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REVIEW OF METAL LITERATURE

An Annotated Survey of Articles, Technical Papers and Reports Appearing in Engineering, Scientific and Industrial Journals and Books, Here and Abroad, Prepared at the Center for Documentation and Communication Research, Western Reserve University, Cleveland, Ohio.

Volume 18
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PREFACE

The A.S.M. Review of Metal Literature is published monthly by the American Society for Metals. The present volume is a collation of the issues from January through December 1961. It is the eighteenth volume in a series that began in 1944.

In most instances, the annotations are not intended to serve as a substitute for a reading of the articles listed. They are brief abstracts designed to indicate the scope and content of the article so that the reader may determine whether it is something he wants to read in its entirety. In other words, they are indicative rather than informative abstracts.

The table of contents lists the main headings into which the A.S.M. Review of Metal Literature is subdivided, together with secondary subdivisions indicating the scope of the main heading. The main sections are designated by capital letters, and individual annotations are identified by the appropriate capital letter preceded by a serial number.

The method of classifying the annotations into subject subdivisions is based upon the "ASM-SLA Metallurgical Literature Classification, International (Second) Edition," published by the American Society for Metals in 1958. Each annotation is likewise followed by code symbols which refer to the subdivisions and schedules of the ASM-SLA Classification.

An understanding of this coding system, however, is not essential to the use of this volume of the Review of Metal Literature, which is accompanied by a complete subject index starting on page 1405. Since the annotations are classified primarily by processes and properties, the subject index has been prepared with the emphasis primarily on materials. Subheads are included in sufficient detail to permit the location of articles on any specific subject related to the metal industry. Indexing is based on the content of the article and not merely on the title.

In using the book, if the primary interest is in the broad field of corrosion, or foundry practice, or heat treatment, turn immediately to the respective section as given in the table of contents. If the main interest is in aluminum alloys, or copper, or cast iron, turn to the corresponding heading in the subject index. If interest lies in specific aspects of foundry practices, or a particular type of heat treatment, these broad processes will be found indexed and subdivided in the subject index. An author index is also provided and a list of addresses of the journals and periodicals from which the literature references are taken.

The annotations have been prepared by technical abstractors and translators under the direction of Alan M. Rees, Abstracts Editor and Manager, Acquisitions and Analysis Department, Center for Documentation and Communication Research of Western Reserve University.

Marjorie R. Hyslop
Editor

March, 1962

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GENERAL METALLURGICAL

1-A. Progress in Stainless and Heat-Resisting Steels. J. Lomas. Engineering and Boiler House Review, v. 75, Oct. 1960, p. 326-328.

Applications of stainless steel powders and tubing. Mechanical properties and corrosion resistance of austenitic stainless steels. (A-general; SS)

2-A. Refractory Metals a la Detroit. Journal of Metals, v. 12, Nov. 1960, p. 871-872.

A symposium on phase equilibria, physical and mechanical properties and oxidation resistance of refractory metals at high temperatures. Fabricating and processing. Use of protective coatings on the metals at high temperatures. (A-general; EG-d37)

3-A. Minor Metals. Charles T. Baroch, Donald E. Eilertsen, Frank L. Fisher, James Paone, H. Austin Tucker and F. W. Wessel. U. S. Bureau of Mines Minerals Yearbook, Preprint, 1959, 18 p.

Sources, production and consumption of Ce, Rb, Ga, Ge, In, Ra, Re, Sc, Se, Si, Tl, Th and Yt. Ore refining and recovery of metal from scrap. 52 ref. (A4; Ce, Ga, Ge, In, Ra, Rb, Re, Sc, Se, Si, Th, Tl, Yt)

4-A. Astroloy--A Superalloy for 1900° F. Use. J. F. Barker, W. H. Couts, Jr., and R. J. Morris. Metal Progress, v. 78, Dec. 1960, p. 94-97.

This latest addition to the ranks of Ni-base superalloys contains 4.50% Al, 3.5% Ti and 0.03% B. It has excellent yield strength and stress-to-rupture properties and can be readily shaped and welded while in the annealed condition. (A-general, Q-general, G-general; Ni-b, SGA-h)

5-A. Information Searching. Metal Progress, v. 78, Dec. 1960, p. 168, 170, 172.

Typical questions currently being searched by electronic retrieval equipment as part of the ASM Metals Documentation Service. Machine searching results are compared with conventional searches made through the indexes of several abstracting services. Lower costs, increased speed and greater completeness are seen as the main advantages over traditional library methods. (A14e)

6-A. "S" Inconel (Corrosion Resisting Casting Alloy). Alloy Digest, Ni-63, Dec. 1960, 2 p.

Nonmagnetic, high corrosion and heat resistant Ni-base alloy. It has an excellent combination of high strength, resistance to ordinary forms of corrosion, good heat resistance and freedom from aging or stress corrosion. It is a structurally stable alloy and does not lose its toughness or ductility due to internal structural changes even after long exposure to high temperatures. (A-general, Q-general; Ni-b, SGA-g)

7-A. Carpenter Stainless No. 12 (Cold Heading Stainless Steel). Alloy Digest, SS-111, Dec. 1960, 2 p.

Austenitic Cr-Ni alloy steel that work hardens very slowly. This steel work hardens more slowly than conventional 18-8 stainless steel and remains nonmagnetic after severe cold forming operations. (A-general, G10, 1-67; SS)

8-A. Birmal P. 83 (Die Casting Alloy). Alloy Digest, Al-98, Dec. 1960, 2 p.

Alloy has good casting characteristics and mechanical properties.

Because this alloy contains both Cu and Si it has better machining characteristics than the Al-Si alloys. Its resistance to corrosion is better than the Al-Cu alloys but is not as good as the Al-Si alloys. (A-general, E13, G17k; Al-b, Cu, Si)

9-A. Crucible B-120VCA (All Beta Titanium Alloy). Alloy Digest, Ti-28, Dec. 1960, 2 p.

Although requiring higher work forces to move, this alloy is more ameanable to cold forming than any other Ti alloy of comparable strength level. It also has good cold heading properties. It responds to age hardening and is designed to be stable for at least 1500 hr. under stress up to temperatures of 550° F. and to substantially higher temperatures for shorter times. (A-general, Q-general, 2-62; Ti-b)

10-A. Allegheny Metal 355 (Heat Treatable Stainless Steel). Alloy Digest, SS-112, Dec. 1960, 2 p.

Precipitation hardening stainless steel which maintains high strength from room temperature up to 1000° F. It has excellent corrosion resistance, is easy to fabricate and has low temperature hardening heat treatment. It depends on martensitic transformation to achieve its strength. (A-general, J-general, Q-general; SS)

11-A. AISI 6145 (Chromium-Vanadium Steel). Alloy Digest, SA-107, Dec. 1960, 2 p.

A tough, shock resisting, shallow-hardening Cr-V steel. It has high fatigue and impact resistance in the heat treated condition. It is adaptable for highly stressed heavy machinery parts which are heat treated after machining. (A-general, Q-general; AY)

12-A. Stentor (Non-Deforming Tool Steel, Type 02). Alloy Digest, TS-100, Dec. 1960, 2 p.

A deep hardening Mn toolsteel. It is oil hardening and nondeforming. The best combination of hardness and toughness is secured by drawing at 375-400° F. The low hardening temperature insures minimum distortion after heat treatment as well as less danger of cracking. The hardened alloy has good wear resistance and toughness. (A-general, Q-general; TS)

13-A. Leaded Naval Brass-605 (Free-Cutting Brass). Alloy Digest, Cu-94, Dec. 1960, 2 p.

A Cu-Zn alloy having relatively high strength, toughness and corrosion resistance. It has higher corrosion resistance than free-cutting brass, although it is not equal to leaded commercial bronze or TeCu. (A-general, Q-general; Cu-n)

14-A. (German.) Geology of the Iron Ore Deposit of Staffhorst-Schwaforden. Hans Gruss. Stahl und Eisen, v. 80, Oct. 27, 1960, p. 1449-1452.

Geological analysis of a recently found iron ore deposit (38% Fe, 7% SiO_2, 5% CaO, 21% CO_2) in terms of geologic-tectonical pattern, structural history of the cap-rock, stratigraphy of the ore-bed, mineralogical and chemical analysis, genesis of the ores, temperature conditions and ore reserves. 9 ref. (A4n; RM-n, Fe)

15-A. China's Mineral Wealth and Metal Production. K. P. Wang. Journal of Metals, v. 12, Dec. 1960, p. 945-951.

Survey of mineral resources including coal, iron, steel, Mn, W, Mo, Cu, Sn, Pb, Zn, Hg, Bi and Sb. Present and future status of less known mineral products, production, mineral output value and reserves. (A4)

16-A. Recent Metallurgical Developments for Tin. J. B. Long. Journal of Metals, v. 12, Dec. 1960, p. 964.

Mechanical and physical properties of Sn alloys and applications of these alloys. Review of Sn uses as an alloying element. (A-general, P-general, Q-general; Sn-b)

17-A. (French-German.) Copper-Silicon-Manganese Bronzes. A. Meyer. Pro-Metal, v. 13, Oct. 1960, p. 382-388.

Structure, melting point, liquidus and solidus temperature, density, thermal expansion and conductivity, electrical resistivity and specific heat of Si-Mn-bronzes containing 2-3% Si and approximately 1% Mn. Fabrication techniques, including forging at 700-875° C and oxy-acetylene welding, welding with coal electrode and protective gas arc welding. (A-general, F22, K-general, P-general; Cu-s, Si, Mn)

18-A. Columbium at Powderhorn, Colorado. Robert M. Grogan. Mines Magazine, v. 50, Sept. 1960, p. 15-16, 27.

Occurrence of Cb at Powderhorn, Colo. principally as the calcium columbium oxide mineral, pyrochlore, in a large carbonatite plug composed mainly of dolomitic marble and containing 0.25% Cb_2O_5. Comparison of deposit's Cb content with world sources. (A11a; Cb)

19-A. (Czech.) Hafnium. Karel Vetejska. Chemicke Listy, v. 54, no. 11, 1960, p. 1123-1132.

Literature review of preparation methods. Data for properties, including atomic weight, density, melting point, boiling point, chemical properties and corrosion by acids and salts. 50 ref. (A-general, P-general, R6; Hf)

20-A. Niobium, Tantalum, Molybdenum and Tungsten. Metal Industry, v. 97, Oct. 28, 1960, p. 359-361.

Proceedings of the University of Sheffield Refractory Metals Conference. Topics include melting, sintering, working, structure, mechanical and physical properties, oxidation and corrosion protection. (A-general, Cb, Mo, Ta, W)

21-A. (Pamphlet.) Super Hardtem-Heppenstal 1 Grade 3C40. Data Sheet no. 9, 1960, 2 p. Heppenstall Co., Pittsburgh, Pa.

Balanced chemical composition selected to provide a strong shock resistant steel for use as insert holder dies for very large presses for the fabrication of large airframe structures. It is also recommended for use as large press dies where the severity of the application precludes the use of Hardtem. (A-general, Q-general; TS)

22-A. (Book.) Advances in X-Ray Analysis, v. 2. William M. Mueller, Editor. 359 p. 1960. Plenum Press, Inc., 227 W. 17th St., New York 11, N. Y.

Proceedings of the seventh annual conference on application of X-ray analysis held Aug. 13-15, 1958 by the Research Institute at the University of Denver. Topics include X-ray diffraction, spectroscopy, microradiography and microscopy techniques and equipment used in analyses of metals, alloys and ore samples. Papers are abstracted separately. (A-general, S11p, M21, M22g)

23-A. (Book.) Advances in X-Ray Analysis, v. 3. William M. Mueller, Editor. 376 p. 1960. Plenum Press, Inc., 227 W. 17th St., New York 11, N. Y.

Proceedings of the eighth annual conference on applications of X-ray analysis held Aug. 12-14, 1959 by the Research Institute of the University of Denver. Topics include X-ray absorption fluorescence, diffraction and instrumentation in the analysis of metals, alloys and compounds. Papers are abstracted separately. (A-general, M22, S11p)

24-A. (Pamphlet.) Tradenames "Thermotem-10" and "Thermoneal-10" Heppenstall Grade R718. Data Sheet No. 4, 4 p., Heppenstall Co., Pittsburgh, Pa.

Chemical composition, tensile properties at elevated temperatures and hardness of a 5% Cr toolsteel. Methods of forging, annealing, hardening, tempering and surface protection. (A-general, 2-62; TS)

25-A. (Pamphlet.) Tradenames "Thermotem-12" and "Thermoneal-12" Heppenstall Grade T721. Data Sheet No. 6, 4 p., Heppenstall Co., Pittsburgh, Pa.

Chemical composition, tensile properties at elevated temperature and hardness of a 5% Cr hot work and toolsteel containing tungsten. Recommendations for forging, annealing, hardening, tempering and surface protection. (A-general, 2-62; TS)

26-A. (Pamphlet.) Tradenames "Thermotem-11" and "Thermoneal-11" Heppenstall Grade H722. Data Sheet No. 5, 4 p., Heppenstall Co., Pittsburgh, Pa.

Chemical composition, tensile properties at elevated temperatures and hardness of a 5% Cr hot work toolsteel containing V. Methods for forging, annealing, hardening, tempering and surface protection of the steel. (A-general, 2-62; TS)

27-A. (Spanish.) Light Metals for Industry: Aluminum. D. Iturrioz. Metalurgia y Electricidad, v. 24, Sept. 1960, p. 108-115.

Historical notes on Al metallurgy, development of Al alloys and expansion of production throughout the world. (A-general; Al)

28-A. New Toolsteel Gives Long Life. Iron Age, v. 186, Dec. 15, 1960, p. 108-109.

Rex 49 contains 1.10% C, 4.25% Cr, 6.75% W, 3.75% Mo, 2.0% V and 5.00% Co. This steel can be heat treated to Rc 67-69. It outperforms other high speed steels and increases tool life two to four times. (A-general; TS)

29-A. Titanium--Titan of the Metals. William Smallwood. Cornell Engineer, v. 26, Nov. 1960, p. 23-29.

Various oxides of Ti are converted to the tetrachloride and then reduced by molten Mg or Na to give a Ti sponge. Data are given for crystal structure, fabrication and processing characteristics and physical and mechanical properties. 15 ref. (A-general, C26, M26, P-general, Q-general; Ti, 6-74)

30-A. Nialite (Aluminum Bronze). Alloy Digest, Cu-96, Jan. 1961, 2 p.

A cast and heat treatable Al-Ni bronze having high strength, slack and corrosion resistance. Data are given for physical and mechanical properties, corrosion resistance and weldability. (A-general, P-general, Q-general; Cu-s, Al, Ni)

31-A. Stainless Steels and Other Ferrous Alloys. W. A. Luce and J. H. Peacock. I/EC (Industrial and Engineering Chemistry), v. 52, Oct. 1960, p. 881-885.

A literature review on various stainless steels and stainless alloys, their physical and mechanical properties and methods of manufacture, metalworking and surface treatment. Advances cited for stainless steel 304, AM 350, AM 355, AISI 201, 202, 304, 17-7 pH alloy and Unitemp 212. 56 ref. (A-general; SS)

32-A. Firthite FS-26 (High Temperature Cermet). Alloy Digest, Ti-29, Jan. 1961, 2 p.

Sintered titanium carbide cermet combining thermal shock resistance and ductility of metals with high temperature strength, oxidation resistance and hardness of ceramic refractory carbides. Mechanical and physical properties with emphasis on stress rupture. (A-general, P-general, Q-general; Ti-b, 6-70)

33-A. Lead, Its Alloy and Compounds. Edward J. Mullarkey. I/EC (Industrial and Engineering Chemistry), v. 53, Jan. 1961, p. 82-86.

Metallurgy; use in steelmaking; powders; shielding; bearings; optics; liquid metals; thermoelectricity; superconductivity; acoustics; corrosion; porcelain enameled Mg. 76 ref. (A-general; Pb 17-57)

34-A. (German.) Processing of Sulphuric Pickling Plant Wastes. Kurt Mathesius. Neue Hutte, v. 5, Nov. 1960, p. 641-646.

Physical and chemical processes for reconditioning of wastes including methods for recovery of $FeSO_4 \cdot 7H_2O$ by distillation, recovery of pure iron oxide by NaOH in the Reker process and neutralization of pickling sewage by CaO or MgO. (A8)

35-A. (German.) Investigation on a Sulphate Recovery Plant in a Wire Mill. Werner Funke. Neue Hutte, v. 5, Nov. 1960, p. 646-652.

Process and machinery for recovery of $FeSO_4$ from rolled and process-annealed wire pickling wastes by precipitation in cold stirring crystallizers. Data are given for solubility of $FeSO_4$ in solutions containing 0-540 g. H_2SO_4 per liter and in pickling wastes. (A8)

36-A. The Changing Iron Ore Industry. Robert M. Lloyd. Paper presented at Pittsburgh Regional Technical Meeting, American Iron and Steel Institute, Nov. 16, 1960, 19 p.

Survey of world ore production and consumption, major producing centers, resources, imports and exports. (A11; Fe)

37-A. Investigation of Bessemer Converter Smoke Control. A. R. Orban, J. D. Hummell and R. B. Engdahl. Metallurgical Society of AIME, Transactions, v. 218, Dec. 1960, p. 1039-1049.

Research program on smoke abatement sponsored by the American Iron and Steel Institute using a 300 lb. experimental Bessemer converter to simulate blowing conditions in a commercial vessel, with sampling and particle removal by a variety of techniques. Measurements of smoke and dust are also made in the field on a 30 ton commercial converter. 21 ref. (A8a, D3, 1-54)

38-A. Carpenter H-46 (Heat Resisting Steel). Alloy Digest, SS-113, Jan. 1961, 2 p.

Modified 12% Cr stainless steel designed primarily for high strength applications in the 900-1200° F. range.

Creep resisting properties of the alloy compare favorably with those of several of the lower grades of austenitic heat resisting steels in the 1000-1200° F. range. (A-general, Q-general, 2-62; SS, SGA-h, SGB-a)

39-A. Vascojet 1000-5 Temper (Ultra High-Strength, Heat-Resistant Steel). Alloy Digest, SA-109, Jan. 1961, 2 p.

Steel designed for applications requiring between 300,000 and 325,000 psi. ultimate tensile strength and 260,000-270,000 psi. yield strength, with good fatigue and impact properties. High strengths are retained, with a completely stable structure, to operating temperatures of 900-1000° F. (A-general, Q-general, 2-62; AY, SGA-h, SGB-a)

40-A. (Book.) Nonferrous Scrap Metal Guidebook. Michael Suisman and Howard M. Rasher, Editors. 135 p. 1960. National Association of Secondary Material Industries, 271 Madison Ave., New York 16, N. Y.

Refinining and alloying of Al, Cu scrap, brass mill scrap, brass and bronze ingot makers scrap, Pb, Mg, special alloys, stainless steel and Zn. World markets, commodity trading, business law and contractual relations and metal statistics. 91 ref. (A8d, B23; EG-a38)

41-A. (Book.) The Metallurgy of Hafnium. D. E. Thomas and E. T. Hayes, Editors. 384 p. May 1960. Naval Reactors, Div. of Reactor Development, U. S. Atomic Energy Commission. (Available from U. S. Government Printing Office, Washington, D. C.) $1.50.

Extraction of Hf from ores, reduction processes, refining, melting, fabrication and shaping. Phase diagrams for several Hf alloy systems together with physical and mechanical properties. (A-general, C-general, M24; Hf)

42-A. (Book.) Oxide Ceramics--Physical Chemistry and Technology. Eugene Ryshkewitch. 472 p. 1960. Academic Press Inc., 111 5th Ave., New York 3, N. Y. $16.

Occurrence, thermal and chemical characteristics, microstructure and phase relationships for alumina, spinel, magnesia, beryllia, zirconia, zirconium silicate, thoria and ceria. (A-general, P-general, M27, M24; 6-70)

43-A. (Book.) Industrial Electric Furnaces and Appliances, 2nd Edition. V. Paschkis and John Persson. 607 p. 1960. Interscience Publishers, Inc., 250 5th Ave., New York 1, N. Y. $24.

Design of and quantitative data for arc, submerged arc, resistance and direct heat furnaces. Mechanisms of heat transfer and induction and dielectric heating. Selection of furnaces. (A-general, W17j, W18s, 1-52)

44-A. (Book-Translation.) The Practical Anodising of Aluminum. Walter W. E. Hubner and A. Schiltknecht. Macdonald & Evans, Ltd., 8 John St., London W. C. I., England. 1960, 334 p. (Translated from the German by Winifred Lewis.)

Design and choice of materials, plant design, mechanical and chemical pretreatment of workpieces; methods of anodizing, brightening, coloring, sealing and mechanical after treatment. (A-general, L19; Al)

45-A. (Book.) An Introduction to Transition-Metal Chemistry--Ligand Field Theory. Leslie E. Orgel. 180 p. 1960. Methuen & Co. Ltd., London. $4.50.

Orbitals and energies, ionic radii, stability, energy level diagrams and spectra, reaction mechanisms and rates, valences and bonding mechanisms in transition metal compounds. (A-general, M25)

46-A. (Book.) Metal Finishing Guidebook-Directory 29th Annual Edition. 756 p. 1961. Metals and Plastics Publications, Inc., 381 Broadway, Westwood, N. J.

Finishing plant engineering, mechanical and chemical surface preparation, plating procedures, organic finishing and control, analysis and test methods. (A-general, L-general)

47-A. (Book-Translation.) Silicon and Its Binary Systems. A. S. Berezhnoi. 275 p. 1960. Consultants Bureau Enterprises, Inc., 227 W. 17th St., New York 11, N. Y. (Translated from the Russian.)

Physical properties of Si binary and ternary alloy systems and compositions of phases formed. Data for crystal lattice parameters and phase stability. 716 ref. (A-general, M24b, M24c, M26; Si-b)

48-A. (French.) Evolution and Recent Developments in Extractive Metallurgy. J.

De Cuyper. Revue des Questions Scientifiques, Oct. 20, 1960, p. 522-546.

Wet and dry methods of extraction and refining of conventional ferrous and nonferrous metals. Applications of new or rare metals and refractory alloys in electronics, nuclear energy, aircraft and missiles; special techniques used for production. (A-general)

49-A. International Figures in the History of the Man-Made Metal Plutonium. Arthur S. Coffinberry. Metal Progress, v. 79, Jan. 1961, p. 84-88.

An outline of work done in various laboratories in the United States, Canada, England, France and Russia, giving credit to the principal scientists and metallurgists. (A-general, A2; Pu)

50-A. Centenary of the German Metallurgical Society. Kurt Thomas. Metal Progress, v. 79, Jan. 1961, p. 103-106.

Although it has a comparatively small membership, Verein Deutscher Eisenhuttenleute is extraordinarily active in German educational and standardization activities and through its publications, 30% of which circulate abroad, has had unusually large influence on the international scene. (A12g, A2; Fe, ST)

51-A. Metallurgical Progress in Canada. Harold J. Roast. Metal Progress, v. 79, Jan. 1961, p. 117-120, 150, 152, 154, 158.

Information from more than a score of laboratories and research departments, industrial, educational and governmental, indicates vigorous advances in all branches of metallurgy, from ore beneficiation to production of dislocations in whiskers and from steel manufacture to atomic energy. (A-general)

52-A. (German.) Magnesium Metallurgy in Great Britain. Solution of Processing Problems. Christopher Smith. Zeitschrift fur Metallkunde, v. 51, Dec. 1960, p. 677-680.

Processing problems and details in hot roughing, rolling into sheet, straightening, pressing, extrusion and forging of common and new Mg alloys with Zr, Th and Be additions. Chemical and mechanical properties of Mg alloys. (A-general, F-general, G-general, Q-general; Mg-b, Be, Th, Zr)

53-A. (German.) Rhenium. Technica, v. 9, Nov. 1960, p. 1428.

Production of rhenium by reduction of ReS_2 or NH_4ReO_4 at 1000° C. by hydrogen. Powder metallurgical, catalytic, physical, chemical and mechanical properties. Use in electronics and in high-temperature thermocouples. (A-general, H-general, P-general, Q-general; Re, 17-57)

54-A. (German.) Steels for Plastics Industry. Technica, v. 9, Nov. 4, 1960, p. 1451-1455.

Composition, mechanical, chemical and other properties including machinability and hardenability of alloyed and unalloyed special steels such as through-hardening, nitriding and case-hardening steels; corrosion and compression resistant steels; and steels which undergo little dimensional change during heat treatment. (A-general, J-general, Q-general, T29s; ST, 17-57)

55-A. A Stainless Steel for Standard Weights. S. J. Rosenberg and T. P. Roysston. Materials Research and Standards, v. 1, Jan. 1961, p. 21-22.

Development of an austenitic stainless steel to meet requirements for use as a mass standard, the alloy being corrosion resistant, nonmagnetic and having a density of 8.4 g. per cc. Methods of fabrication and heat treatment to produce standard weights. (A-general, F-general, P-general, X20; SS-e, 17-57)

56-A. Refractory Metals. L. F. Yntema and Allan L. Percy. Midwest Engineer, v. 13, Dec. 1960, p. 8-11.

Historical review of the technology and applications of Ta, W, Mo and Cb. Data are given for physical and mechanical properties. (A-general, P-general, Q-general, 10-54; Cb, Mo, Ta, W, 17-57)

57-A. How Brass Mill Controls Wastes. W. M. Rumberger. Power Engineering, v. 64, Dec. 1960, p. 68-69.

Treatment of effluent from plants which contains Cu, Zn and hexavalent and trivalent Cr from pickling and cleaning operations includes reduction by SO_2 in an equalization tank, neutralization by lime slurry and precipitation of metals as hydroxides. (A8, C26, C27; Cr, Cu, Zn)

58-A. Latrobe C. L. W. Alloy Digest, TS-101, Jan. 1961, 2 p.

Development of a low carbon, medium tungsten hot work steel which will maintain its properties up to a dull red heat. Methods of annealing, hardening, tempering and machining. Physical and mechanical properties. (A-general, J-general, Q-general; TS)

59-A. Gilding Brass, 95%. Alloy Digest, Cu-96, Jan. 1961, 2 p.

Development of a corrosion resistant Cu alloy containing 5% Zn which is readily formed and has higher strength than Cu. Data are given for machinability, weldability, corrosion resistance and physical and mechanical properties. (A-general, R-general, G17k, K9s; Cu-b, Zn)

60-A. Titanite. Alloy Digest, Al-99, Jan. 1961, 2 p.

Development of a high strength, natural aging Al casting alloy requiring no heat treatment to develop high strength and shock resistance. Data are given for composition, physical and mechanical properties, castability and machinability. (A-general, P-general, Q-general, G17k; Al-b)

61-A. U.S.S. Carilloy 2 1/4 Cr-1 Mo. Alloy Digest, Al-99, Jan. 1961, 2 p.

Development of a low alloy, oxidation and corrosion resistant steel suitable for use at 900-1100° F. Mechanical and physical properties, workability, weldability and machinability. (A-general, R-general, G17k, K9s, Q23q; AY)

62-A. (German.) Evolution of Metallurgical Processes and Operating Practices. Friedrich A. Springorum. Stahl und Eisen, v. 80, Dec. 8, 1960, p. 1838-1849.

Development of acid and basic Bessemer and openhearth furnace steel melting processes from puddle process in 1860 to present state. Pig iron production in the blast furnace as affected by invention of slag-tuyere and cowper, resulting in rise in capacity from 25 tons per day in 1860 to modern 2000 tons per day. Recent developments in production of steel by oxygen refining and vacuum degassing. (A2, D-general)

63-A. (German.) History of Steel Shaping. Willy Ochel. Stahl und Eisen, v. 80, Dec. 8, 1960, p. 1852-1863.

Art of shaping by hammering and forging before invention of puddle process. Development of shaping by rolling as influenced by production of ingot steel by Bessemer and openhearth processes, evolution of rolling techniques and equipment for hot and cold rolling and development of processing techniques for rolled products. (A2, F23; ST)

64-A. (German.) Steel in Engineering Development During the Past Hundred Years. Hans Kallen. Stahl und Eisen, v. 80, Dec. 8, 1960, p. 1864-1877.

Development of heat treating, stainless, high-pressure and high-temperature resistant, high-speed and transformer steels and permanent magnet alloys as influenced by chemical, mechanical and nondestructive testing methods; processing (e.g., welding) methods and by experiences and needs of steel consumers in civil engineering, plant construction and chemical engineering. (A2, S-general; ST)

65-A. (Russian.) Low Alloy Steel With Vanadium for Railway Car Building and Construction. M. S. Mikhalev and M. I. Gol'dshtein. Stal', Nov. 1960, p. 1026-1029.

Experimental meltings of newly developed 15 GF Mn-V steel with 0.08-0.09% V. Study of microstructure, tendency of steel to aging and kinetics of austenite decomposition at various cooling rates. Steel exhibits satisfactory mechanical properties, workability, weldability and economical advantages for railway car applications. 11 ref. (A-general, M27, N-general, Q-general, T23p, 2-60; ST, V, 17-57)

66-A. Apex 39-11 (Aluminum Die Casting Alloy). Alloy Digest, Al-100, Feb. 1961, 2 p.

Alloy has excellent castability and the highest strength of the Al-Si-Cu group of die casting alloys, both at room and elevated temperatures. Machining characteristics are better than those of the Al-Si alloy. (A-general; Al-b)

67-A. Altemp-V36. (High Temperature Alloy). Alloy Digest, Co-25, Feb. 1961, 2 p.

A version of S-816 alloy but with better oxidation and corrosion resistance. In sheets, it also has higher

rupture and creep strength. It is designed for service in the range of 1200-1500° F. where high strength and corrosion resistance are required, and at higher temperatures for lower stress applications. (A-general; Co-b, SGA-h)

68-A. UHB-Orvar (Hot Work Toolsteel, Type H13). Alloy Digest, TS 102, Feb. 1961, 2 p.

Die casting die steel and a general hot work steel. It has the ability to harden satisfactorily in air, minimum tendency to scale on air cooling from the hardening temperature, high resistance to heat checking when repeatedly heated and cooled, high resistance to the washing and erosive action of the die casting alloy. (A-general; TS)

69-A. Durehete 1050 (High Temperature Bolting Steel). Alloy Digest, SA-111, Feb. 1961, 2 p.

A low carbon, Cr-Mo-V steel recommended for high temperature bolts and fasteners. It has a high level of structural stability and possesses a high resistance to creep and stress relaxation behavior. (A-general; CN-g)

70-A. AISI 4337 (Nickel-Molybdenum-Chromium Alloy Steel). Alloy Digest, SA-110, Feb. 1961, 2 p.

A tough, shock resisting, oil hardening alloy steel. In the heat treated condition it has high fatigue and tensile strength along with good ductility. (A-general; AY)

71-A. AISI Type 316 (Corrosion Resisting Steel). Alloy Digest, SS-114, Feb. 1961, 2 p.

A Mo-containing modification of the standard 18-12 stainless steel. Mo tends to increase the general corrosion resistance, decreases intergranular corrosion caused by carbide precipitation at certain elevated temperatures and tends to increase strength at elevated temperatures. (A-general; SS)

72-A. Mallory 28. Alloy Digest, Cu-97, Feb. 1961, 2 p.

Cu base alloy has exceptionally high electrical and thermal conductivity coupled with reasonably hard strength and hardness. (A-general; Cu-b)

73-A. Magnesium-AM-1000A (Casting Alloy). Alloy Digest, Mg-49, Feb. 1961, 2 p.

Alloy responds to an age hardening heat treatment producing high tensile properties and good fatigue strength. It is suited for parts which must withstand repeated stresses. (A-general, Mg-b)

74-A. Beryllium Described as True Space Age Metal. A. Townhill. Metals Review, v. 34, Jan. 1961, p. 22-23.

Processing of Be from BeO by thermal reduction of BeF_2 or electrolysis of fused salts. Mechanical and chemical properties, applications in space vehicles and nuclear reactors. Powder metallurgy techniques for production of Be forms. (A-general, C23, C26, H-general, Q-general; Be)

75-A. Growth of the Iron-Ore and Manganese Base of the Steel Industry of the USSR. P. Ya. Antropov. Paper from "Contemporary Problems of Metallurgy". Consultants Bureau, Inc., New York, 1960, p. 15-28.

Survey of Fe and Mn ore sources and reserves, including magnetite, hematite, limonite, martite, siderite, ankerite, titanomagnetite, Braunite, psilomelane and manganosilicate, with attention to composition, grade facility of mining and utilization with or without beneficiation. Some mining, ore dressing and reduction processes are given, with data for pig iron production. (A4n, A11a, B-general; Fe, Mn)

76-A. Chemistry of Titanium. I. I. Kornilov. Paper from "Contemporary Problems of Metallurgy". Consultants Bureau, Inc., New York, 1960, p. 484-490.

All of the elements of the periodic table are classified into four groups according to chemical interaction with Ti, in terms of solubility ionic or covalent bondings and formation of metallic solid solution and intermetallic compounds. Physical and mechanical properties of Ti are given with phase diagrams of quaternary, ternary and binary alloys. 13 ref. (A-general, M-general, P-general, Q-general; Ti)

77-A. (Pamphlet.) Tenzaloy. Bulletin no. 103R5, Federated Metals Div., American Smelting and Refining Co., 120 Broadway, New York 5, N. Y., 1960, 7 p.

Mechanical and physical properties of Tenzaloy, a high-strength Al casting alloy (7.5% Zn, 0.6% Cu, 0.4% Mg) which can be aged at 20° C. Casting, welding, brazing and finishing methods. (A-general, Q-general, P-general; Al-b, 5)

78-A. (Book.) Metalsmithing for the Artist-Craftsman. Richard Thomas. 173 p. 1960. Chilton Co., New York, N. Y. $7.50.

Review of casting, forming, joining and surface treatment techniques as metalsmithing processes. (A-general, G-general, K-general)

79-A. (Book.) X-Ray Spectrochemical Analysis. L. S. Birks. 137 p. 1959. Interscience Publishers, Inc., 250 5th Ave., New York 1, N. Y.

Production of X-rays and their interaction with crystals. Theory, operating conditions and methods for excitation of the X-ray spectra of metals, alloys, ceramics, glass, minerals and ores. Design of X-ray detectors such as Geiger counters and scintillation counters. (A-general, S11p)

80-A. (Book.) Extrusion of Metals. Claude E. Pearson and Redvers N. Parkins. 329 p. 1960. John Wiley & Sons, Inc., 440 4th Ave., New York, N. Y.

A review of the properties of metals and their alloys as applied to their extrusion by hydraulic, mechanical and pneumatic equipment under cold and hot conditions. Effect of flow, speed, pressure and friction on the behavior of metals during extrusion and the properties of the finished product. Papers are abstracted separately. (A-general, F24, G5)

81-A. (Book-Translation.) Contemporary Problems of Metallurgy. A. M. Samanin, Editor. 530 p. 1960. Consultants Bureau, Inc., 227 W. 17th St., New York 11, N. Y. $16.

Translation of 45 papers published by the Academy of Sciences of the USSR. Topics include ore sources and ore preparation, iron and steel metallurgy, nonferrous metallurgy; sheet and ingot rolling; and structures, transformations and physical and mechanical properties of ferrous and nonferrous alloys. Emphasis is on improvement of thermochemical and thermodynamic parameters and technical and economic indexes, with related equipment, of iron and steelmaking. Papers abstracted separately. (A-general)

82-A. (Book.) The Determination of Gases in Metals. 308 p. 1960. Iron and Steel Institute, 4 Grosvenor Gardens, London S. W. I., England. $8.80.

Report of a symposium organized by the Society for Analytical Chemistry, in conjunction with the Iron and Steel Institute and the Institute of Metals. Sampling of liquid metals. Determination of gases by micro vacuum fusion techniques, an isotope dilution method and activation analysis. Techniques for analysis of Fe, steel, cast iron, Be and other metals. Papers abstracted separately. (A-general, S11r; Be, CI, Fe, ST)

83-A. (Book-Translation.) Ultrasonics and Its Industrial Application. O. I. Babikov. 1960, 224 p. Consultants Bureau, Inc., 227 W. 17th St., New York 11, N. Y.

Characteristics of ultrasonic vibrations and their use in industries producing steel, Al, Cu, Ag, Zn, Pt and other metals, as well as gypsum, graphite, rubber, plastic, glass and porcelain. Applications of ultrasonics in the measurement of physical and metallurgical properties, flaw detection, drilling, cutting, polishing, soldering, plating, pulverizing and cleaning: 202 ref. (A-general, 1-74)

84-A. (Book.) Carbon Steel Sheets. American Iron and Steel Institute, Steel Products Manual, 1960, 112 p. AISI, 150 E. 42nd St., New York 17, N. Y.

Rolling and heat treating methods for producing uncoated sheets. Preparation and inspection of galvanized, electrolytic Zn and Sn coated and Al coated sheets. Applications in formed roofing and siding sheets. Mechanical properties. (A-general, Q-general, L-general; CN, Al, Sn, Zn, 4-53)

85-A. (Book-German.) 100 Jahre Verein Deutscher Eisenhuttenleute--1860-1960. 1960, 104 p. Verlag Stahleisen mbH., Dusseldorf, Germany.

Anniversary publication with papers on historical and technological evolution of metallurgical processes in iron and steel production: iron and steel melting in blast furnace, acid and basic Bessemer converter, openhearth furnace;

oxygen refining; processing of steel by casting and working; improvement of steel quality by new testing methods and special melting techniques (e.g., vacuum metallurgy); role of raw materials and fuels. (A-general, D-general)

86-A. (Book-Translation.) The Practical Anodizing of Aluminium. Walter W. E. Hubner and A. Schiltknecht. 320 p. 1960. Macdonald & Evans, 8 John St., London, W. C. I., England. $7.50.

Flow-sheet of the anodizing processes including mechanical and chemical pretreatment, brightening, anodic oxidation, sealing and after-treatment. Design and choice of materials. Plant design. (A-general, L19; Al)

87-A. (Book.) Boron--Synthesis, Structure and Properties. J. A. Kohn, W. F. Nye and G. K. Gaule, Editors. 189 p. 1960. Plenum Press, Inc., 227 W. 17th St., New York 11, N. Y. $8.50.

Proceedings of a Conference on Boron sponsored by U. S. Army Signal Research and Development Laboratory, Sept. 1959. Collection of articles on the preparation of high-purity, elemental, crystalline boron and borides. Mechanical and physical properties. Crystallography. (A-general; B)

88-A. (Book.) Production of Wide Steel Strip. Special Report no. 67. May 1960, 187 p. Iron and Steel Institute, 4 Grosvenor Gardens, London, S. W. 1, England.

Oxygen and openhearth steelmaking practices, hot and cold rolling techniques and heat treatments used to produce steel strip. Sn and plastic coating and galvanizing procedures for products. (A-general, D2, D10, F23, J-general, L-general; ST, 4-53)

89-A. Safety in Welding--Proposed Recommendations for Fire Prevention in Usage of Cutting and Welding Processes. Welding Fabrication and Design, v. 4, Jan. 1961, p. 15-17.

Cutting and welding by electric arc and oxy-fuel gas flame using safety precautions which minimize danger of fires. (A7p, G22, K1, K2)

90-A. Practical Steel Plant Research. Karl L. Fetters. Blast Furnace and Steel Plant, v. 49, Feb. 1961, p. 164-170.

Applications of research to problems encountered in steelmaking. (A9m, D-general)

91-A. Physical and Mechanical Properties of Commercial Molybdenum-Base Alloys. Defense Metals Information Center, Battelle Memorial Institute, DMIC Rept. 140, Nov. 30, 1960, 142 p. (Available as PB 151099 from U. S. Office of Technical Services, Washington 25, D. C.)

Compilation of the physical and mechanical properties of Mo and Mo-0.5% Ti, Mo-0.5% Zr, Mo-0.05% Zr, Mo-0.5% Ti-0.08% Zr, Mo-1.25% Ti-0.15% Zr-0.15% C, Mo-50% W and Mo-30% W alloys. Comparison to Ta-10% W, commercially pure tungsten and Fansteel 82 for applications at temperatures above 2000° F. 63 ref. (A-general, P-general, Q-general, 10-54; Mo-b, 17-57)

92-A. (Book-Translation.) Rare Earth Elements. D. I. Ryabchikov, Editor. 1959. 356 p. Academy of Sciences, USSR, Moscow.

A collection of 42 papers presented at a conference on rare earth metals. Papers deal with separation techniques, especially ion exchange chromatography and chemical, radiation and spectral methods of analysis. Applications of rare earths in the glass industry, metallurgy and in catalysis. (A-general, C-general, S-genera; EG-g45)

93-A. Recovery of Nickel, Chromium and Water. Electroplating and Metal Finishing, v. 14, Feb. 1961, p. 48-52, 75.

Use of static drag-out tanks, surface active additives, counterflow rinses and ion exchange equipment to recover Ni, Cr and water from drag-out, sludge and spray produced in plating operations. (A8)

94-A. (Italian.) Monel Alloys in the Foundry. Fonderia, v. 9, Dec. 1960, p. 537, 539, 541.

Composition and physical and mechanical properties of normal, H and S-Monel; casting methods and applications; and heat treatment. Data are given for high temperature stability, corrosion and erosion resistance, hardness, machinability and tensile, plastic and thermal properties. (A-general, E-general, P-general, Q-general; Ni-b)

95-A. (Book.) X-Ray Metallography. A. Taylor. 993 p. 1961. John Wiley &

Sons, Inc., 440 Park Avenue South, New York 16, N. Y. $27.

Crystallographic study of metals, alloys, steels and nonmetallic refractory materials to determine crystal structure and orientation, grain size, precipitation hardenability and internal stress. (A-general, M21f, M22g, M26)

96-A. (Italian.) Metallurgical Production: Ordinary and Special Steels. Pt. 4. Classification of Steel. Angelo Bellini. Rivista di Meccanica, v. 11, Nov. 21, 1960, p. 45-48.

Characteristics of nitriding steels and steels for automatic machining operations. Data are given for composition, heat treatment temperatures and mechanical properties. (A-general, P-general, Q-general; ST)

97-A. (German.) Current Status and Developmental Prospects of Special Metals. R. Kieffer. Radex Rundschau, Dec. 1960, p. 365-366.

Metallurgy (melting, reduction, working), thermodynamics (classification of phase diagrams), engineering application (Zr coated fuel elements, Mo and tungsten jets for missiles, Mo electrodes for glass melting furnaces, Ta in condensors) and economics (world production, price) of following transition elements: Cb, Ti, Zr, Ta, Mo and W. (A-general; Cb, Mo, Ta, Ti, W, Zr)

98-A. (German.) Thin Metal Layers. Production, Properties and Application. E. Ritter. Radex Rundschau, Dec. 1960, p. 389-394.

Method and plant for production of very thin metal layers by evaporation in high vacuum (up to 10^{-10} Torr) at elevated temperatures. Factors influencing structure of layers during formation such as reaction with gas phase and diffusion on condensing surface. Physical properties of layers including optical parameters (refraction index and adsorption coefficient) as a function of layer thickness; electrical resistance, magnetic properties. Application in optical and electrical engineering. (A-general, N15g, P-general; 14-62, 17-57)

99-A. (Italian.) Some Nickel-Copper Foundry Alloys. Angelo Azzolini. Fonderia Italiana, v. 9, Nov. 1960, p. 449-456.

Survey of alloys containing 60-65% Ni, 28-32% Cu, 0-3.70% Si, 0.20-1.5% Mn, 0.5-1.5% Fe, 0-3% Al and 0.10-0.20% C with additions of Ti, Zr, Nb or Mg. Methods of melting and casting, mechanical properties, forming and applications. 4 ref. (A-general, E-general, G-general, Q-general; Ni-b, Cu, 17-57)

100-A. (French.) Applications and Future Possibilities of Niobium. L. Habraken. Revue de la Societe Royale Belge des Ingenieurs et des Industriels, Dec. 1960, p. 538-561.

Review of physical and chemical properties of Cb and methods of preparation. Applications as alloying elements in austenitic steel, high-temperature alloys and carbides; future possibilities of application in aviation, missiles and nuclear power plants. 59 ref. (A-general, P-general, Q-general, 10-54; Cb, 17-57)

101-A. Notes on Beryllium. M. Schofield. Mining Magazine, v. 104, Feb. 1961, p. 77-79.

Review of refining and fabricating techniques. Physical and mechanical properties. Applications in nuclear reactor components. (A-general, P-general, Q-general; Be)

102-A. (Italian.) Spheroid Graphite Castings in Equipment for Transportation of Liquids. K. H. Kirgin. Nickel, Aug. 1960, p. 1-13.

Metallurgy, foundry practice and heat treatment of spheroid graphite cast iron. Resistance of spheroid graphite cast iron to thermal and mechanical shock. Corrosion and high-temperature resistance, pressure tightness and welding properties. (A-general, E-general, Q-general, R-general; CI-r)

103-A. (Book.) Short Course on Process Industry Corrosion, Proceedings. V. D. Miller, Editor. 448 p. 1960. National Association of Corrosion Engineers, 1061 M & M Building, Houston 2, Texas.

Corrosion resistance of Fe, steel, Al, Cu, Ta, Cb and other metallic and nonmetallic materials in various chemical environments. Applications in processing equipment. Papers are abstracted separately. (A-general, R6, R7, T29; Al, Cb, Cu, Fe, ST, Ta)

104-A. (German.) Beryllium. G. A. Meerson, D. D. Sokolov, N. F. Mironov, N. M. Bogorad, J. D. Pachomov, D. S. Lovovskij, E. S. Ivanow and V. M. Smelev. Kernenergie, v. 2, Oct-Nov. 1960, p. 939-945.

Review of Be technology including production by melting $Be_3Al_2Si_6O_{18}$, subsequent leaching and electrolysis or reduction by metallic Mg and processing by hot pressing and extruding at 1120-1150° C. under vacuum, pressing and sintering (1180-1200° C.) Be powder, vacuum casting and machining. Data for microstructure, mechanical properties and ductility. (A-general, Q-general, M27; Be)

105-A. Hyper-Eutectic Aluminium-Silicon Casting Alloys. S. J. Ashton, J. Muir and W. M. Doyle. Metal Industry, v. 98, Mar. 3, 1961, p. 171-172.

Melting at 800° C., sand casting, die casting and degassing of EX. 451 Al-Si alloy. Testing to determine effect of phosphorus content on tensile strength and insoluble phosphorus per cent. Measurements of grain size, nucleation efficiency and distribution and size of primary silicon phase. (A-general, C-general, E-general, Q-general, 2-60; Al, Si)

106-A. Annual Report-1960, International Tin Research Council, p. 20-33.

Review of research on hot tinning, electrodeposition and alloying of Sn with various metals. Mechanical and electrical properties, hardness, corrosion and rust resistance and crystal structure of Sn alloys and Sn plate. Applications. (A9m, Q-general, P15; SN)

107-A. (Book.) Finishing Handbook and Directory 1961. H. T. Chambers, Editor. 536 p. 1961. Sawell Publications Ltd., 4 Ludgate Circus, London 4, England.

Revised index of finishing processes including anodizing, electroplating, galvanizing, polishing and cleaning techniques. Plant and equipment design. 18 ref. (A-general, L-general)

108-A. (Book.) Aluminum Tank Repair. 1961. 91 p. Reynolds Metals Co., Richmond 18, Va.

Cleaning of tanks, mechanical forming of repair sections and Tig and Mig welding procedures. Repairing specific damage such as seepage leaks, cracks and structural failure. (A-general, K1, L-general, T26q; Al, 17-57)

109-A. (Book.) Cobalt--Its Chemistry, Metallurgy and Uses. Roland S. Young, Editor. 1960. 424 p. American Chemical Society Monograph no. 149, Reinhold Publishing Corp., New York.

Chemical, physical and mechanical properties, phase diagrams and catalytic behavior of Co and Co alloys in high-temperature, high-strength service and other metallurgical applications. (A-general, P-general, Q-general; Co-b)

110-A. (Book.) Hardness--Theory and Practice. Pt. 1. Practice. Louis Small. 1960. 537 p. Service Diamond Tool Co., Ferndale, Mich.

Principles, methods and equipment for Rockwell, Vickers, hardenability and Jominy, Knoop, hot hardness and microhardness testing. Application to sheet metal, castings and forgings, carbon alloy, tool and special steels and cemented carbides and plastics. Conversion scales for hardness values are given with American, German and British standards. (A-general, Q29, 10-54)

111-A. (Book.) Metals Handbook, 8th Edition. v. 1. Properties and Selection of Metals. Taylor Lyman, Editor. 1961, 1300 p. American Society for Metals, Metals Park, Novelty, Ohio.

The first of a series of volumes prepared by the American Society for Metals expanding the technical information coverage of the Metals Handbook. The volume contains 112 articles with compilations of data and reference tables covering mechanical and physical properties, performance characteristics and applications of carbon and low alloy steels, cast irons, stainless steels and heat resisting alloys, tool materials and nonferrous metals. Indexes are included with definitions of metallurgy and engineering technology. (A-general, P-general, Q-general, 17-52; CI, ST, SGA-h, TS, EG-a39)

112-A. L-D and Basic Lined Side-Blown Converter. K. Gupta and Bhanu Prakash. Paper from "Symposium on Pilot Plants in Metallurgical Research and Development". Council on Scientific & Industrial Research, Jamshedpur, India, 1960, p. 113-117.

Design and operation of L-D process cupola and converter and basic-lined side-blown converter pilot models. Models are compared as to composition of product, heat losses and capacity. (A9j, D3, D10a)

113-A. Steel Melting in a Pilot Plant Shaft Furnace. J. Eyre, C. Hulse and M. Thring. Paper from "Symposium on Pilot Plants in Metallurgical Research and Development". Council on Scientific & Industrial Research, Jamshedpur, India, 1960, p. 119-130.

Design and construction of counter-flow furnaces with various shapes. Performance of an experimental unit is discussed in terms of running conditions, thermal efficiency, analysis of product, metallic yield and refractory wear. (A9j, W17h, 1-52)

114-A. Pilot Plants in Metallurgical Research at Fried. Krupp, Essen. H. Krainer. Paper from "Symposium on Pilot Plants in Metallurgical Research and Development". Council on Scientific & Industrial Research, Jamshedpur, India, 1960, p. 131-136.

Design of pilot plants for experimental work on Fe ore reduction outside the blast furnace and on oxygen steelmaking using the L-D process. Emphasis is placed on the Krupp-Renn process. (A9j, D8j, D10)

115-A. Pilot Plants for the Agglomeration of Iron Ores on a Semi-Industrial Scale. H. Raush and F. Cappel. Paper from "Symposium on Pilot Plants in Metallurgical Research and Development". Council on Scientific & Industrial Research, Jamshedpur, India, 1960, p. 143-151.

Description of test equipment and methods for investigating sintering and pelletizing processes of agglomeration. (A9j, B16; Fe)

116-A. The Role of the Pilot Plant in Iron Ore Sintering. A. Grieve and F. Ely. Paper from "Symposium on Pilot Plants in Metallurgical Research and Development". Council on Scientific & Industrial Research, Jamshedpur, India, 1960, p. 153-159.

Investigation of a pilot plant sintering process by a pot test procedure to determine gas volume, sinter strength, mix permeability, shrinkage factors, coke rate and optimum sintering time. (A9j, B16; Fe)

117-A. Hot Dip Aluminizing of Steel Wire Laboratory Scale Investigations and Pilot Plant Studies. A. Kapoor, P. Gupte and B. Nijhawan. Paper from "Symposium on Pilot Plants in Metallurgical Research and Development". Council of Scientific & Industrial Research, Jamshedpur, India, 1960, p. 188-195.

Description of pilot tests on aluminized wire to determine effect of speed and direction of draw and thickness of wire on the coating weight. Outline of accelerated corrosion test programs in salt spray. Design of coil feeding arrangement, degreasing unit, furnace and sinker for pilot plant. (A9j, L16; ST, Al, 4-61)

118-A. Production of Manganese and Manganese Dioxide. N. Dhananjayan, H. Chakrabarte and T. Baneyei. Paper from "Symposium on Pilot Plants in Metallurgical Research and Development". Council of Scientific & Industrial Research, Jamshedpur, India, 1960, p. 204-212.

Design of a pilot plant for crushing and grinding ore, reducing ground ore, leaching reduced ore with acidic liquor, purifying leach liquor, preparing the electrolyte and electrolysis. (A9j, B13, C19n, C23; Mn)

119-A. Continuous Casting Development for Steel. Iain M. D. Halliday. Paper from "Symposium on Pilot Plants in Metallurgical Research and Development". Council on Scientific & Industrial Research, Jamshedpur, India, 1960, p. 253-265.

Pilot plant developments in the continuous casting of steel by processes employing vertically held water cooled molds. Consideration of pouring time, solidification procedures and mold design. (A9j, D9q)

120-A. (Book.) Vacuum Technology Transactions. C. Robert Meissner, Editor. 1959. 335 p. Pergamon Press, 122 E. 55th St., New York 22, N. Y. $20.

Publication of papers on the role of spectroscopy in vacuum science, high and ultrahigh vacuum techniques such as electron bombardment and deposition, vacuum system applications, preparation of thin films and vaporizing sources and ionic pumping. (A-general, 1-73)

121-A. (Pamphlet.) Effect of Alloying Elements. Paper from "Federated Aluminum Casting Alloys Handbook". American

Smelting and Refining Co., New York, 1960, p. 4-8.

Mechanical and physical properties of cast Al alloys at high temperatures as affected by Cu, Si, Mg, Mn, Fe, Zn, Ni and Ti contents. (A-general, P-general, Q-general, 2-60; Al-b, 5)

122-A. (Russian.) Regeneration of Mo From Depleted Pickling Solutions. V. N. Parusnikov. Tsvetnye Metally, Dec. 1960, p. 61-65.

Investigation of various methods of Mo recovery from acidic solutions. Effect of precipitation, distillation and neutralization techniques on yield and practicability. 8 ref. (A11d)

123-A. Recent Progress in Development of Self-Fluxing Air Proof Brazing Alloys. Nikolajs Bredzs and Harry Schwartzbart. Welding Journal, v. 40, Mar. 1961, p. 123s-129s.

Review of self-fluxing filler alloys containing Li and B used in brazing steel and nonferrous alloys. Factors analyzed are flux viscosity, effect of moisture during brazing with alloys without B and the Li-B ratio. Results indicate that optimum performance is obtained with an alloy of 78% Cu, 20% Zn, 1 1/2% B and 0-1/2% Li. 11 ref. (A-general, K8; SGA-f, 17-52)

124-A. (Book.) The Physical Examination of Metals, 2nd Edition. Bruce Chalmers and A. G. Quarrell, Editors. 917 p. 1960. Edward Arnold, Ltd., 41 Maddox St., London, W.I., England. $30.

Comparison of optical, electrical, thermal, magnetic, ultrasonic and X-ray methods for determining structures, physical and mechanical properties and soundness of metals. (A-general, S-general)

125-A. Improved Aluminum Offers Lifetime Brightness. A. L. Moxon and S. B. Wyman. Iron Age, v. 187, Mar. 23, 1961, p. 78-79.

Development of an Al bright alloy with a metal base purity no higher than that of conventional alloys which retains its luster even at increased film thicknesses without sacrificing strength and forming traits. (A-general; Al-b)

126-A. Radioactive Isotopes and Their Application in Metallurgy. D. H. Houseman. Paper from "The Physical Examination of Metals". Edward Arnold Ltd., London, England, 1960, p. 737-824.

Principles of artificial isotope preparation and utilization. Applications in study of diffusion, oxidation, wear and corrosion of metals. 181 ref. (A-general, 1-59)

127-A. Antimony, Bismuth, Gallium, Indium, Selenium and Tellurium. OTS Selective Bibliography SB-438. (Available from U.S. Office of Technical Services, Washington 25, D. C.)

Listing U.S. Government reports and foreign translations covering thermoelectric, optical and photoconductive properties, with the effects of radiation and impurities. (A-general; Sb, Si, Ga, In, Se, Te)

128-A. Germanium and Silicon. OTS Selective Bibliography SB-437. (Available from U.S. Office of Technical Services, Washington 25, D. C.)

Research reports of Army, Navy, Air Force, Atomic Energy Commission and other government agencies covering crystal structure, phase studies, optical and photoconductive properties, effects of impurities and radiation. (A-general; Ge, Si)

129-A. New Stainless Steel Offers Three Benefits. Steel, v. 148, Mar. 27, 1961, p. 178.

Development of a new free machining steel similar to Type 303 but with a lower sulphur content. Steel offers better machinability, improved corrosion resistance and good surface finish. (A-general, G17k; SS)

130-A. AISI 4615 (Case Hardening Alloy Steel). Alloy Digest, SA 112, Mar. 1961, 2 p.

Ni-Mo case hardening steel is outstanding for its uniformity of case and response to heat treatment, relative freedom from distortion during quenching and excellent toughness at high hardness. Its resistance to abnormal grain growth is of particular advantage in forging. (A-general; AY)

131-A. Haynes No. 713C (High Temperature Alloy). Alloy Digest, Ni-64, Mar. 1961, 2 p.

Vacuum melted cast nickel base alloy having outstanding rupture strength at 1700° F. combined with excellent resistance to thermal fatigue and good

castability. It was originally developed as an air-melted, air-cast alloy designated as Inconel 713C. (A-general; Ni-b)

132-A. Meehanite He (Heat Resisting Iron Casting). Alloy Digest, Ci-29, Mar. 1961, 2 p.

Casting alloy capable of resisting extreme thermal shock. Its maximum operating temperature is 1150° F. He metal is a relatively low strength material and is used in applications where mechanical properties are not of particular importance. (A-general; Fe-b)

133-A. WaiMet WI-52 (High Temperature Alloy). Alloy Digest, Co-26, Mar. 1961, 2 p.

Cobalt-base alloy having high strength with good ductility and corrosion resistance. It combines excellent high-temperature properties with good castability and is recommended for applications requiring high strength under continuous high heat up to 1750° F. Protective coatings of chromium and aluminum have been developed to offset the oxidation which occurs at 1750° F. (A-general; Co-b)

134-A. Nironze 635 (Age-Hardenable Copper Alloy). Alloy Digest, Cu-98, Mar. 1961, 2 p.

Copper-nickel silicon alloy which combines excellent cold working properties with high-tensile and very high-yield strengths, good electrical conductivity, excellent general corrosion and stress-corrosion resistance. Supplied in the solution-annealed and draw condition, it offers exceptional cold working properties. (A-general; Cu-b, Ni, Si)

135-A. Noral 730 (Aluminum Bearing Alloy). Alloy Digest, Al-101, Mar. 1961, 2 p.

Recommended where high loadings and speeds are encountered and where adequate lubrication is available. The qualities of tin as a bearing material are combined with the strength of aluminum to give excellent wear characteristics. With a thermal conductivity three times greater than that of steel and five times greater than Babbitt metal, Noral 730 is plastic enough to conform to any normal misalignment, it embeds particles easily and is, therefore, highly suitable for heavy duty machinery such as rolling mills. (A-general; Al-b)

136-A. Pandex Vac Arc (Stainless, Heat Resistant Superalloy). Alloy Digest, SS-115, Mar. 1961, 2 p.

Austenitic iron-nickel-chromium alloy designed for service up to 1300° F. where high strength, heat and corrosion resistance are required, and for service at higher temperatures where the stresses are moderate. It has good resistance to thermal fatigue and to cyclic heating. (A-general; SS)

137-A. Van Cut (High Speed Steel-Type M3). Alloy Digest, TS-103, Mar. 1961, 2 p.

Tungsten-molybdenum-vanadium high-speed steel with exceptional wear-resistance and hot strength. Toughness, as indicated by resistance to impact, is slightly higher than AISI T1 and a little less than AISI M2. (A-general; TS-m)

138-A. Further Studies on Active-Eutectoid Alloys of Titanium. R. F. Bunshah. New York University (Wright Air Development Division). U. S. Office of Technical Services, PB 161964, May 1960, 80 p. $2.

Development of a new class of Ti alloys of the alpha-compound type with potential utility where short time elevated strength properties are needed for one-cycle operation. Several of the alloys of this class showed outstanding short-time tensile strengths up to 1200° F. and exhibited correspondingly good creep rupture properties, but those alloys which displayed highest strengths also showed instability. It was established, however, that stability could be partially restored by some sacrifice in strength. (A-general; Ti-b)

139-A. (English.) Development of Siteel and Its General Characteristics. Keiiti Ohta. Kansai University, Technology Reports, Mar. 1959, p. 65-71.

Heat treatment characteristics and mechanical properties of a grain-refined FeSi alloy containing less than 8% Si. 11 ref. (A-general; Fe-b, Si)

140-A. Laboratory-Scale Casting Furnace for High Melting Point Metals. P. G. Clites and E. D. Calvert. U. S. Bureau of Mines, Report of Investigations 5726, 1961, 13 p.

Development of a 20 cu. in. capacity laboratory furnace for determining casting characteristics of metals and alloys and variable relationships involved in skull-melting and casting high temperature metals. Cast specimens are obtained from Zr, Ti, Hf, Cb, Mo, Ta, W, Fe, Cr and Cu. (A9, E10b, E-general; SGA-h)

141-A. Molybdenum Alloy and Process Technology. R. C. Nelson. Journal of Metals, v. 13, Mar. 1961, p. 223-224.

Mechanical properties of Mo-base alloys and the latest developments in forging, extrusion, casting, Kroll and bomb reducing, thermal dissociation, electrolysis, welding and coating of Mo-base alloy powders. (A-general, Q-general, F-general; Mo-b, 6)

142-A. (Pamphlet.) New Alloy: Fernico-5, General Electric Research Laboratory Bulletin, Winter 1961, 9 p.

Development of a vacuum melted Fe-Ni-Co alloy with a thermal expansion close to that of alumina so that it is especially suited for use in ceramic-to-metal seals for electron tubes, thermionic energy converters and high temperature circuits. (A-general, P11g; SGA-n, Fe-b, Co, Ni)

143-A. Capacitor Grade Tantalum. Lawrence H. Belz. Electrochemical Society, Journal, v. 108, Mar. 1961, p. 229-235.

Review of occurrence, production costs and properties of Ta. Powder metallurgy techniques and evaluation of various powder types in terms of their relation to anode design, production and performance. Effects of anode density and sintering temperature on performance. Production of sheet, wire and foil are reviewed with data for electrical characteristics. 4 ref. (A-general, C-general, H-general, P15, T1e, 10-54; Ta, 17-57)

144-A. (Book-Translation.) The Continuous Casting of Steel in Commercial Use. K. P. Korotkov, N. P. Maiorov, A. A. Akvortsov and A. D. Akimenko. 171 p. 1960. Pergamon Press, 122 E. 55th St., New York 22, New York. $8.50.

Principles and technological parameters of continuous casting, with attention to the design, operation and efficiency of a continuous casting steel plant in the USSR. Structure, mechanical properties and quality of the ingots produced. 35 ref. (A-general, D9q, Q-general; ST)

145-A. (Book.) Elementary Structural Analysis, 2nd Edition. C. H. Norris and John B. Wilbur. 651 p. 1960. McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 36, N. Y.

Review of the methods and applications of theoretical structural analysis. Designs for various structures, loads and service conditions. Determination of shear and bending moment, static stability, reactions, stress, influence lines, deflection, moment distribution and plastic behavior. (A-general, T26)

146-A. (Book.) The Electro-Erosion Machining of Metals. A. L. Livshits. 115 p. 1960. Butterworth & Co., Ltd., 88 Kingsway, London, W. C. 2, England. $5.75.

Principles of electro-erosion machining and techniques involved in the electro-pulse, electro-spark, anodo-mechanical and electro-contact methods. Design and operation of equipment with attention to pulse generation and control. (A-general, G24)

147-A. (French.) Metallurgy of High Strength Steels Containing 5% Chromium. G. A. Roberts. Revue de Metallurgie, v. 58, Jan. 1961, p. 65-77.

Hardened X2, X3, VJ, VJ-VM, X5 and Vascojet 1000 steels are mechanically tested after tempering at 100-700° C. Data are given for elastic limit, tensile strength and hardness as functions of the tempering temperature and time and of the carbon content and for fatigue strength and heat resistance. Application in jet airplane parts. 19 ref. (A-general, Q-general, 2-60, 2-64, T24; SGA-h, AY, Cr, 17-57)

148-A. (Book.) Effect of Surface-Active Media on the Deformation of Metals. V. I. Likhtman, P. A. Rebinder and G. V. Karpenko. 188 p. 1960. Chemical Publishing Co., 212 5th Ave., New York. $5.75.

Testing of single crystal and polycrystalline metals to determine the effects of surface active media on plastic and plastic deformation processes and on mechanical properties such as creep and fatigue. Analysis of the adsorption process and its effects and of the mechanisms governing adsorption fatigue and corrosion of metals. 101 ref. (A-general, Q24, Q-general, R-general, 10-54)

149-A. Beryllium as a Structural Material. Engineering Materials and Design Conference, Proceedings, Feb. 1960, p. E1-E8.

Fabrication of cast or powdered Be, including machining, brazing and welding. Physical and mechanical properties and possible applications of Be in aircraft structures. 9 ref. (A-general, G-general, K-general, P-general, Q-general, T24; Be, 17-57)

150-A. Properties of the New Cobalt-Base Alloy UMCo50. L. Habraken and D. Coutsouradis. Cobalt, Mar. 1961, p. 3-21.

Heat treatment effects on the structure and properties of Co-Cr-Fe alloys and the effects of addition elements on UMCo50 (50% Co, 30% Cr, 20% Fe). Data are given for thermal shock, abrasion, impact, oxidation and corrosion resistance, machinability, weldability, hardness, tensile properties and stress and melting characteristics. 13 ref. (A-general, G17k, K9s, Q-general, R-general, 2-60, 2-64, 3-66; Co-b)

151-A. What Beryllium Can Do for You. Paul E. Gage. Product Engineering, v. 32, Feb. 20, 1961, p. 82-85.

Mechanical and physical properties of Be are compared to light, heavy, reactive and refractory metals, stainless steels and superalloys. Applications in environments requiring high thermal stability and good strength to weight ratio. (A-general, P-general, Q-general; Be, 17-57)

152-A. Niobium-20 wt.% Uranium, High Temperature Metallic Fuel of the Future. John A. DeMastry, Frederic R. Shober and Ronald F. Dickerson. Nuclear Science and Engineering, v. 9, Mar. 1961, p. 299-304.

Development of a 20% U-Cb alloy for reactor fuel application. Fabrication characteristics, mechanical properties and corrosion behavior in air, CO_2, NaK, water and steam are reported with data given for temperature and aging effects on properties. 6 ref. (A-general, Q-general, R-general, T11, 2-62, 2-65; Cb-b, U, 17-57)

153-A. Unusual Metals. Bryan Whipple. Michigan Technic, v. 79, Mar. 1961, p. 13-15.

Physical and mechanical properties of metals such as Os, V, Sc, Ge, Te, Cs, Th, In, Pt, Ga, Hf, Pd, Re, Pr, Gd, Dy and Tc. Cost comparison and survey of applications in industry. (A-general, P-general, Q-general; EG-b, EG-c, EG-d, EG-g, 17-57)

154-A. Hyper-Eutectic Aluminum Silicon Casting Alloys. S. J. Ashton, J. Muir and W. M. Doyle. Metal Industry, v. 98, Feb. 1961, p. 143-146.

Mean tensile properties of sand-cast and die-cast Al-Si test bars and effect of pouring temperature, Na contamination, holding time, remelting and degassing on the primary Si phase in hyper-eutectic Al-Si alloys. Use of ferro-phosphorus in refining the alloy. (A-general, E25, N-general, Q27, 2-60; Al-b, Si)

155-A. A Review of the Effects of Starting Material on the Processing and Properties of Tungsten, Molybdenum, Columbium and Tantalum. Defense Metals Information Center, Battelle Memorial Institute, DMIC Memo. 90, Mar. 13, 1961, 37 p. (Available as PB 161240 from U. S. Office of Technical Services, Washington 25, D. C.)

A summary relating characteristics of the as-reduced refractory metal powders W, Mo, Cb and Ta to the properties of the consolidated or fabricated product. Effect of powder history on purity, particle size and on homogeneity of alloys; effect of powder particle size on compaction and sintering and effect of powder purity on composition and properties after sintering and melting. 41 ref. (A-general, H-general, P-general, Q-general; Cb, W, Mo, Ta, EG-d37, 6)

156-A. A New High-Temperature Alloy. Metal Treatment and Drop Forging, v. 28, Mar. 1961, p. 123-124.

Development of a Ni-base alloy containing 25% Cr and 3% each of Mo, Co and W. Alloy is meant for service above 980° C. and has good creep-rupture properties, low coefficient of expansion and good oxidation resistance. (A-general; Ni-b, Cr)

157-A. (Pamphlet.) Symposium on Temperature--Its Measurement and Control in Science and Industry. American Institute of Physics, 335 E. 45th St., New York 17, N. Y. Mar. 1961, 116 p. $5.

Review of papers presented at symposium in Columbus, Ohio, Mar. 27-31, 1961, sponsored by American Institute

of Physics, Instrument Society of America and National Bureau of Standards. Topics include temperature measurement methods and equipment and materials of application. (A-general, X9, 10-54)

158-A. (Pamphlet.) Uniloy 303 MA. Universal-Cyclops Steel Corp., Bridgeville, Pa. 1961, 11 p.

Development of a new free machining stainless steel which combines greatly improved machinability with improved corrosion resistance and resistance to splitting. Data for composition, physical and mechanical properties and workability. (A-general, G17k; SS)

159-A. (Pamphlet.) Stronger Cast Stainless Keeps Promises. E. A. Schoefer. Reprint from Chemical Engineering, Mar. 7, 1960, 4 p. Alloy Casting Institute, 1001 Franklin Ave., Garden City, N. Y.

Data for mechanical properties, corrosion and abrasive wear resistance, machinability, weldability and linear coefficient of thermal expansion of Cd-4MCu cast alloy. Applications. (A-general, G17k, K9s, Q-general; SS, 5)

160-A. (Books-French.) Equilibrium Diagrams of Quaternary Systems. v. 1-2, 1960. R. Cayron. Institut de Metallurgie, Louvain, France. 162 p.

Equilibrium diagrams for compositions and various temperatures of quaternary systems in general, with special reference to the Sn-Bi-Cd-Pb, Ag-Ni-Cu-Au and Ag-Pb-Cu-S systems. Primarily the liquid-solid transformations are considered with mention of some quinary and more complex systems. 5 ref. (A-general, M24d, N12)

161-A. Aluminum and Its Alloys in 1960. E. Elliott. Metallurgia, v. 63, Feb. 1961, p. 65-70.

Review of research and technical progress in metallurgy of Al and Al alloys including extraction founding, fabrication, constitution and physical and mechanical properties. Applications. (To be continued.) 88 ref. (A9; Al-b)

162-A. Electrical Resistance Alloys. Research & Industry (India), v. 6, Jan. 1961, p. 1-3.

Electrical resistance alloys free from Ni and Co and Fe, Cr and Al are developed for use as a substitute for Nichrome and Kanthol. The addition of Ti and Zr suppresses the tendency towards grain growth and improves the high-temperature properties. (A-general; Fe-b, Al, Cr)

163-A. (Book.) Materials Handbook. 8th Edition. George S. Brady. 1022 p. 1956. McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 36, N. Y. $6.50.

Data are given for physical and mechanical properties, sources, applications, colors and compositions of metals, alloys, ceramics, plastics, chemicals, fuels, gases, abrasives, woods, refractories, lubricants and ores. (A-general, A11, P-general, Q-general, 11-68)

164-A. (French.) A New Columbium Steel. S. Witis. Industrie du Petrole, v. 28, Dec. 1960, p. 87.

Technical characteristics and composition of GLX-W Cb steel. Application in pipeline construction. (A-general, T26r; ST, Cb, 17-57)

165-A. (Book.) Nondestructive Testing. Warren J. McGonnagle. 455 p. 1961. McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 36, N. Y. $15.

Comprehensive survey of theoretical and empirical background, development and applications of nondestructive testing methods including visual, pressure and leak, penetrant, thermal, X-ray and gamma radiography, ultrasonics, dynamic, magnetic, electrical, eddy current, chemical, residual stress, irradiation and thickness measurement techniques. Metal discontinuities are analyzed and related to specific testing procedures. 397 ref. (A-general, 11-64, S13)

166-A. Rare Metals Are a Challenge to Metallurgy. Australasian Manufacturer, v. 45, Mar. 4, 1961, p. 68-71.

Extraction and refining of Be from beryl by fluorination, fusion and electrolysis and of Zr from zicron by chloride conversion process and reduction with Mg or Na. Data are given for mechanical and physical properties, corrosion resistance and neutron absorption cross section. (A-general, C-general, P-general, Q-general; Be, Zr)

167-A. (Book.) Vacuum Microbalance Techniques, v. 1. M. J. Katz, Editor. 152 p. 1961. Plenum Press, Inc., 227 W. 17th St., New York 11, N. Y.

Conference report on design, construction and applications of vacuum microbalances including automatic recording, pivotal and quartz types and use with omegatron spectrometer. Topics include operation under ultra-high vacuum and high-temperature conditions and the study of ion-bombardment, sputtering rates and mass changes. Effects of pressure on sample weight changes and microgravimetric study of hydrogen and the effect of thermomolecular gas flow on balance suspension are presented and a corrective procedure described for thermonuclear effects on oxidation behavior. 5 ref. (A-general, 10-64, S11e, 1-73)

168-A. (Russian.) Alkali-Sulphidic Method for Treatment of Lead Works Dust. Z. A. Serikov and S. M. Anisimov. Tsvetnaya Metallurgiya, June 1960, p. 65-73.

Extraction of Pb, Zn and Cd and the metals Tl, Se, As and Te from Pb dust by melting at low temperature and leaching with NaOH and H_2SO_4 solution. Design of the apparatus for alkali-sulphidic melting of the dust. 8 ref. (A8a; Pb)

169-A. Review of Recent Development in the Technology of High-Strength Stainless Steels. D. A. Roberts. Defense Metals Information Center, Battelle Memorial Institute, DMIC Memo. 99, Apr. 14, 1961, 2 p.

Improvement of the rupture life of an alloy composed of 35% Mn, 8% Al, 0.5% V, 0.6% C and balance Fe, by the addition of Mo, W or both. The alloy is oxidation resistant and contains no Cr. 3 ref. (A-general, 10-54, Q3, 2-60; SS, Mn, W, Mo, SGB-a)

170-A. (German.) New Development of Aluminum Alloys. Paul Brenner. Jahrbuch 1959 der WGL, Oct. 1959, p. 343-357.

Review of design and fabrication of age hardenable, Mg containing alloys for aircraft, heat resistant alloys and sintered products. Improvement of mechanical properties, particularly tensile, yield and fatigue strength by product design, such as taper-rolled sheet and strip, resin bonded Al foil honeycomb and other sandwich construction, special extruded profiles and heavy forgings. (A-general, F-general, G-general, Q-general; Al-b)

171-A. How to Get the Most Out of 6063 Extrusion Alloy. M. E. Molitor and H. E. Miller. Modern Metals, v. 17, Apr. 1961, p. 44, 46-47.

Development of a precipitation-hardening alloy for extrusion industry. Mg-Si phase diagram is used to explain how composition, homogenization, reheat temperature, extrusion quench rate and aging time and temperature affect mechanical properties. (A-general; Al-b)

172-A. (Book-Translation.) Continuous Casting of Steel. M. C. Biochenko. 218 p. 1961. Butterworth & Co., Ltd., 88 Kingsway, W.C.2, London, England. $9.50.

Continuous production of ingots, billets and slabs and the "ingotless" rolling of strip, both ferrous and nonferrous. Defects, ductility and structure as affected by cooling and solidification methods. 64 ref. (A-general, D9q)

173-A. (Italian.) Hard American Aluminum-Magnesium Alloys of the 5000 Series. Alluminio, v. 30, Jan. 1961, p. 25-26.

Mechanical characteristics, weldability, machinability and composition of 5052, 5454, 5154, 5086, 5083 and 5456 Al-Mg alloys. (A-general, K9s, G17k, Q-general, 2-60, Al-b, Mg)

174-A. (French.) Refractory Steels and Alloys. Principles of Application. R. Neyret. Chimie & Industrie, v. 85, Jan. 1961, p. 73-85.

Structure and mechanical properties of austenitic steels and alloys and their resistance to oxidation, elevated temperatures, hot gases and carburizing atmospheres. Influence of the presence of P, S, Co and V. (A-general, Q-general, R1h, 2-60, 2-62; SGA-h, AY)

175-A. (Italian.) Aluminum Alloy With High Silicon Content. Fonderia, v. 10, Feb. 1961, p. 75-78.

Compositon, melting and casting techniques, physical and mechanical properties and applications of X392 Al-Si alloys. (A-general, C-general, P-general, Q-general, 2-60; Al-b, Si, 17-57)

176-A. Review of Recent Developments in the Technology of Molybdenum and Molybdenum-Base Alloys. J. A. Houck. Defense Metals Information Center, Battelle Memorial Institute, DMIC Memo. 96, Apr. 7, 1961, 2 p. (Available as PB 161246 from U. S. Office of Technical Services, Washington 25, D. C.)

Summary of production and alloying methods, including Kroll process reduction, powder metallurgy and dispersion strenthening. Data are given for mechanical properties, workability and high-temperature properties for alloys containing Ti, Zr, W and C. (A-general, C26, H-general, Q-general, 2-60, 2-62, 10-54; Mo-b, C, Ti, W, Zr)

177-A. High Strength, Medium Alloy Steel Takes Heat. Steel, v. 148, May 1, 1961, p. 60-61.

Development of a temper resistant alloy steel capable of retaining ultra-high strength after tempering at 1000-1300° F. (A-general; AY)

178-A. (German.) Properties and Usefulness of Heat Resistant 12% Chromium Steel. Gerhard Kruger. Neue Hutte, v. 6, Mar. 1961, p. 131-138.

Development of heat resistant 12% Cr steel from corrosion resistant turbine blade steel X20 Cr 13 by alloying with Mo, W and V to increase stress-rupture strength at elevated temperatures (600° C.) Data are given for stress-rupture and mechanical strength, corrosion resistance, constitution diagrams, microstructure, workability and weldability. Survey of engineering applications. (A-general, K9s, Q-general, R-general, 2-60, 2-62; SS, Cr, Mo, W, V, 17-57)

179-A. (Book.) The Interpretation of X-Ray Diffraction Photographs. N. F. M. Henry, H. Lipson and W. A. Wooster. 282 p. 1960. MacMillan & Co., Ltd., London, England. $16.

Oscillation photographs, Lave photographs and Weissenberg photographs produced by X-ray refraction and absorption are used to determine crystal orientation. (A-general, M22g)

180-A. (Book.) Impact. The Theory and Physical Behavior of Colliding Solids. Werner Goldsmith. 379 p. 1960. Edward Arnold, Ltd., 41 Maddox St., London W. 2, England. $17.50.

Impact, torsion, compressive and tensile testing of elastic solids, spheres, bars, masses, beams and rods by dynamic loading. 442 ref. (A-general, Q28n, Q27b, Q1b)

181-A. (Book-Translation.) High Temperature Metallography. M. G. Lozinskii. 474 p. 1961. Pergamon Press, 122 E. 55th St., New York 22, N. Y. $17.50.

Construction and maintenance of apparatus for investigating the structure and mechanical properties of metals by heating in vacuum. Basic principles of high-temperature metallography. Methods for measuring and for investigating the deformation of metals and alloys at high temperatures in vacuum. 252 ref. (A-general, M-general, 1-66)

182-A. Bethlehem 57 Special (Hot Work Tool Steel, Type H25). Alloy Digest, TS-104, Apr. 1961.

Steel has high red-hardness and abrasion resistance and therefore is excellent for hot work applications at high operating temperatures. Its other advantages are good resistance to wash, good resistance to heat checking and adequate shock resistance. (A-general; TS)

183-A. Duralumin-K (Heat Treatable, Wrought Aluminum Alloy). Alloy Digest, Al-102, Apr. 1961, 2 p.

High strength, wrought alloy recommended for highly stressed applications. It responds to precipitation-hardening heat treatment. (A-general; Al-b)

184-A. Max-El 2-B (Free-Machining Steel). Alloy Digest, CS-15, Apr. 1961, 2 p.

General purpose free-machining steel offering a good combination of strength, toughness and abrasion resistance as well as excellent machinability. It is generally used in the as-rolled condition at a Brinell hardness of 200-235. (A-general; CN)

185-A. Jethete M. 151 (Hardenable Corrosion Resisting Steel). Alloy Digest, SS-116, Apr. 1961, 2 p.

Corrosion resistant steels of the 12% Cr type especially suitable for sheet and strip applications where a 112,000 psi. tensile strength material might be selected with easy fabrication and welding and for service at elevated temperature. (A-general; SS)

186-A. Inconel 718 (Age-Hardenable Nickel-Base Alloy). Alloy Digest, Ni-65, Apr. 1961, 2 p.

Ni-Cr alloy having exceptionally high tensile, yield, creep and rupture strength at temperatures up to 1300° F. (A-general; Ni-b)

187-A. Hydro-T-Metal (Architectural and Industrial Zinc-Base Alloy). Alloy Digest, Zn-7, Apr. 1961, 2 p.

Alloy of Ti, Cu, Cr, Mn and high-grade Zn. It has good resistance to deformation under stress and can be subjected to high temperatures without grain growth and consequent loss of strength. As a result, it resists stretch or sag under tension at temperature change. (A-general; Zn-b)

188-A. Amzirc (High Conductivity Copper Alloy). Alloy Digest, Cu-99, Apr. 1961, 2 p.

Consists of high conductivity, oxygen-free OFHC Cu and a small amount of high-purity Zr. The alloy has high electrical conductivity combined with strength at elevated temperatures. It is free from notch sensitivity. (A-general; Cu-b)

189-A. (Book.) Metallizing of Plastics. Harold Narcus. 208 p. 1960. Rheinhold Publishing Co., 430 Park Ave., New York 22, N. Y. $5.50.

Plastics are metallized with various metals by chemical reduction, metal evaporation, cathode sputtering, Ag spray method and other miscellaneous processes. Data presented on characteristics of metallized deposits. Plating eliminates undesirable properties of plastics, increases tensile, impact and flexural strength and increases resistance to abrasion and heat distortion. 74 ref. (A-general, L23)

190-A. Imperial (Manganese Steel). Alloy Digest, SA-113, Apr. 1961, 2 p.

High-carbon high-manganese steel possessing great ductility. Its ductility, which is its most valuable property, can be greatly affected by the rate of cooling. It has great toughness and high wear resistance. (A-general; AY)

191-A. Aluminum and Its Alloys in 1960. Some Aspects of Research and Technical Progress. E. Elliott. Metallurgia, v. 63, Mar. 1961, p. 105-114.

Review of the metallurgy of Al and its alloys, including extraction, founding, fabrication, constitution, properties and standardization and applications. (A-general; Al-b)

192-A. Copper and Copper Alloys. Metallurgia, v. 63, Mar. 1961, p. 133-135.

Summary developments in the field of Cu and Cu alloys including extraction, fabrication, finishing, mechanical and physical properties and testing. (To be continued). (A-general; Cu-b)

193-A. Manganese Puts Muscle and Corrosion Resistance in Aluminum. Union Carbide Metals Review, v. 4, Winter-Spring, 1961, p. 19-20.

Alloying of Al with Mn to produce heat treatable, nonheat treatable and casting alloy of high-tensile strength and corrosion resistance and with improved grain structure, purity and ductility. (A-general; Al-b, Mn)

194-A. (Book.) Embrittlement by Liquid Metals. Harold Markus, Joseph M. McCaughey and William Rostoker. 159 p. 1960. Reinhold Publishing Corp., 430 Park Ave., New York 22, N. Y. $7.95.

Discussion reviews literature on embrittlement in solid metals, crack propagation, factors influencing embrittlement and its mechanism, delayed failure, metal fracture and static stress and concludes that the origin of fracture is at the liquid metal-metal interface. 147 ref. (A-general, Q26s)

195-A. Austenitic Manganese Steels--New Alloys Developed With Improved Wearing Qualities. T. E. Norman, D. V. Doane and A. Solomom. Alloy Metals Review, v. 9, Mar. 1961, p. 1-11.

Austenitic steels having a combination of good mechanical properties and improved resistance to gouging abrasion are produced when carbide dispersions are developed in the 12% Mn high C (0.61-1.47%) types. Grain refinement and carbide dispersions are obtained by combining a 2% Mo addition with a pearlitizing heat treatment at 1100° F. followed by a re-austenitizing treatment at 1600-1900° F. 12 ref. (A-general; SS-e)

196-A. Aluminum Addition to 303 Stainless Improves Machinability. Machine and

Tool Blue Book, v. 56, May 1961, p. 115-116.

Description of a free machining Cr-Ni stainless steel designated Uniloy 303 MA. Chemical resistance, corrosion resistance, weldability and surface finish. (A-general, G17k; SS)

197-A. (Book.) Open Hearth Proceedings. v. 43. 1961. 289 p. American Institute of Mining, Metallurgical and Petroleum Engineers, 29 W. 39th St., New York 18, N. Y.

Series of papers from the 43rd Conference of the National Open Hearth Steel Committee of the Iron and Steel Division on techniques and equipment involved in openhearth steelmaking with emphasis on use of oxygen. (A-general, D9)

198-A. (Book.) The Effect of Atmosphere on the Fatigue of Lead. K. U. Snowden. 1959. 73 p. University of Melbourne Press, Melbourne, Australia.

Study of the fatigue properties of high-purity polycrystalline Pb in air at various pressures and in separate gas atmospheres. Results indicate that oxygen reduces fatigue life by forming intercrystalline cracks and has a more damaging effect when strain is decreased. 48 ref. (A-general, Q7; Pb)

199-A. A Review of Recent Developments in Titanium. R. A. Wood. Light Metal Age, v. 19, Apr. 1961, p. 6, 10.

A review in the following areas: markets; chemical reactions, as spontaneous ignition of Ti in oxygen; corrosion; mechanical properties such as notch sensitivity, embrittling effect and fracture toughness; the status of new high-strength alloys; and applications in wire and missiles. 15 ref. (A-general; Ti)

200-A. Powdered Metals Are Big Business. Hugh Canning. Canadian Chemical Processing, v. 45, Apr. 1961, p. 66-69.

Report on the production, applications and properties of powdered metals including Zn, Pb, Cu, Ni and Co. (A-general; Co, Cu, Ni, Pb, Zn, 6)

201-A. Materials for Extreme Service. E. A. Kachik. Chemical Engineering Progress, v. 57, Apr. 1961, p. 65-68.

Development of high-temperature materials and processes. Vacuum arc and vacuum induction melting, explosive forming and hardening, flame or arc spraying of materials, film formation on ceramic substrates, powder metallurgy processes discussed for new temperatures and future usage. (A-general; SGA-h)

202-A. New Weldable 18% Nickel Steel Has High Ductility. Welding Engineer, v. 46, May 1961, p. 85.

Development of a 18% Ni alloy steel with exceptional toughness at high-strength levels. Sound crack-free welds can be obtained with manual or automatic welding without preheating. (A-general, K9s; ST, Ni)

203-A. Refractory Metals Emerging as Structural Materials. Steel, v. 148, May 8, 1961, p. 115-130.

Mechanical and physical properties, fabricability and availability of the refractory metals in relation to their use as structural materials. (A-general, P-general, Q-general; EG-d37)

204-A. (Book.) Advances in Cryogenic Engineering. v. 6. K. D. Timmerhaus, Editor. 1961. 662 p. Plenum Press, Inc., 227 W. 17th St., New York 11, N. Y. $15.

Collection of papers from the proceedings of the Sixth National Conference held by the National Bureau of Standards and the University of Colorado at Boulder, Colorado, Aug. 23-25, 1961. Topics covered are superconductivity, transfer phenomena, design of equipment, physical equilibria, heat transfer, thermometry and mechanical properties at cryogenic temperatures. (A-general, 1-67)

205-A. An Investigation of Intermetallic Compounds for Very High Temperature Applications. R. M. Payne. Brush Beryllium Co. (Wright Air Development Division). U. S. Office of Technical Services, July 1960, 130 p. $3.

Preparation, fabrication and properties of intermetallic compounds under development for service at temperature ranging from 2300-3000° F. The compounds, principally beryllides, are prepared by solid-state reactions and fabricated chiefly by hot pressing techniques. Oxidation tests in dry air at 2500-3000° F. and in moist air (57° F. dew point) at 2300-2500° F. (A-general; Be, 14-68)

206-A. Titanium Alloy Forgings. H. J. Henning and P. D. Frost. Defense Metals Information Center. U. S. Office of Technical Services, PB 15100, Dec. 1960, 89 p. $2.25.

Current information on the availability, metallurgical and dimensional quality and mechanical properties of Ti die forgings. Data on many typical forgings including alpha-beta alloy forgings, alpha-alloy forgings and all-beta forging alloy. (A-general; Ti-b, 4-51)

207-A. High-Temperature Metallurgy and Heat Resistant Alloys. OTS Selective Bibliography SB-452, 34 p. (Available from U. S. Office of Technical Services, Washington 25, D. C.) $.10.

Lists research reports of the Army, Navy, Air Force, Bureau of Mines and other government agencies as well as foreign research literature on heat resistant alloys and high-temperature metallurgy. Significant literature is cited on high-temperature intermetallic compounds, alloys by powder metallurgy, brazing for high-temperature service and certain high-temperature metal coatings. A separate listing of Atomic Energy Commission research reports on high-temperature metallurgy include 89 citations. (A-general, 1-66; SGA-h)

208-A. (Book.) The Wire Industry Encyclopaedic Handbook. 528 p. 1961. Wire Industry, Ltd., 33 Turnival St., London, England.

Handbook on wire drawing and fabricating including an index of brand names, a list of specifications and standards and selected articles on lubrication, die maintenance and raw materials selection. (A-general, F28)

209-A. Electrolytic Destruction of Cyanide Residues. John M. Connard and G. Paul Beardsley. Metal Finishing, v. 59, May 1961, p. 54-55.

A mild steel tank with carbon anodes and mild steel cathodes is used to destroy cyanide-bearing materials from Cd, Zn and Cu plating baths. (A8b)

210-A. Tantung Investment Casting. R. A. Haskell and A. N. Neyrinck. Precision Metal Molding, v. 19, May 1961, p. 49-51.

Data given for Rockwell hardness, coefficient of thermal expansion, rupture and tensile strengths, thermal conductivity and hot hardness of investment castings of Tantung 166A, a group of cast alloys based on Co and containing Cr, W, Ta, Mn, Fe and C. (A-general; Co-b, Cr, W, 5-62)

211-A. Porcelain-Enameled Aluminum Extrusions. Precision Metal Molding, v. 19, May 1961, p. 61-62, 64.

Appearance, durability, chemical, impact, abrasion and thermal shock resistance and thermal stability given for porcelain enameled 6061 Al alloy. 3 ref. (A-general; Al-b, 4-58, 8-71)

212-A. Malleable Iron--Past, Present, Future. Gordon B. Mannweiler. Modern Castings, v. 39, Mar. 1961, p. 49-50.

Review of industrial development and applications of malleable Fe with attention to increase mechanical strength by improved production methods and quality control. (A-general, Q-general, 10-54, T-general; CI-s, 17-57)

213-A. Improved Stainless. Automatic Machining, v. 22, May 1961, p. 39-41.

Corrosion and end-wise splitting resistance, machinability and finishing qualities of Uniloy 303 MA which differs from 303 stainless mainly in the substitution of Al for about half of the sulphur. (A-general; SS)

214-A. (French.) Cast Steel. Pratique des Industries Mecaniques, v. 47, Feb. 1961, p. 29-31.

Composition, mechanical properties and applications of some cast stainless and mild steels. (A-general; CN, SS, 5)

215-A. (French.) Numerous Steels for High-Temperature and High-Mechanical Strength Applications. Metallurgie et la Construction Mecanique, v. 93, Feb. 1961, p. 87-89, 91, 93, 95.

Composition, mechanical properties and suggested heat treatments for PH 55, D 979, AF 71, 19-9 W Mo, 19-9 D-L, GSA, B-18B, N-153, gamma and S-495 steels. (A-general; ST, SGA-h, SGB-a)

216-A. AM355 for Gas Turbine Engines. Paul A. Bergman. Metal Progress, v. 79, May 1961, p. 79-88.

AM355, a controlled-transformation stainless steel, offers an excellent combination of the better features found in the 300 and 400 series. This article discusses general characteristics and

properties of AM355 forgings and bar stock including the effects of retained austenite and its control. (A-general, T24b, Q-general; SS)

217-A. Armco High Strength no. 1 (High-Strength Low-Alloy Steel). Alloy Digest, SA-115, May 1961, 2 p.

Important advantages claimed over carbon steels in flat rolled steel applications are increased strength, decreased weight, longer life and greater resistance to corrosion, shock and fatigue resistance. (A-general; AY, SGB-a)

218-A. Premabraze 130 (High Temperature Brazing Alloy). Alloy Digest, Au-1, May 1961, 2 p.

A solid solution type Au-Ni brazing alloy with a composition characterized by a sharp melting point. (A-general; Au-b, Ni)

219-A. Climelt Molybdenum-0.5% Ti (High Temperature Alloy). Alloy Digest, Mo-2, May 1961, 2 p.

A Mo alloy having high strength at elevated temperatures, high modulus of elasticity, low coefficient of expansion and high-thermal conductivity. It has exceptionally high rupture properties above 1600° F. (A-general; Mo-b, Ti)

220-A. Aluminum 360 and A360 (Aluminum Die Casting Alloy). Alloy Digest, Al-103, May 1961, 2 p.

Alloy A360 is a purer form of alloy 360 having lower impurity maximums. Both alloys have excellent casting characteristics, good corrosion resistance and good mechanical properties. (A-general; Al-b)

221-A. Revere no. 533 (Nickel Silver). Alloy Digest, Cu-100, May 1961, 2 p.

An 18% nickel silver alloy having ductility, malleability and resistance to corrosion. It is recommended for deep drawing applications. (A-general; Cu-b, Ni)

222-A. Hipersil (Silicon-Iron Magnetic Alloy). Alloy Digest, Fe-19, May 1961, 2 p.

A high-permeability Si-Fe alloy recommended for use in transformers. It has low hysteresis loss and preferred orientation. Its superior magnetic qualities exist only in the rolling direction. (A-general; Fe-b, Si)

223-A. Unimach UCX-3 (High Strength Alloy Steel). Alloy Digest, SA-114, May 1961, 2 p.

Co modification of the AISI 4100 series type of steel. It is essentially not notch sensitive in the 225,000-235,000 psi. yield strength range. It is a new ultra-high-strength steel suitable for manufacture of high-performance rocket motor uses. (A-general; AY, Co)

224-A. Cooper PH-55B (Precipitation-Hardening Stainless Steel). Alloy Digest, SS-117, May 1961, 2 p.

A high-strength high-ductility alloy recommended for corrosion resistance of parts subjected to a combination of stress and shock. It responds to an age hardening heat treatment. (A-general; SS)

225-A. (Slovak.) High-Strength Weldable Steels in Hungarian Industry. Bela Zorkoczy. Zvaracsky Sbornik, v. 10, Jan. 1961, p. 41-50.

Composition and mechanical properties of the Mn-Ti-Al steel MTA50. Impact strength for the temperature range -40 to 20° C. Structure in the rolled and normalized states. Fatigue strength. (A-general, K9s; ST, SGB-a)

226-A. High Temperature Properties and Alloying Behavior of the Refractory Platinum-Group Metals. R. W. Douglass, F. C. Holden and R. I. Jaffee. Battelle Memorial Institute (Department of the Navy). U. S. Office of Technical Services, PB 161823, Aug. 1959, 118 p. $2.75.

Results of a literature survey. The major emphasis is on the metallurgical properties of the four more refractory Pt group metals, Rh, Ir, Os and Ru. Information on Pt and Pd is included. (A-general; Pt, Pd, Rh, Os, Ru, Ir)

227-A. Cobalt. OTS Selective Bibliography SB-457. (Available from U. S. Office of Technical Services, Washington 25, D. C.) $.10.

Research reports of the Army, Navy, Air Force, Atomic Energy Commission and other government agencies are listed in addition to translations of foreign technical literature and government owned patents available for license on Co metals, alloys and compounds including isotopes. (A-general; Co)

228-A. Beryllium Research and Development in the Area of Composite Materials. J. Greenspan. Nuclear Metals, Inc. (Wright Air Development Division). U. S. Office of Technical Services, PB 171083, July 1960, 121 p. $2.75.

Studies of the bend ductility of Be sheets designed for sample width and thickness show that the amount of ductility is sensitive to grain orientation as well as to the sample dimensions. In narrow samples (small width/thickness ratio), bend ductility is highest with a highly preferred basal plane texture. (A-general, Q5g; Be, 4-53)

229-A. Beryllium: A Survey of the Literature. K. D. Carroll. Lockheed Aircraft Corp. U. S. Office of Technical Services, PB 161812, Apr. 1960, 59 p. $1.50.

Literature on Be published in the period 1957-1960 is surveyed and listed. Each entry carries a short abstract of the contents. (A-general; Be)

230-A. Beryllium: A Search of the Literature 1957-1959. K. D. Carroll. Lockheed Aircraft Corp. U. S. Office of Technical Services, PB 161811, Jan. 1960, 113 p. $2.

The fields of Be metallurgy, crystallography, fabrication methods and the application of Be to aircraft and missiles are reviewed. Also included are references on the toxicology of Be, its hazard limits and means of detection. (A-general; Be)

231-A. Evaluation of Beryllides. J. R. Lewis. Journal of Metals, v. 13, May 1961, p. 357-362.

Evaluation of properties, fabrication and nuclear applications of Be and its alloys in terms of density, elastic modulus, melting point, oxidation and impact resistance, hardness and thermal characteristics. 42 ref. (A-general; Be-b)

232-A. (Russian.) Die Steels for Hot Pressing of Hard-to-Work Alloys. E. V. Smirnov. Metallovedenie i Termicheskaya Obrabotka Metallov, Feb. 1961, p. 31-35.

Establishment of optimum ratio for carbon and alloying elements. Hardness and mechanical properties tested in terms of heat treatment and composition. (A-general; TS)

233-A. Review of Recent Developments in the Technology of Nickel-Base and Cobalt-Base Alloys. D. A. Roberts. Defense Metals Information Center, Battelle Memorial Institute, DMIC Memo. 104, May 5, 1961, 4 p. (Available as PB 171623 from U. S. Office of Technical Services, Washington 25, D. C.)

Summary of alloy development including a cast Ni-base Cr-Co superalloy, IN-100 with improved rupture properties to 1900° F.; a Co-based Cr-W casting alloy, no. 152, with improved fatigue, thermal shock and oxidation resistance but with lower creep strength than no. 151 and a series of Ni-based casting alloys with superior stress-rupture life to Udimet 700 and Nicrotung. Also investigated are dispersion-hardened alloys by powder metallurgy techniques and the mechanical and physical properties of existing alloys. (A-general, H-general, P-general, Q-general, 2-60; Ni-b, Co-b)

234-A. Review of Recent Developments in the Metallurgy of Beryllium. Webster Hodge. Defense Metals Information Center, Battelle Memorial Institute, DMIC Memo 105, May 10, 1961, 5 p. (Available as PB 171624, U. S. Office of Technical Services, Washington 25, D. C.).

Summary of DMIC reports (Feb. 1-Apr. 30, 1961), covering purification by zone refining and distillation; metallographic examination; and measurement of mechanical and physical properties as a function of composition, heat treatment and fabrication and working processes. 14 ref. (A-general, C-general, F-general, Q-general, P-general, 2-60, 2-64, 3-68; Be, 10-54)

235-A. Mechanical Properties of Materials at High Temperature. A. I. Smith. Chartered Mechanical Engineer, v. 8, May 1961, p. 278-285.

Literature review of recent research in the U. S. and Britain on equipment and procedures for testing materials such as W, Mo, Ta, Cb, Ti, Be and their alloys. Emphasis on material strengths at high temperatures for use in nuclear reactors, rockets and turbines. 87 ref. (A-general, Q-general; SGAh, Be, Cb, Mo, Ta, Ti, W)

236-A. (German.) Principles of Waste Gas Processing in the Oxygen Top-Blowing Process. Hans Hoff. Stahl und Eisen, v. 81, Apr. 27, 1961, p. 562-571.

Investigation of gas formation in the converter and volume of waste gas in the dust removal plant as a function of time during course of refining as a basis for development of two methods of waste gas control, comprising controlled suction of waste gas, with subsequent combustion and dust removal and dust removal without previous combustion. (A8a, D3)

237-A. (French.) Gallium. Pierre de la Breteque. Bulletin de la Societe Chimique de France, Jan. 1961, p. 48-54.

Occurrence, physical and chemical properties, analysis, extraction and purification of Ga. Its alloys and compounds and their utilization. (A-general; Ga)

238-A. (Pamphlet.) Metallurgical Problems Encountered in the Manufacture of Large Rimming Steel Ingots. Great Lakes Steel Corp., Detroit, Mar. 22, 1961, 36 p.

Review of investigations conducted on large low-carbon rimming steel ingots and slabs. Skin-zone sulphur chemistry, core-zone sulphur distribution, skin-core patterns and slab test patterns. Influence of oxygen content and sulphur distribution on metallurgical quality. (A-general; ST-d, 5-59)

239-A. (Book.) Extractive Metallurgy of Copper, Nickel and Cobalt". Paul Queneau, Editor. 1961. 647 p. Interscience Publishers, Inc., 250 Fifth Ave., New York 1.

Papers presented at a symposium sponsored by the Extractive Metallurgy Division of the Metallurgy Society, American Institute of Mining, Metallurgical and Petroleum Engineers, New York, Feb. 15-18, 1960. Subjects covered include Cu, Ni and Co separation, fluid bed roasting, fuel-fired smelting and converting processes, electric furnace smelting, atmospheric and elevated pressure leaching, refining, dialysis and recovery processes. An annotated bibliography of 1190 references is included. Papers are abstracted separately. (A-general, C-general, 11-64; Cu, Co, Ni)

240-A. (Italian.) Low-Alloy Casting Steels. G. Violi. Metallurgia Italiana, v. 53, Feb. 1961, p. 45-52.

Effect of alloying elements (Cr, Mo, Mn and Ni) during heat treatment. Relations between heat treatment, microstructure and mechanical properties of steel castings. Determination of empirical quality index. (A-general; AY, 5)

241-A. (Book.) Materials for Nuclear Engineers. A. B. McIntosh and T. J. Heal, Editors. 1960. 373 p. Interscience Publishers, Inc., 250 Fifth Ave., New York 1. $11.35.

Preparation, fabrication, physical and nuclear properties, mechanical properties, effects of reactor conditions and compatibility of U, Pu, Th, ceramic fuels, graphite, Mg, Be and Zr. Applications in nuclear reactors. (A-general, T11; U, Pu, Th, Mg, Be, Zr, NM, 17-57)

242-A. Uranium. R. W. Nichols. Paper from "Materials for Nuclear Engineers". Interscience Publishers, Inc., New York 1, 1960, p. 8-63.

Review of uranium metallurgy including extraction and fabrication techniques; elastic, tensile, creep, thermal, electrical, nuclear, magnetic and optical properties; allotropic forms, phase changes and dimensional stability; effects of irradiation; and compatibility with air, carbon dioxide, hydrogen, nitrogen, water and other metals. 56 ref. (A-general, T11; U, 10-54, 17-57)

243-A. Materials Information--Its Use in Nuclear Engineering. A. B. McIntosh. Paper from "Materials for Nuclear Engineers". Interscience Publishers, Inc., New York 1, 1960, p. 1-7.

Physical and mechanical properties, compatibility, fabrication techniques, behavior under reactor conditions and other factors affecting use of metal and nonmetal materials in nuclear power engineering. Reasons for variation in properties. (A-general, T11; 10-54, 17-57)

244-A. Plutonium. K. Q. Bagley. Paper from "Materials for Nuclear Engineers". Interscience Publishers, Inc., New York 1, 1960, p. 64-111.

Review of Pu metallurgy including occurrence, extraction fabrication and handling; crystallography and allotropic transformations; nuclear, thermal, elastic, tensile, magnetic and other properties; corrosion resistance and compatibility with other materials; lattice parameters and phase diagrams

of Pu alloy systems. Applications in nuclear reactors. 40 ref. (A-general, T11; Pu, 10-54, 17-57)

245-A. Thorium. I. P. Bell. Paper from "Materials for Nuclear Engineers". Interscience Publishers, Inc., New York 1, 1960, p. 112-132.

Review of Th metallurgy for nuclear reactor applications including occurrence and methods of extraction; physical and mechanical properties and their variation with temperature, strain rate, alloying elements and impurities; irradiation stability and resistance to reaction with water, gases, liquid metals and solids; melting, casting, powder metallurgy, working, machining and welding methods. 23 ref. (A-general, T11; Th, 10-54, 17-57)

246-A. Magnesium. T. J. Heal. Paper from "Materials for Nuclear Engineers". Interscience Publishers, Inc., New York 1, 1960, p. 219-268.

Review of metallurgy of Mg and Mg alloys including extraction and fabrication methods; structure, deformation characteristics, ignition temperature, electrical resistivity and thermal, nuclear, tensile, creep, elastic and other properties; theoretical mechanisms of intergranular cavitation; compatibility with gases, aqueous media and metals; effects of irradiation; application as canning materials for fuel elements. 36 ref. (A-general, T11; Mg-b, 10-54, 17-57)

247-A. Beryllium. L. R. Williams and P. B. Eyre. Paper from "Materials for Nuclear Engineers". Interscience Publishers, Inc., New York 1, 1960, p. 269-318.

Review of Be metallurgy including production by metallic reduction or electrolysis; melting, casting and purification; powder production and consolidation; mechanical working, joining and machining; behavior of single crystals; effects of strain rate, grain size and elevated temperatures on tensile, stress rupture and creep properties; neutron cross section, crystal structure, electrical, thermodynamic, thermal and elastic properties; compatibility with air, hydrogen, carbon dioxide, water, liquid metals and uranium; canning techniques, toxicity and safety precautions in handling. 70 ref. (A-general, T11; Be, 10-54, 17-57)

248-A. Zirconium. C. Tyzack. Paper from "Materials for Nuclear Engineers". Interscience Publishers, Inc., New York 1, 1960, p. 319-366.

Review of Zr metallurgy including extraction, fabrication and joining of Zr and Zr alloys; lattice parameters and creep, fatigue, tensile, elastic, nuclear, thermal, electrical and thermodynamic properties; effects of cold work and impurity content; compatibility with air, carbon dioxide, hydrogen, oxygen, acids, alkalies, aqueous media, uranium and liquid metals; applications in nuclear reactors. 81 ref. (A-general, T11; Zr-b, 10-54, 17-57)

249-A. (Book.) Fatigue Testing and Analysis of Results. W. Weibull, Editor. 1961. 305 p. Pergamon Press Inc., 122 E. 55th St., New York 22. $12.

General survey of fatigue test procedures, nomenclature, machines and equipment, measuring devices and test piece design and preparation. Methods discussed include routine, short and long-life cumulative damage, service stimulating, abbreviated and accelerated tests. Testing factors and planning presentation and analysis of results. (A-general, Q7)

250-A. Production of Wide Steel Strip. A. J. K. Honeyman. Iron and Steel Institute, Journal, v. 198, May 1961, p. 1-4.

Review of a symposium in London, May 1960, discussing papers from the UK, USA, Australia, Holland and Italy on future requirements of the tin-plate and vehicle industries and steelmaking, hot rolling, cold rolling, heat treatment and coating techniques for producing wide strip. (A-general; ST, 4-53)

251-A. (Book.) Symposium on the Testing and Evaluation of Materials for Solid Propellant Rocket Motor Casings, Report no. MAB-156-M. 314 p. 1959. National Academy of Sciences, Washington 25, D. C.

Symposium held by the National Research Council on Feb. 2-3, 1959, covering material selection and design, fracture and failure mechanisms, mechanical testing procedures and fabrication methods for high-strength steel and Ti alloy sheet. Topics include bend, center-cracked tensile, notched tensile and bulge tests; crack propagation and fracture sensitivity studies; application of the mechanics theory to fracture

analysis. (A-general, Q-general, Q26, T2p; SGB-a, ST, Ti-b, 4-53, 17-57)

252-A. Status of the Beryllium Industry in the United States of America. Bengt R. F. Kjellgren. NML (National Metallurgical Laboratory) Technical Journal, v. 3, Feb. 1961, p. 37-45.

Detection of beryl source with scintillation counter and Sb gamma-ray source. Mining, crushing, separation and reduction of beryl followed by vacuum casting to produce Be billets. Mechanical and physical properties of Be given. (A-general; Be)

253-A. Review of Recent Developments in the Technology of Tungsten. V. D. Barth. Defense Metals Information Center, Battelle Memorial Institute, DMIC Memo. 108, May 18, 1961, 4 p. (Available as PB 171627 from U. S. Office of Technical Services, Washington 25, D. C.)

Explosive forming, vacuum casting, arc melting, forging, extruding, electron beam welding and brazing of tungsten to produce billets, weldments and missile nozzles. Testing of 85 W-15 Mo alloy at temperatures to 4000° F. to determine yield strength, ultimate tensile strength, elongation and loading time to fracture. 9 ref. (A-general; W)

254-A. Hardened Particles Increase Alloy's Tool Resistance. E. J. Stefanides. Design News, v. 16, May 22, 1961, p. 64-65.

Report on heat resistant alloy (Infusite) with solid hardened particles in suspension. Alloy is capable of resisting pressure applied by carbide cutting tools and is, therefore, utilized in the fabrication of safes. (A-general; SGA-h)

255-A. Copper and Copper Alloys. A Survey of Technical Progress During 1960. Metallurgia, v. 63, Apr. 1961, p. 175-184.

Literature review of some 236 references covering extraction, fabrication, finishing, properties and testing. (A-general; Cu-b)

256-A. Conference on Internal Steel Quality and Methods of Its Assessment. West of Scotland Iron and Steel Institute, Journal, v. 68, 1960-1961, 202 p.

Conference papers on internal steel defects and inspection procedures for castings, forgings, plates and weldments. Vacuum casting technique for heavy forgings. 38 ref. (A-general, S-general, 9; 4-51, 4-53, 5, 7-51)

257-A. Low-Temperature Bonding. Electromechanical Design, v. 5, Apr. 1961, p. 30.

Report on bonding properties of Ga when mixed with Cu, Ag, Ni and Au. Resultant alloys are high-temperature resistant (to 900° C.) after hardening and are useful in fastening wire to heat sensitive electronic devices. (A-general; Ga-b, Ag, Au, Cu, Ni)

258-A. (German.) Melting, Molding and Casting of Ferrous and Nonferrous Metals. Montanwissenschaftliche Literaturberichte, v. 6, Dec. 1960, p. 2381-2607.

Review of the literature with abstracts covering scientific principles, process control, energy and materials; melting and refining technology, properties of metals, foundry practice, metal processing; corrosion, corrosion protection and surface treatments; material testing and refractories used in furnaces. (A-general, C-general, D-general, E-general, 10-54, 11-65)

259-A. (Book.) Atomic Theory for Students of Metallurgy. William Hume-Rothery. 1960. 427 p. Institute of Metals, 17 Belgrave Square, London, S.W.1, England. $7.50.

Review of the electron theory of metals and alloys including structure of the free atom, assemblies of atoms, free electron theory of metals, Brillouin-zone theory of metals and the crystal structure of metallic elements. (A-general, M25)

260-A. (Book.) Proceedings--American Petroleum Institute. Section 3. Refining. v. 40. 1960. 430 p. American Petroleum Institute, 12 Ave. of the Americans, New York 20, N. Y.

Collection of papers on corrosion problems, tubing inspection and maintenance, use of power fuels, use of lubricants, design of piping and waste disposal in refinery installations. (A-general, R-general, T29n)

261-A. Pipe Production Expedited by Cranes With Memories. Steel, v. 148, May 29, 1961, p. 77.

Crane magnets automatically controlled by sensing devices, memory

units and limit switches are used to transfer pipe from welding stations to the testing area. (A5a, T26r)

262-A. (Book.) Rare Metals Handbook. 2nd Edition. Clifford A. Hampel, Editor. 1961. 715 p. Reinhold Publishing Co., 420 Park Ave., New York 22, N. Y. $20.

Physical, mechanical, chemical, atomic and electrical properties given. Production, occurrence, fabrication, derivation, recovery and applications of each. Rare earths, alkaline earths, platinum metals, refractory metals plus Cs, Cr, Pu, Rb, Sc and Yt discussed. (A-general; EG-c, EG-d37, EG-g)

263-A. The Alkaline Earth Metals--Calcium, Barium and Strontium. Charles L. Mantell. Chapter 2 from "Rare Metals Handbook". Reinhold Publishing Co., New York 22, 1961, p. 15-31.

Physical, chemical, electrical, thermodynamic, tensile, atomic, chemical and crystalline properties given for each element. Discussion of analysis, derivation, production, recovery and electrolytic processes and subsequent application. 149 ref. (A-general; EG-f)

264-A. Beryllium. Bengt R. F. Kjellgren. Chapter 3 from "Rare Metals Handbook". Reinhold Publishing Co., New York 22, 1961, p. 32-57.

Beryllium oxides and alloys discussed. Occurrence, consumption, derivation, production, extrusion, fabrication and applications. Physical, mechanical, chemical, thermodynamic and toxic properties given. 28 ref. (A-general; Be)

265-A. Bismuth. Herbert E. Howe. Chapter 4 from "Rare Metals Handbook". Reinhold Publishing Co., New York 22, 1961, p. 58-68.

Physical, chemical, mechanical and atomic properties given. Bi binary, ternary, quartenary and quinary systems with compositions and eutectic temperatures given. Electrolytic processes and fabrication described. 28 ref. (A-general; Bi)

266-A. Boron. Hugh S. Cooper. Chapter 5 from "Rare Metals Handbook". Reinhold Publishing Co., New York 22, 1961, p. 69-81.

Specific heat, resistivity, physical and chemical properties given. Occurrence, analysis, fabrication and applications. Electrolysis and reduction processes. 107 ref. (A-general; B)

267-A. Cadmium. F. G. McCutcheon and John R. Musgrave. Chapter 6 from "Rare Metals Handbook". Reinhold Publishing Co., New York 22, 1961, p. 82-92.

Physical, chemical, thermal, electrical, toxic properties given. Occurrence, derivation, recovery, purification and electroplating processes described. Binary and ternary systems discussed. 81 ref. (A-general; Cd)

268-A. Chromium. R. W. Fountain. Chapter 7 from "Rare Metals Handbook". Reinhold Publishing Co., New York 22, 1961, p. 93-113.

Physical, chemical, mechanical, electrical and toxic properties given. Chromium alum, chromic acid and iodide processes described. Ductility and transition temperatures. Deposition, arc melting, fabrication. Applications. 91 ref. (A-general; Cr)

269-A. Cobalt. C. R. Whittemore. Chapter 8 from "Rare Metals Handbook". Reinhold Publishing Co., New York 22, 1961, p. 114-148.

Occurrence, concentration in ores and metallurgy. Physical, chemical, thermodynamic, mechanical, atomic and electrical properties. Data for Co-bearing magnetic materials. Reduction, purification, leaching and corrosion processes. Applications. 29 ref. (A-general; Co)

270-A. Columbium. Edwin M. Sherwood. Chapter 9 from "Rare Metals Handbook". Reinhold Publishing Co., New York 22, 1961, p. 149-177.

Thermodynamic, chemical, physical, mechanical and corrosion properties listed. Corrosion as affected by HCl, H_2SO_4, NaOH and KOH concentration. Solvent extraction, crystallization, extractive metallurgy, refining and welding by argon-arc and electron beam described. 158 ref. (A-general; Cb)

271-A. Gallium. A. P. Thompson. Chapter 10 from "Rare Metals Handbook". Reinhold Publishing Co., New York 22, 1961, p. 178-187.

Physical, chemical, corrosive, toxic and thermodynamic properties given. Alloys formed with Ga. Metals and nonmetals resistant to Ga. Occurrence, production, recovery and application methods. 41 ref. (A-general; Ga)

272-A. Germanium. H. R. Harner. Chapter 11 from "Rare Metals Handbook". Reinhold Publishing Co., New York 22, 1961, p. 188-197.

Physical, chemical and thermodynamic properties. Alloys and compounds of Ge with eutectic and melting temperatures are reported. Occurrence, recovery, fabrication and applications described. 84 ref. (A-general; Ge)

273-A. Hafnium. Donald R. Martin and Philip J. Pizzolato. Chapter 12 from "Rare Metals Handbook". Reinhold Publishing Co., New York 22, 1961, p. 198-219.

Physical, mechanical, chemical and structural properties at various temperatures. Occurrence, extraction and separation from Zr. Melting, fabrication, welding and metallography. Applications. 130 ref. (A-general; Hf)

274-A. Indium. J. R. Mills, R. A. King and C. E. T. White. Chapter 13 from "Rare Metals Handbook". Reinhold Publishing Co., New York 22, 1961, p. 220-238.

Physical, chemical, mechanical and thermodynamic properties. Listing of In alloy systems. Occurrence, derivation and several recovery processes discussed. Corrosion rate determined in various acids and alkalis. 81 ref. (A-general; In)

275-A. Lithium. P. E. Landolt and Marshall Sittig. Chapter 14 from "Rare Metals Handbook". Reinhold Publishing Co., New York 22, 1961, p. 239-270.

Electrochemical, thermodynamic, physical properties tabulated. Li oxides, nitrides, halides, salts, alloys and intermetallic compounds listed and discussed. Data given for occurrence, production, and efficiency of conversion from spodumene and other ores. 124 ref. (A-general; Li)

276-A. Manganese. Charles L. Mantell. Chapter 15 from "Rare Metals Handbook". Reinhold Publishing Co., New York 22, 1961, p. 271-282.

Physical and chemical properties and allotropism of Mn given. Occurrence, production, electrowinning and electrolysis processes. Application of Mn in Type 201 and 202 steel. 19 ref. (A-general; Mn)

277-A. Molybdenum. R. S. Archer. Chapter 16 from "Rare Metals Handbook". Reinhold Publishing Co., New York 22, 1961, p. 283-303.

Physical, mechanical, atomic, thermodynamic, hardness and emissivity properties given. Corrosive effects from hydrochloric, sulphuric, phosphoric and hydrofluoric acids. Fabrication and applications. (A-general; Mo)

278-A. The Platinum Metals. F. E. Beamish, W. A. E. McBryde and R. R. Barefoot. Chapter 17 from "Rare Metals Handbook". Reinhold Publishing Co., New York 22, 1961, p. 304-335.

Physical, thermal, chemical and mechanical properties given for Pt, Pd, Ru, Os, Rh and Ir. Occurrence, production, recovery and separation from Ni ores, refining and fabrication. Acid corrosion resistance. Applications discussed. 102 ref. (A-general; Ir, Os, Pd, Pt, Rh, Ru)

279-A. Plutonium. W. N. Miner, A. S. Coffinberry, F. W. Schonfeld, J. T. Waber, R. N. R. Mulford and R. E. Tate. Chapter 18 from "Rare Metals Handbook". Reinhold Publishing Co., New York 22, 1961, p. 336-392.

Physical, chemical, thermal, mechanical properties; crystal structure for Pu binary compounds and allotropes; phase diagrams for several Pu systems. Occurrence, production, derivation, separation, pyrometallurgy, metallography and applications discussed. 224 ref. (A-general; Pu)

280-A. Rare Earth Metals. Howard E. Kremers. Chapter 19 from "Rare Metals Handbook". Reinhold Publishing Co., New York 22, 1961, p. 393-417.

Physical, chemical, thermal, elastic, magnetic, mechanical and electrical properties. Discussion of ferrous and nonferrous alloys and table of binary and ternary systems. Occurrence, analysis, production, preparation and applications. 111 ref. (A-general; EG-g)

281-A. Rhenium. A. D. Melaven. Chapter 20 from "Rare Metals Handbook". Reinhold Publishing Co., New York 22, 1961, p. 418-433.

Atomic, physical, mechanical, thermal and chemical properties given. Occurrence, production, derivation and extraction. Preparation from potassium and ammonium perrhenates discussed. Applications. 96 ref. (A-general; Re)

282-A. Rubidium and Cesium. Clifford A. Hampel. Chapter 21 from "Rare Metals Handbook". Reinhold Publishing Co., New York 22, 1961, p. 434-440.

Atomic, thermal, physical and chemical properties listed. Occurrence, derivation, production, preparation and applications discussed. 13 ref. (A-general; Cs, Rb)

283-A. Scandium. A. H. Daane. Chapter 22 from "Rare Metals Handbook". Reinhold Publishing Co., New York 22, 1961, p. 441-446.

Atomic, thermal and chemical properties given. Preparation of scandium fluoride and scandium metal by various processes. 13 ref. (A-general; Sc)

284-A. Selenium. John R. Stone and Peter E. Caron. Chapter 23 from "Rare Metals Handbook". Reinhold Publishing Co., New York 22, 1961, p. 447-458.

Physical properties given for metallic Se. Solid, allotropic, amorphous, crystalline, liquid and vapor states discussed. Formation of Se compounds. Occurrence, derivation and applications. 35 ref. (A-general; Se)

285-A. Silicon. Donald W. Lyon and Jack E. Field. Chapter 24 from "Rare Metals Handbook". Reinhold Publishing Co., New York 22, 1961, p. 459-468.

Physical, chemical and thermodynamic properties given. Occurrence, production, derivation, analysis and applications. 112 ref. (A-general; Si)

286-A. Tantalum. Clifford A. Hampel. Chapter 25 from "Rare Metals Handbook". Reinhold Publishing Co., New York 22, 1961, p. 469-518.

Physical, mechanical, chemical and corrosive properties given. Effect of temperature and cold reduction on tensile and hardness properties. Extraction, consolidation, purification, electrolysis and melting processes. 103 ref. (A-general; Ta)

287-A. Tellurium. John R. Stone and Peter E. Carbon. Chapter 26 from "Rare Metals Handbook". Reinhold Publishing Co., New York 22, 1961, p. 519-528.

Physical and chemical properties of hexagonal Te and Te compounds. Occurrence, derivation and applications. 30 ref. (A-general; Te)

288-A. Thallium. Herbert E. Howe. Chapter 27 from "Rare Metals Handbook". Reinhold Publishing Co., New York 22, 1961, p. 529-535.

Physical and chemical properties; eutectic points of various Tl alloys. Occurrence, production and applications. 75 ref. (A-general; Tl)

289-A. Thorium. Harley A. Wilhelm. Chapter 28 from "Rare Metals Handbook". Reinhold Publishing Co., New York 22, 1961, p. 536-558.

Physical, chemical, electrical, thermodynamic and mechanical properties for Th and Th compounds. Production, fused salt electrolysis, bomb reduction, metallography and other processes discussed. 90 ref. (A-general; Th)

290-A. Titanium. H. R. Ogden. Chapter 29 from "Rare Metals Handbook". Reinhold Publishing Co., New York 22, 1961, p. 559-579.

Physical, mechanical, electrical, thermodynamic properties for Ti and commercial Ti alloys. Occurrence, extraction, metallurgy, electrolysis, corrosion and fabrication. Applications. 13 ref. (A-general; Ti)

291-A. Tungsten. K. C. Li. Chapter 30 from "Rare Metals Handbook". Reinhold Publishing Co., New York 22, 1961, p. 580-597.

Physical, mechanical and chemical properties for tungsten and tungsten alloys. Metallurgy, metallography, fabrication, melting and spraying techniques. Applications. 29 ref. (A-general; W)

292-A. Uranium. Saul Isserow. Chapter 31 from "Rare Metals Handbook". Reinhold Publishing Co., New York 22, 1961, p. 598-628.

Physical, mechanical, chemical, tensile, thermodynamic properties given.

Refining, milling, preparation; reaction with elements, compounds, acids, alkalis and salts. 181 ref. (A-general; U)

293-A. Vanadium. H. E. Dunn and D. L. Edlund. Chapter 32 from "Rare Metals Handbook". Reinhold Publishing Co., New York 22, 1961, p. 629-652.

Physical, thermodynamic, mechanical and chemical properties given. Corrosion by various acids and sea water; fabrication, metallography and applications. Optical and physical properties of vanadium minerals. 25 ref. (A-general; V)

294-A. Yttrium. A. H. Daane. Chapter 33 from "Rare Metals Handbook". Reinhold Publishing Co., New York 22, 1961, p. 653-666.

Physical, mechanical, thermodynamic properties given. Occurrence, separation, preparation, reduction and melting techniques. Applications. 20 ref. (A-general; Y)

295-A. Zirconium. A. W. Schlechten. Chapter 34 from "Rare Metals Handbook". Reinhold Publishing Co., New York 22, 1961, p. 667-686.

Physical, mechanical, chemical, thermal properties given. Separation, production, decomposition, electrodeposition; corrosion by acids, gases, liquid metals, organic compounds, chlorides and alkalis; applications. 73 ref. (A-general; Zr)

296-A. Magnesium-Lithium Alloys--Lightest Metals for Spacecraft. Magnesium Products, May 1961, p. 1-2.

Effect of solution heat treating and extrusion on the elongation, compressive yield strength, tensile yield strength, ultimate tensile strength, brittleness and failure of LA141 and LA91 Mg alloys. These Mg alloys can be melted and cast by open-air flux methods or in a closed system under partial pressures of inert atmospheres and may be readily welded using inert-gas-shielded arc welding techniques or by spot welding. (A-general; Mg-b, Li)

297-A. (Pamphlet.) Electron Beam Tantalum Alloy. May 31, 1961. 2 p. Stauffer Metals Division, 1201 South 47th St., Richmond 4, Calif.

Data given for composition, physical properties, room temperature and elevated temperature, tensile properties, Brinell hardness, Charpy V Notch impact strength and stress rupture life. Effect of annealing and cold rolling on mechanical properties. Fabrication techniques such as electron beam or inert gas fusion welding, forging, annealing, rolling, tempering, stress relieving and recrystallization. (A-general; Ta-b)

298-A. Some Recent Advances in the Metallurgy of Nickel and Its Alloys. L. B. Pfeil. Australian Institute of Metals, Journal, v. 6, Feb. 1961, p. 53-61.

Review of extraction processes for Ni. Influence of trace elements on properties of Ni alloys. Ni plating. Applications of Ni at low temperatures. (A-general; Ni-b)

299-A. Extensive Program Presented at AFS Technical Sessions. Foundry, v. 89, June 1961, p. 142-144, 146, 148, 151, 153-154, 158, 161, 162.

Papers presented at the American Foundrymen's Society 65th Annual Castings Congress, San Francisco, May 11, 1961. Topics include gray iron, brass and bronze, malleable iron, light metals, heat transfer, patternmaking, industrial engineering and costs and safety hygiene and air pollution. (A-general, E-general, 10-54; CI, EG-a39, Cu-n)

300-A. Ductile Iron Society Meets in San Francisco. Foundry, v. 89, June 1961, p. 182-183.

Summaries of papers on trends in use of ductile iron presented at American Foundrymen's Society 65th Annual Castings Congress (San Francisco, May 11, 1961). Topics include tests on impact properties, holding times when casting with Mg and future production estimates. (A-general, E-general, 10-54; CI-r)

301-A. The Emergence of Titanium. M. Schofield. Iron & Steel, v. 34, May 1961, p. 173-175.

Historical review on the production of pure Ti metal, Ti powder and Ti sponge. Use of Ti as a deoxidizer and alloying element in steel and cast iron production. (A-general; Ti)

302-A. (Pamphlet.) Tool Steels. B. L. Averbach. 1961. 32 p. Climax Molybdenum Co., Division of American Metal Climax, Inc., 1270 Ave. of the Americas, New York 20, N. Y.

Principle types of toolsteel containing Mo are reviewed in terms of heat treatment and microstructural constituents with attention to hot hardness and dimensional stability in high-temperature service. Data are given for physical and mechanical properties as a function of composition, temperature and heat treatment. 32 ref. (A-general, J-general, N-general, P-general, Q-general; TS, 17-57)

303-A. Cast Magnesium and the Designer. Light Metals, v. 24, May 1961, p. 136-137.

Symposium papers on Mg castings and their design. (Joint meeting of the Assoc. of German Engineers and the Assoc. of German Foundrymen, Essen, Germany, Mar. 23-24, 1961). Subjects covered include production development, Mg alloy metallurgy, machining, surface protection and treatment, design, sand, gravity and pressure die castings and industrial applications. (A-general; Mg, 5)

304-A. (German.) Metallic Thorium. G. A. Meerson and A. F. Islankina. Planseeberichte fur Pulvermetallurgie, v. 8, Jan. 1961, p. 173-187.

Review of production of metallic Th by reduction of ThO_2 and by electrolysis of halide salts. Sintering of Th in terms of properties of raw Th powder. Pressing. Physical and mechanical properties of sintered Th. 20 ref. (A-general; Th)

305-A. High Speed Steels Meet Tool Needs. Pt. 1. Peter Payson. Metal Progress, v. 79, June 1961, p. 65-68.

Since the introduction of 18-4-1 at the turn of the century, engineers have improved alloys and lowered costs, until today's users have a wide variety of excellent high-speed steels to choose from. (A-general; TS-m)

306-A. Better Air-Hardening Tool Steels. Neil J. Culp. Metal Progress, v. 79, June 1961, p. 70-72.

Toolsteels which can be fully hardened by cooling in air from austenitizing temperatures in the 1500-1600° F. range are often the answer to problems involving warpage, distortion and uniformity in hardening. (A-general; TS)

307-A. Classification and Selection of Tool Steels. Metal Progress, v. 79, June 1961, p. 96-B.

Designations, composition and applications of 14 principal types of toolsteels. (A-general; TS)

308-A. Freer Machining and Better Corrosion Resistance. Tooling and Production, v. 27, June 1961, p. 49.

Description of 303 MA Uniloy, a freer machining and more corrosion resistant steel than AISI 303. 303 MA Uniloy combines Al with sulphur additions to provide a superior microstructure. (A-general; SS)

309-A. Aluminum EC (Electrical Conductivity Grade of Aluminum). Alloy Digest, Al-104, June 1961, 2 p.

Alloy is required to meet the commonly specified minimum conductivity requirement of 61% of the International Annealed Copper Standard. It has a mass conductivity of 201%. The electrical conductivity does not change with cold work, at least up to 41% cold reduction. It is of higher purity than commercial aluminum 1100. (A-general; Al-b)

310-A. N-S 25 (High Temperature Spring Alloy). Alloy Digest, Co-27, June 1961, 2 p.

This Co-base alloy has high resistance to oxidation and carburization up to 1800° F., has high fatigue strength against mechanical and thermal stresses and excellent hot ductility. It is nonmagnetic. It is recommended for spring applications operating at temperatures from 400-1400° F. (A-general; Co-b)

311-A. Jalcase 9 (Free-Cutting Carbon Steel). Alloy Digest, Cs-16, June 1961, 2 p.

Steel will not harden deeply on heat treatment except in thin sections. It should not be used where it is essential that properties be approximately the same throughout the full sections. The grade responds very well to induction or flame hardening treatments where a high order of surface hardness is desired. (A-general; CN)

312-A. Cunico (Permanent Magnet Alloy). Alloy Digest, Cu-101, June 1961, 2 p.

Cu-base permanent magnet alloy is ductile, malleable and machinable after its heat treated stage; has lower residual and higher coercive force than Alnico II. Cunico can be magnetized in any direction since it does not possess directional properties. (A-general; Cu-b)

313-A. Ni-Vee Type B (Constructional Bronze). Alloy Digest, Cu-102, June 1961, 2 p.

Has the engineering advantages of easy castability, low shrinkage, pressure tightness, fine grain, economy and versatility. In common with other bearing bronzes, it may be mated with itself or other metals to provide satisfactory resistance to seizure, galling and metal-to-metal wear. (A-general; Cu-s)

314-A. Scaife MX-2 (Ultra High Strength Steel). Alloy Digest, SA-116, June 1961, 2 p.

Co modified Type 4140 ultra-high strength steel having high multiaxial capabilities at the 225,000-235,000 psi. (0.2% offset) yield strength levels. (A-general; ST, SGB-a)

315-A. Enduro S-1 Nickel (Corrosion Resisting, Hardenable Steel). Alloy Digest, SS-118, 2 p.

Cr type martensitic corrosion resisting steel to which Ni is added to increase corrosion resistance and mechanical properties; it has high oxidation resistance and can be used in the annealed condition up to 1300° F. (A-general; SS)

316-A. Potomac A (High Strength Steel). Alloy Digest, TS-105, June 1961, 2 p.

Medium carbon, alloy steel that can maintain strength at elevated temperatures up to 1000° F. is recommended for hot die applications and structure components where strength at elevated temperatures is important. (A-general; AY)

317-A. Copper. OTS Selective Bibliography SB-458. (Available from U. S. Office of Technical Services, Washington 25, D. C.) $.10.

Research reports of the Army, Navy, Air Force, Atomic Energy Commission and other government agencies are listed in addition to translations and government owned patents. Reports cover general research on high and low temperature properties, Cu films, powder metallurgy, electrolytic Cu and semiconducting properties of intermetallic Cu compounds. (A-general; Cu)

318-A. Composite Stainless Wire Withstands Flexing Damage. Steel, v. 148, June 19, 1961, p. 88-89.

Development of a composite wire with a core of phosphor bronze and an outer surface of 304 stainless steel. Wire combines the corrosion resistance of stainless steel with improved flex resistance. (A-general; Cu-s, SS, 4-61)

319-A. New Steel Extends Process Tool Life. Steel, v. 148, June 19, 1961, p. 108.

A new tungsten toolsteel combines deep hardening at low temperatures with good wear resistance and dimensional stability. Steel has increased service life of rotary press punch holders to a year. (A-general; TS, W)

320-A. (German.) Recent Developments in the Magnesium Field. Karl Ernst Mann. Zeitschrift fur Metallkunde, v. 52, Apr. 1961, p. 243-251.

Review of current status of Mg technology including production by electrolysis of $MgCl_2$ and by melting, processing techniques such as continuous casting, impact extrusion, mechanical properties of cast and impact extrusion alloys, research on Mg-Li and Mg-Zr alloys, corrosion protection by surface treatment and alloying and application of Mg in motor and gear cases as a canning material for reactor fuel elements and in corrosion protection of Fe. (A-general; Mg)

321-A. New Tool Steel Uses Tungsten to Lubricate Forming Punch. Iron Age, v. 187, June 15, 1961, p. 106-107.

Powdered iron oxide is compacted into magnetic cores for computers using a rotary press with a punch holder, composed of a new tungsten tool and die steel containing 1.50% C, 2% Mg, 0.25% Si, 0.90% Cr, 1% Mo and 4% W. It combines low hardening temperature, good wear resistance and dimensional stability and produces a slippery abrasive resistant surface under load. (A-general; TS, W)

322-A. Cleaner Chrome Boon to Melters. Iron Age, v. 187, June 15, 1961, p. 116.

Oxygen blowing of ferrochrome to produce a highly refined charge chrome for use in stainless and toolsteels, steel castings and cast iron. The resulting product has the composition 58-65% Cr, 4.25% C, 1% Si and 0.03% S. (A-general; AD-n31, Cr)

323-A. (Book.) Powder Metallurgy. Metallurgical Society of AIME. Werner Leszynski, Editor. 1961. 847 p. Interscience Publishers, Inc., 250 Fifth Ave., New York 1, N. Y.

Proceedings of an International Conference held in New York, June 13-17, 1960, under the joint sponsorship of the Metal Powder Industries Federation and the Powder Metallurgy Committee of the Institute of Metals Division, The Metallurgical Society, American Institute of Mining, Metallurgical and Petroleum Engineers. (A-general, H-general)

324-A. How to Get More From High Speed Steels. George A. Roberts and John C. Hamaker, Jr. Steel, v. 148, June 12, 1961, p. 140-144.

Super-high-speed steels (high carbon, high vanadium) now fill the gap between conventional high-speed steels and the carbides and ceramics. Special surface treatments reduce friction and improve tool performance. (A-general; TS-m)

325-A. (Book.) Metal Industry Handbook and Directory 1961. 1961. 560 p. Iliffe Books Ltd., Dorset House, Stamford St., S. E. 1, London, England.

General properties of metals and alloys; data and tables; electroplating and allied processes; directory of trade names, manufacturers and products. (A-general, L17, 11-68)

326-A. (Book.) Industrial Furnaces. v. 1. 5th Edition. W. Trinks and Matthew Mawhinney. 1961. 486 p. John Wiley & Sons, Inc., 440 Park Ave. South, New York 16, N.Y.

Basic principles underlying furnace design and operation; theory and calculation of heat transfer; movement of gases in furnaces; fuel economy. A-general, 1-55)

327-A. Developments in Stainless Steel. Mechanical World and Engineering Record, v. 141, June 1961, p. 214-215.

Review of recent research on stress corrosion cracking, effect of chemical composition and heat treatment on microstructure and corrosion resistance. Influence of strain rate and temperature on ductility and effect of machining transformation. (A9; SS)

328-A. (German.) Niobium--Metal With a Future. R. Kieffer and B. F. Kieffer. Metall, v. 15, May 1961, p. 394-403.

Review of mechanical and chemical properties such as affinity to gases, production methods of liquid-liquid extraction, fused salt electrolysis or alkaline reduction, processing methods, alloying techniques with Ta, Mo, W, Ti, Zr, V, Al and C and applications in nuclear technology and as a hard metal. 51 ref. (A-general; Cb)

329-A. (German.) Investigation of Natural Age Hardening AlZnMg Alloys. Pt. 1. W. Rosenkranz. Metall, v. 15, May 1961, p. 425-432.

Results of cold and warm age hardening and corrosion tests on AlZnMg alloys of various composition. Investigation of a new AlZnMg alloy with 7.5% $MgZn_2$ with respect to mechanical properties as influenced by various heat treatments and natural age hardening of pressed specimens as influenced by pressing temperature and preheat treating. (A-general; Al-b, Mg, Zn)

330-A. (Book.) Rare Earth Alloys. Karl A. Gschneider, Jr. 1961. 449 p. D. Van Nostrand Co., Inc., 120 Alexander St., Princeton, N. J. $12.75.

Extensive compilation of information on the known rare earth alloy systems brings the phase diagrams, crystallographic and thermodynamic data and physical and mechanical properties of these alloys into a single, convenient reference volume. 653 ref. (A-general; EG-g45)

331-A. Commercial Production of Rhenium Metal. Microtechnic, v. 15, Apr. 1961, p. A 50.

Review of properties and commercial production of wrought Rh rod, wire and strip with attention to high temperature, welding and electrical applications. (A-general, 10-54; Re, 4, 17-53)

332-A. (Book.) Physical Chemistry of Process Metallurgy. Pt. 1. v. 7. Metallurgical Society of AIME. George R. St. Pierre, Editor. 1959. 644 p. Interscience

Publishers, Inc., 250 Fifth Ave., New York 1, N. Y. $22.50.

Collection of papers from an international symposium on physical, chemical and thermodynamic properties of liquid metals and slags, nature and structure of liquid metals and solubility and phase equilibria in metals systems. Papers are abstracted separately. (A-general, N14)

333-A. Materials for the Future. C. L. Kobrin. Iron Age, v. 187, June 22, 1961, p. 115-122.

Review of possible lines of future development in computer designed alloys, ductile ceramics, heat resistant plastics. A greater interchangeability of materials will be apparent. Composites which combine the test features of all materials will be in greater demand. There will be metal-plastics, glass-plastics, glass-metals. They may be of clad, reinforced or sandwich concepts. Reinforcing will be in the form of powders, flakes and fibers. (A-general)

334-A. (French.) A New Cobalt Alloy and Its Applications in the Construction of Metallurgical Furnaces. Journal du Four Electrique et des Industries Electrochimiques, v. 66, Apr. 1961, p. 131-132.

Melting, deoxidation and casting of an alloy composed of 50% Co and 50% ferrochrome and containing 0.05-0.2% carbon. Application in the manufacture of heat resistant furnace components. Physical and mechanical properties. (A-general; Co-b)

335-A. Review of Recent Developments in Titanium and Titanium Alloy Technology. R. A. Wood. Defense Metals Information Center, Battelle Memorial Institute, DMIC Memo. 93, Mar. 27, 1961, 5 p. (Available as PB 161243 from U. S. Office of Technical Services, Washington 25, D. C.)

Review of research with reference to chemical reactions, corrosion mechanisms and mechanical properties of Ti and Ti alloys. Production processes. 15 ref. (A-general; Ti-b)

336-A. (Czech.) Economy Austenitic Steels of the Cr-Mn-Ni-N Type. K. Hybek, J. Solc and M. Zezulova. Strojirenstvi, v. 11, Apr. 1961, p. 275-282.

Sheet containing 0.08-0.12% C, 5.5-9.53% Mn, 0.34-0.60% Si, 0.020-0.035% P, 0.008-0.035% S, 3.5-5.35% Ni, 16-19% Cr and 0-0.35% N is tested for structure, corrosion resistance in 5-10% acetic acid at room temperature and 90° C. and in boiling solution of 3% NaCl and 10% lactic acid, mechanical properties and weldability. Effect of 0-80% cold deformation on ductility. 6 ref. (A-general; SS-e)

337-A. Physical Metallurgy of Nickel-Base Superalloys. C. H. Lund. Defense Metals Information Center, Battelle Memorial Institute, DMIC Memo. 153, May 5, 1961, 40 p. (Available as PB 171422 from U. S. Office of Technical Services, Washington 25, D. C.)

Solid-solution hardening precipitation hardening, strengthening by B and Zr additions and failure are considered in theoretical terms. Heat treatment reactions in regard to microstructural changes and carbide behavior. Tabulated mechanical properties of 30 British, U. S. and Soviet alloys. 37 ref. (A-general, Ni-b, SGA-h)

338-A. High-Strength Steel Forgings. H. J. Henning and F. W. Boulger. Defense Metals Information Center, Battelle Memorial Institute. U. S. Office of Technical Services, PB 151102, Jan. 1961, 62 p. $1.75.

Data are presented on forgings made from martensitic steels heat treated to strengths ranging from 240,000-300,000 psi. Forging characteristics, design limitations, dimensional tolerances and quality control problems. (A-general; SS-c, 4-51)

339-A. Physical and Mechanical Properties of Electrorefined Vanadium. J. D. Ramsdall, W. L. O'Brien, J. S. Winston and D. R. Schuyler. U. S. Bureau of Mines, Report of Investigations 5769, 1961, 22 p.

Evaluation of workability, recrystallization characteristics and mechanical and physical properties of high-purity electrorefined vanadium. Tabular and graphic presentation of effects of temperature, O, N and C on properties. 12 ref. (A-general; V)

340-A. (Book.) Physical Chemistry of Process Metallurgy. Pt. 2. v. 8. Metallurgical Society of AIME. George R. St. Pierre. 1959. 727 p. Interscience Publishers, Inc., 250 Fifth Ave., New York 1, N. Y. $25.

Papers and discussions from conference held at Pittsburgh, Penn. on Apr. 27 to

May 1, 1959. Topics include process reaction rates and mechanisms; solidification of metals; properties of halide and sulphide melts; industrial applications of physical chemistry; desulphurization in the steel plant; hydro and electro metallurgy; process controls and statistical methods. Papers are abstracted separately. (A-general, 10-54)

341-A. Alloy "713C" Has Good Properties to 1800° F. F. Kenneth Iverson. Precision Metal Molding, v. 19, June 1961, p. 44-45.

Composition and elevated temperature creep rupture and tensile properties of a precipitation hardening, vacuum melted Ni-base, Cr-Al-Mo alloy. Methods of investment casting, machining, grinding and welding the alloy. (A-general, Q-general, 2-62; Ni-b, Cr, Al, Mo)

342-A. Iron, Carbon Steel and Alloy Steel. H. S. Link and R. J. Schmitt. I/EC (Industrial and Engineering Chemistry), v. 53, July 1961, p. 590-595.

Review of literature on physical and mechanical properties of Fe and carbon, low-alloy and stainless steels in various structural shapes. Fabrication techniques with emphasis on welding. Corrosion studies. 33 ref. (A-general; AY, CN, Fe, SS, 4-57)

343-A. A New Nickel-Cobalt-Molybdenum Plate Steel. Cobalt, no. 11, June 1961, p. 38.

Development of a new 18% Ni alloy steel composed of 18% Ni, 7% C, 5% Mo, less than 0.5% Ti and a maximum of 0.05% C. Values are given for yield and tensile strength, Charpy-V notch impact strength and endurance limit determined after heat treating at 500° C. and hot rolling or solution annealing at 820° C. (A-general; ST, Co)

344-A. The Platinum Metals Today. Metal Progress, v. 80, July 1961, p. 87-90, 116, 118, 120, 122, 124.

The design engineer, seeking unusual metals with desirable properties, may find that the metals in the Pt group have much to offer. Their resistance to corrosion by almost all acids and freedom from oxide film formation at high temperatures made them useful in many applications. (A-general, Q-general; EG-c, 17-57)

345-A. Development of New Nickel-Base Brazing Alloys Having Ductility. R. A. Long. Welding Journal, v. 40, June 1961, p. 259s-264s.

Requirements of brazing filler metals. Development of a new brazing alloy based on the ternary system Ni-Mo-Si. Effects of addition of Mn, Cr, Sn, Li, Be, Co and Fe on liquidus and solidus temperatures. Data are given for oxidation resistance, hardness, flow and wetting characteristics and ductility. (A-general, Q-general, 2-60; SGA-b, Ni-b, Mo, Si)

346-A. (German.) The Rare Earth Metals--Deposits, Extraction and Application. Franz Matthes. Wissenschaftliche Zeitschrift, v. 3, no. 2, 1960-1961, p. 111-114.

Review of properties (density, melting point, boiling point, stable oxides), ore minerals and deposits, extraction metallurgy and application of rare earth metals. (A-general, 10-54; EG-g)

347-A. (Book.) Seventh International Conference on Low Temperature Physics, Proceedings. G. M. Graham and A. C. Hollis Hallett. 1961. 725 p., University of Toronto Press, Canada. $15.

Papers presented at the conference held at the University of Toronto, Aug. 29-Sept. 3, 1960, by the Union Internationale de Physique Pure et Appliquee with the co-operation of the Canadian Assoc. of Physicists. Topics include the Mossbauer effect, magnetic relaxation, proton polarization, nuclear orientation, Fermi surface, ultrasonic attenuation, resistance minima, superconductivity and electrical, transport and thermodynamic properties of metals, salts and gases at temperatures near or below 10° K. Papers are abstracted separately. (A-general, P-general, P15g, P12. 2-63, 10-54)

348-A. Development and Progress of High Speed Steels. Robert S. Rowe. Australian Machinery and Production Engineering, v. 14, June 1961, p. 23, 25, 27.

Survey of high-speed steels with special reference to the microstructure. Chemical composition and physical and mechanical properties of several German, American and Swedish makes of toolsteels available in Australia. 7 ref. (A-general, P-general, Q-general, 10-54; TS)

349-A. (Book.) SLA Bibliography No. 3 Guide to Metallurgical Information. Elizabeth W. Tapia, Editor. 1961. 85 p. Special Libraries Assoc., 31 E. 10th St., New York 3, N.Y.

An annotated and indexed compilation of reference sources covering process physical and mechanical metallurgy as applied to ferrous and nonferrous metals. References include abstracting services, bibliographies, encyclopedias, dictionaries, handbooks, patent literature and specifications and standards on a world basis. (A-general, 11-65)

350-A. (Book.) Progress in Very High Pressure Research. F. P. Bundy, W. R. Hibbard, Jr., and H. M. Strong, Editors. 1961. 314 p. John Wiley & Sons, Inc., 440 Park Ave., New York 16, N. Y.

Papers presented at an International Conference held at Bolton Landing, Lake George, New York, on June 14, 1960, covering equipment and technique for high pressure forming, structures of materials formed under high pressure and behavior of matter under high pressure such as electrical and magnetic changes in materials resulting from decrease of interatomic or intermolecular distances. A review of high pressure work in the U.S.S.R. is included. Papers are abstracted separately. (A-general, 3-74, 10-54)

351-A. (Book-German.) Mechanical Technology. Alfred Kopecky and Rudolf Schamschula. 1961. 431 p. Springer Verlag Wien, Austria.

Textbook of mechanical technology of materials with emphasis on metals. Properties, structure and production of metals and nonmetallic materials, material testing, forming and fabrications, bonding by welding and soldering. (A-general, 10-54)

352-A. Review of Recent Developments in the Technology of Molybdenum and Molybdenum-Base Alloys. J. S. Houck. Defense Metals Information Center, Battelle Memorial Institute, DMIC Memo. 114, July 5, 1961, 3 p.

Effect of melting and primary fabrication practice on the yield strength of Mo-0.5% Ti sheet bars and the effect of heat treatment prior to swaging on the rupture strength of TZC alloy. Studies on strength properties and hot hardness of Mo-TZC alloy and M-W alloys. 8 ref. (A-general, F-general, Q-general, 2-60, 2-64, 3-68; Mo-b, 10-54)

353-A. Review of Recent Developments in the Technology of Columbium and Tantalum. E. S. Bartlett and F. F. Schmidt. Defense Metals Information Center, Battelle Memorial Institute, DMIC Memo. 115, July 7, 1961, 4 p.

Effect of the addition of Zr, Mo, Ta and W on the mechanical properties of Cb alloys. Impact and tensile properties of Cb-14W alloy and heat treatment studies on Cb alloys containing Zr, Mo and W. Bend ductility of Ta-30Cb-7.5 alloy. 11 ref. (A-general, Q-general, 2-60, 2-64; Cb-b, Ta-b, 10-54)

354-A. New Alloy Steel. Engineer, v. 211, June 23, 1961, p. 1042.

An austenitic creep-resisting alloy steel for service temperatures up to 675° C. which contains 15% Cr, 16% Ni, 6% Mn and smaller percentages of Si, Mo, V, Cb and B. Mechanical properties are given for the alloy in the solution treated condition. (A-general, Q-general, Q3, 2-62, 2-64; AY)

355-A. (Translation-Brutcher no. 5174.) Properties of Materials Based on Borides. K. I. Portnoi. Issledovanue Splavov Tsvetnykh Metallov Sbornik, Feb. 1960, p. 197-204.

Study of Ti, Cr and Zr borides; specimen preparation, scaling resistance, relative brittleness and borolites. (A-general; Ti, Cr, Zr, NM-a37)

356-A. Beryllium Bronze. Metal Treatment and Drop Forging, v. 28, June 1961, p. 241-242.

Values are given for Brinell hardness and electrical conductivity of a Cu-Be alloy containing 2.5% Be after heat treatment at 800° C. Applications of beryllium bronze are reviewed with special discussion of method of making electron microscope grids. (A-general, P15g, Q29m, T1, 17-57; Cu-b, Be)

357-A. Aluminum 363 (Aluminum Casting Alloy). Alloy Digest, Al-105, July 1961, 2 p.

Al-Si-Cu-Zn casting alloy having good tensile ductility in the as-cast condition responds to a solution and age-hardening

treatment. (A-general; Al-b, Si, Cu, Zn)

358-A. Tantung G. Alloy Digest, Co-28, July 1961, 2 p.

Cast Cr-W Co-base alloy containing Ta or Cr carbide and having wear and corrosion resistance is used primarily for cutting tools. Tantung bridges the gap between maximum cutting speeds possible with high-speed steel and minimum speeds practical with carbides. (A-general; Co-b, Cr, W, Ta, Cb, C)

359-A. Red Brass, 85% (Corrosion Resistant Brass). Alloy Digest, Cu-103, July 1961, 2 p.

Formerly called Rich Low Brass, it is noted for its rich golden color and is frequently used to imitate Au in costume jewelry and related products. Extensively used for plumbing and industrial piping, it has excellent corrosion resistance to water and withstands repetitive forming and bending operations and does not cold work harden rapidly. (A-general; Cu-n)

360-A. Cunisil-837 (High-Strength Copper Alloy). Alloy Digest, Cu-104, July 1961 1961, 2 p.

Most of the Ni and Si in heat treated Cunisil are present as an intermetallic compound of nickel silicide and it is the precipitation of nickel silicide in the form of particles of submicroscopic size by a relatively low temperature heat treatment that accounts largely for the distinctive properties of the alloy. (A-general; Cu, Ni, Si)

361-A. Timken HS-260 (Ultra-Strength Steel). Alloy Digest, SA-117, July 1961, 2 p.

Steel designed for minimum tensile strength level of 260,000 psi. in the heat-treated condition. It exhibits good ductility and impact values consistent with the high hardness. (A-general; AY)

362-A. AISI Type 501 (Corrosion Resisting Steel). Alloy Digest, SS-119, July 1961, 2 p.

Low-Cr type corrosion resisting steel that is used for its heat resistance and good mechanical properties at elevated temperatures as well as for its corrosion resistance at moderately elevated temperatures. Its resistance to heat and corrosion does not compare to a genuine stainless steel but it serves well for a moderately priced alloy. (A-general; SS, Cr)

363-A. Par-Exc (Tool and Die Steel, Type S1). Alloy Digest, TS-106, July 1961, 2 p.

Medium-carbon low-alloy and die steel recommended for hubbing dies, punches, small die casting dies, hot work tools and other parts requiring moderate hardness and high toughness. This grade can be carburized to produce a wear resisting surface with a high strength high toughness score. (A-general; TS)

364-A. Badger (Non-Deforming Tool Steel, Type O1). Alloy Digest, TS-107, July, 1961, 2 p.

Oil hardening, nondeforming tool and die steel having good hardenability characteristics. W and Cr additions increase its wear resistance over the straight Mn oil-hardening type die steel. (A-general; TS, W, Cr)

365-A. (Punched Cards.) High Temperature Strength Data for Metals and Alloys. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. $22.50.

Compilation of data in the form of hand sorted edge-notched punched cards indicating chemical composition, heat treatment, microstructure, hardness, short-time tensile properties, creep and rupture strength for temperatures to 1700° F. The cards are coded for sorting by material, form, type of test, alloy, producer of the material and source of data. Materials include alloy, stainless and carbon steels, refractory and superalloys, light metals and Ni, Co and Cr-base alloys. (A-general, A14, Q-general, 2-62; SGA-h, ST, EG-a39 Ni-b, Co-b, Cr-b)

366-A. Marbrite Steels for Industry. Australasian Manufacturer, v. 46, June 10, 1961, p. 80-82.

Physical and mechanical properties and applications of bright steel bars; free-cutting steels; Ledbrite, a lead-bearing free-cutting steel designed to reduce cycle times and increase tool life and case hardening and oil quenching steels. (A-general, Q-general, 2-60; AY, TS-b)

367-A. Industrial Cryogenics Explores New Areas. Pt. 2. Chemical Processing, v. 24, July 1961, p. 27-49.

Review of parameters governing cryogenic insulation and storage; mechanical properties of a modified ductile iron for cryogenic applications; use of N_2 in cryogenics; thermal shock resistance of 304 stainless steel extended bonnet valves and the application of CO_2 in cryogenic cooling. (A-general, Q-general, 2-63; CI-q, SGB, 1-52, 17-57)

368-A. (German.) Properties of the Material -- "Chill Gray Cast Iron". S. Portz. Maschinenbau Technik, v. 10. May 1961, p. 228-232.

Microstructure as influenced by cooling rate, mechanical properties including hardness, damping properties and tensile, compression and bending strength and technological properties such as wear resistance, machinability and resistance to internal pressure of chilled gray cast iron. 6 ref. (A-general, G17k, M27, Q-general, 2-64; CI)

369-A. (German.) On Technology of High-Melting Metals. Technica, v. 10, June 9, 1961, p. 769-771.

Review of physical, mechanical and chemical properties at room and elevated temperatures for high melting point metals, special processing methods including working and annealing under Ar atmosphere and electron beam melting and welding and development of heat resistant Cb-W-Ta alloys. (A-general, C-general, P-general, Q-general, 2-60, 2-64, 3-68; EG-d37)

370-A. (Book-Translation.) Soviet Electrochemistry. v. 1. Kinetics and Polarography. 1961. 264 p. Consultants Bureau, Inc., 227 W. 17th St., New York 11, N. Y.

Proceedings of the Fourth Conference on Electrochemistry, Moscow, USSR, Oct. 1-6, 1956, held by the Division of Chemical Sciences and the Institute of Physical Chemistry, Academy of Sciences, USSR. Papers presented on double-layer absorption, hydrogen overvoltage, electrochemical and diffusion kinetics and polarography. Abbreviated conference discussion on principal subjects are included. 589 ref. (A-general, L17, P15, 10-54)

371-A. Novel Integral Nozzle Perfected. John F. Judge. Missiles and Rockets, v. 9, July 24, 1961, p. 37-38.

Summary of research activities carried out at the Haynes Stellite Co., Division of Union Carbide. Topics include the development of a tungsten-graphite integral rocket nozzle which resists erosion and crack formation; production of a high-strength Cb-base alloy, Haynes alloy Cb-752, which is easily fabricated by conventional methods and forms a ductile weld joint; market research for refractory products and oxidation and aerospace applications of Cb. (A9, R1h, T2p, T24; Cb-b, W, 17-57)

372-A. (Book.) Year Book of the American Bureau of Metal Statistics. (40th Annual Issue for 1960). 1961. 139 p. American Bureau of Metal Statistics, 50 Broadway, New York 4, N. Y. $4.

Mine production, smelter production, consumption, imports and exports and other economic statistics on a world-wide basis. Tables of metal prices, monthly and annual; lists of metallurgical plants and their capacities; tables of production statistics by companies, both domestic and foreign, relating to nonferrous metals. (A4)

373-A. Haynes Stellite Alloy No. 3 (Heat, Corrosion and Wear Resistant Alloy). Alloy Digest, Co-29, Aug. 1961, 2 p.

Co-base alloy having high hardness and compressive strength, high heat and corrosion resistance, along with excellent abrasion and wear resistance. (A-general, Q-general, 2-60, 2-62; Co-b)

374-A. Alten 50 WR (Alloy Cast Iron). Alloy Digest, CI-30, Aug. 1961, 2 p.

Possesses high strength and high fatigue limit to permit high working stresses with lightness of sections and good resistance to wear against sliding friction. It withstands abrasion at high speeds and high unit pressures. Its maximum operating temperature is about 650° F. (A-general, Q-general, 2-60, 2-62; CI)

375-A. Alcan 236 (Aluminum Casting Alloy). Alloy Digest, Al-106, Aug. 1961, 2 p.

A 7% Cu, 2% Si aluminum alloy recommended for medium stressed castings, which is a nonheat treatable,

general purpose alloy with excellent machining qualities and good casting characteristics, possessing moderate strength. (A-general, E25p, G17k, Q-general; Al-b, Cu, Si)

376-A. Cunife-1 (Permanent Magnet Alloy). Alloy Digest, Cu-105, Aug. 1961, 2 p.

Alloy of Cu, Ni and Fe which is malleable, ductile and machinable, even after it has been age-hardened. The magnetic properties are fully developed only after extensive cold working. The preferred direction of magnetization is along the direction of cold working and the best magnetic properties are found only in the smaller sizes of rods or wires. Magnetically, it compares favorably with Alnico III. (A-general, P-general, Q-general, 2-60, 2-64, 3-68; SGA-n, Cu-b, Ni, Fe)

377-A. Nimonic 105 (Heat and Corrosion-Resisting Alloy). Alloy Digest, Ni-66, Aug. 1961, 2 p.

Ni-Cr-Co-base alloy with a significant content of Mo together with Ti and Al has outstanding resistance to creep at very high temperatures. (A-general, Q-general, Q3, 2-60, 2-62; Ni-b, Cr, Co)

378-A. AISI 94B30 (Ni-Cr-Mo-B Alloy Steel). Alloy Digest, SA-118, Apr. 1961, 2 p.

Triple alloy mild carbon steel having good hardenability, strength and toughness. It is an oil or water hardening steel and is relatively free of temper brittleness. The high depth hardness is reflected in good torque properties. It has good shock resistance and is recommended for heavy duty, moderately high strength applications. (A-general, Q-general, 2-60, 2-64; CN)

379-A. Esco Alloy 45S (Stainless Casting Alloy). Alloy Digest, SS-120, Apr. 1961, 2 p.

Austenitic, Mo-bearing stainless steel containing some ferrite that possesses distinct metallurgical characteristics that distinguish it from the similar (but not identical) AISI wrought grades Type 316 and Type 319. The major difference between the two groups is one of metallurgical structure, which influences their corrosion resistance, weldability and mechanical properties. (A-general, Q-general, 2-60, 3-71; SS-e, Mo)

380-A. Select B FM (Air Hardening Tool Steel, Type A-2). Alloy Digest, TS-108, Aug. 1961, 2 p.

High carbon, medium chrome type die steel. Air hardening and minimum distortion properties have been successfully combined with ease of machining, maximum toughness and good wearing properties to make this steel ideal for many applications. Harmful carbide segregation is not present in this steel. Intricate shapes may be heat treated with little danger of warping or cracking. (A-general, Q-general, 2-60, 2-64; TS-h)

381-A. (Book.) Stainless Steel Industry of Japan. Apr. 1961. 147 p. Japan Stainless Steel Assoc., Murako Bldg., 6, 2-Chome, Takara-cho, Chuo-ku, Tokyo, Japan.

History and development of the Japanese stainless steel industry. Review of production techniques and equipment including melting, casting, hot and cold working, fabrication, forging, quality control and research. Economic and statistical considerations. (A4, 10-54; ST)

382-A. The Venturi Scrubber for Cleaning Oxygen Steel Process Gasses. Howard P. Willet and Daniel E. Pike. Iron and Steel Engineer, v. 38, July 1961, p. 126-131.

Method for sizing gas cleaning plants and description of the Venturi gas cleaning system. Removal of fume containing Fe_2O_3, FeO, Mn_3O_4 and oxides of Si, Ca, Al and P accompanying the L-D oxygen steel process. Comparisons are made with electrostatic precipitator systems in terms of power consumption, space requirements and dust processing. 7 ref. (A8a, D10a, W13c)

383-A. Nickel. OTS Selective Bibliography SB-465. (Available from U. S. Office of Technical Services, Washington 25, D. C.) $.10.

Research reports of the Army, Navy, Air Force, U. S. Atomic Energy Commission and other government agencies are listed in addition to translations of foreign technical literature and government-owned patents available for license

on Ni, metal, alloys, compounds and catalysts. (A-general, 10-52; Ni)

384-A. Research in the Machine Tool Industry. Metal Treatment and Drop Forging, v. 28, July 1961, p. 291-294.

Survey of machine tool applied research including study of tungsten carbide and metrology. Future trends. (A9, T6n)

385-A. Rare Indium in the Metal Industries. M. Schofield. Metallurgia, v. 63, May 1961, p. 231-232, 237.

Applications of In include electroplating of bearing alloys, lubrication of dies and production of dental and surgical metals, solder and low-melting alloys. (A-general, 10-54; In, 17-57)

386-A. (Book-Translation.) The Metallurgy of Semiconductors. Yu. M. Shashkov. 1961. 183 p. Consultants Bureau, Inc., 227 W. 17th St., New York 11, N.Y.

Survey of physiochemical, electrical and optical parameters of Ge and Si; methods for extractive metallurgy and refining; and production of semiconductors. Topics include growth of monocrystals by zone melting and crystal pulling techniques, heat treatment, doping and the production of heterogeneous electrical structure in monocrystals, impurity diffusion and distribution, preparation of ohmic contacts and etching. 293 ref. (A-general, C-general, P-general, P15g; EG-j31, Ge, Si)

387-A. (Book-German.) Material Science of Nuclear Technology. Willfrid Epprecht. 1961. 407 p. Birkhauser Verlag Basel. Stuttgart, Germany.

Textbook covering principles of nuclear physics; physical chemistry of reactor materials including properties of the atom, solid state physics, properties of liquids and gases and surface reactions; effect of nuclear radiation on materials; reactor materials for fission and breeding, fuel elements, construction and absorption and shielding purposes. (A-general, 10-54, T11, 17-57)

388-A. Review of Recent Developments in the Technology of High-Strength Stainless Steels. D. A. Roberts. Defense Metals Information Center, Battelle Memorial Institute, DMIC Memo. 117, July 14, 1961, 3 p.

Survey of research for Apr. 1-June 30, 1961. Topics include the processing of wide sheet of Rene 41, AM 350, AM 355, A286, Potomac 4, 422, and 4340 to close tolerance; crack strength and propagation in AM 355, 4340, and Ti; heat treatment and resultant properties of Armco 12-8-6 PH and 20, 25% nickel steels. 4 ref. (A-general, G-general, J-general, Q-general, 10-54; SS, SGA-h)

389-A. (Pamphlet.) Annual Report of Defence Standards Laboratories. (June 30, 1960). Dept. of Supply--Australian Defence Scientific Service, Maribyrnong, Victoria, Australia.

Use of radioactive tracers and other techniques to determine electrode potential, corrosion resistance, tensile strength, creep resistance, microstructure and half-life of Fe, steel, stainless steel, Ir-192, Cr, Ti, Zn, Pb and Cu alloys, steel boiler tube and Cr-Ni liquid oxygen tanks. (A9, P-general, Q-general, R-general, S-general, 11-63)

390-A. A Survey of Research on the Transuranic Elements. M. B. Waldron. Contemporary Physics, v. 2, June 1961, p. 385-402.

Present and future status of research on Th, U, Pu, Np and Am are discussed with a review of methods of production and physical properties of these and other transuranic elements. (A-general, EG-h30, 10-54)

391-A. (German.) Tantalum. E. Erben and R. Lesser. Metall, v. 15, July 1961, p. 679-686.

Review of Ta metallurgy including ore sources; production of metal powder by fused salt electrolysis and subsequent reduction processes; sintering of compacts up to 2600° C.; electron beam melting and casting; and resultant physical, chemical and mechanical properties and applications. (A-general, C23p, C5k, H-general, P-general, Q-general; Ta)

392-A. Gray Iron-ASTM Specification A48. Machine Design--Ferrous Metals Book, 1961, p. 2-4.

Physical and mechanical properties; fabrication; applications; and general characteristics. (A-general, P-general, Q-general; CI-n)

393-A. Ductile Iron--ASTM Specifications A339 and A396. Machine Design--Ferrous Metals Book, 1961, p. 5-6.
Physical and mechanical properties; heat treatment; characteristics; applications; design considerations; fabrication. (A-general, P-general, Q-general, 2-64; CI-r)

394-A. Malleable Iron--ASTM Specifications A47 and A220. Machine Design--Ferrous Metals Book, 1961, p. 7-8.
Physical and mechanical properties; characteristics; applications; fabrication; corrosion resistance. (A-general, P-general, Q-general; CI-s)

395-A. Carbon Steel Castings--ASTM Specifications A27, A148 and A216. Machine Design--Ferrous Metals Book, 1961, p. 9-14.
Physical and mechanical properties; elevated and low temperature properties; characteristics; design considerations; fabrication; heat treatment. (A-general, P-general, Q-general, 2-61; CN-p)

396-A. Alloy Steel Castings--ASTM Specifications A148, A217 and A352. Machine Design--Ferrous Metals Book, 1961, p. 15-20.
Physical and mechanical properties at low and elevated temperatures; design considerations; fabrication; general characteristics. (A-general, P-general, Q-general, 2-61; AY, SS-b)

397-A. Plain Carbon Steels--AISI Types 1010 and 1015. Machine Design--Ferrous Metals Book, 1961, p. 21-23.
Physical and mechanical properties at low and elevated temperatures; fabrication; and general characteristics. (A-general, P-general, Q-general, 2-61; CN-g)

398-A. Plain Carbon Steels--AISI Types 1020 and 1025. Machine Design--Ferrous Metals Book, 1961, p. 25-26.
Physical and mechanical properties at low and elevated temperatures; treatment temperatures; fabrication; and general characteristics. (A-general, P-general, Q-general, 2-61, 2-64; CN)

399-A. Plain Carbon Steels--AISI Types 1030 and 1035. Machine Design--Ferrous Metals Book, 1961, p. 27-29.
Physical and mechanical properties at low and elevated temperatures; fabrication; corrosion resistance; and general characteristics. (A-general, P-general, Q-general, 2-61; CN-p)

400-A. Plain Carbon Steels--AISI Types 1040 and 1045. Machine Design--Ferrous Metals Book, 1961, p. 30-32.
Physical and mechanical properties at low and elevated temperatures; fabrication; treatment temperatures; general characteristics. (A-general, P-general, Q-general, 2-61, 2-64; CN-p)

401-A. Plain Carbon Steels--AISI Types 1050, 1055 and 1060. Machine Design--Ferrous Metals Book, 1961, p. 33-34.
Physical and mechanical properties; treatment temperatures; machinability and weldability; corrosion resistance. (A-general, P-general, Q-general, 2-64; CN-r)

402-A. Resulphurized Steels--AISI Types B1112, B1113, C1113, C1212, C1213 and SAE 12L14. Machine Design--Ferrous Metals Book, 1961, p. 35-36.
Physical and mechanical properties; weldability and machinability; corrosion resistance and general characteristics. (A-general, G17k, K9s, P-general, Q-general; CN, SGA-k)

403-A. Resulphurized Steels--AISI Types 1117 and 1118. Machine Design--Ferrous Metals Book, 1961, p. 37-39.
Physical and mechanical properties; design data; treatment temperatures; fabrication; and general characteristics. (A-general, P-general, Q-general, 2-64; CN, SGA-k)

404-A. Resulphurized Steels--AISI Types 1137, 1141, and 1144. Machine Design--Ferrous Metals Book, 1961, p. 40-42.
Physical and mechanical properties; treatment temperatures; fabrication; and general characteristics. (A-general, P-general, Q-general, 2-64; CN, SGA-k)

405-A. Low Alloy Steels--AISI Types 4130, 4140 and 4150. Machine Design--Ferrous Metals Book, 1961, p. 43-46.
Physical and mechanical properties at low and elevated temperature;

fabrication; corrosion resistance; and general characteristics. (A-general, P-general, Q-general, 2-61; AY)

406-A. Low Alloy Steels--AISI Types 4320, 4337 and 4340. Machine Design--Ferrous Metals Book, 1961, p. 47-52.

Physical and mechanical properties at low and elevated temperatures; treatment temperatures; fabrication; corrosion resistance; general characteristics. (A-general, P-general, Q-general, 2-61, 2-64; AY)

407-A. Low Alloy Steels-AISI Types 8620, 8630, 8640 and 8650. Machine Design--Ferrous Metals Book, 1961, p. 50-52.

Physical and mechanical properties; low temperature properties; treatment temperatures; characteristics; fabrication; corrosion resistance. (A-general, P-general, Q-general, 2-62, 2-64; AY)

408-A. Corrosion-Resistant Steel Castings-- ACI Types CA-15, CA-40, CB-30, CC-50 and CE-30. Machine Design--Ferrous Metals Book, 1961, p. 53-58.

Physical and mechanical properties of Fe-Cr or Fe-Cr-Ni alloys; heat treatment; characteristics; applications; design considerations; fabrication. (A-general, P-general, Q-general, 2-64; SS-b, SGA-g, Cr, Ni)

409-A. Corrosion-Resistant Steel Castings--ACI Types CF-3, CF-8, CF-20, CF-3M, CF-8M, CF-12M and CF-8C. Machine Design--Ferrous Metals Book, 1961, p. 56-58.

Physical and mechanical properties of Fe-Cr-Ni alloys; heat treatment; characteristics; applications; design considerations; fabrication. (A-general, P-general, Q-general, 2-64; SS-b, SGA-g, Cr, Ni)

410-A. Corrosion-Resistant Steel Castings--ACI Types CF-16F, CH-20, CK-20 and CN-7M. Machine Design--Ferrous Metals Book, 1961, p. 59-61.

Physical and mechanical properties of Fe-CN-Ni alloys; applications; design considerations; fabrication; characteristics. (A-general, P-general, Q-general, 2-64; SS-b, SGA-g, Cr, Ni)

411-A. Heat-Resistant Alloy Castings--ACI Types HA, HD, HE and HF. Machine Design--Ferrous Metals Book, 1961, p. 62-64.

Physical and mechanical properties of Fe-Cr alloys; elevated temperature properties; heat treatment; applications; design considerations; fabrication; characteristics. (A-general, P-general, Q-general, 2-62, 2-64; SS-b, SGA-h, Cr)

412-A. Heat-Resistant Alloy Castings--ACI Types HH, HI, HK, HL and HN. Machine Design--Ferrous Metals Book, 1961, p. 65-67.

Mechanical and physical properties of Fe-Cr alloys; elevated temperature properties; heat treatment; characteristics; applications; design considerations; fabrication. (A-general, P-general, Q-general, 2-61, 2-64; SS-b, SGA-h, Cr)

413-A. Heat-Resistant Alloy Castings--ACI Types HT, HU, HW and HX. Machine Design--Ferrous Metals Book, 1961, p. 68-70.

Physical and mechanical properties of Fe-Cr-Ni alloys at high temperature; heat treatment; characteristics; applications; design considerations; fabrication. (A-general, P-general, Q-general, 2-62, 2-64; SS-b, SGA-h, Cr, Ni)

414-A. Stainless Steels--AISI Types 201 and 202. Machine Design--Ferrous Metals Book, 1961, p. 71-72.

Physical and mechanical properties; treatment temperatures; characteristics; applications; fabrication; corrosion resistance. (A-general, P-general, Q-general, 2-64; SS-e)

415-A. Stainless Steels--AISI Types 301, 302, 302B, 303, 303Se, 304, 304L and 305. Machine Design--Ferrous Metals Book, 1961, p. 73-77.

Physical and mechanical properties; elevated and low temperature properties; treatment temperature; characteristics; applications; fabrication; corrosion resistance. (A-general, P-general, Q-general, 2-61, 2-64; SS-e)

416-A. Stainless Steels--AISI Types 316, 316L and 317. Machine Design--Ferrous Metals Book, 1961, p. 78-80.

Physical and mechanical properties at low and elevated temperatures; treatment temperatures; characteristics;

application; fabrication; corrosion resistance. (A-general, P-general, Q-general, 2-61, 2-64; SS-e)

417-A. Stainless Steels AISI Types 321, 347 and 348. Machine Design--Ferrous Metals Book, 1961, p. 81-82.

Physical and mechanical properties; elevated temperature properties; treatment temperatures; characteristics; applications; fabrication; corrosion resistance. (A-general, P-general, Q-general, 2-61, 2-64; SS-e)

418-A. Stainless Steels--AISI Types 308, 309, 309S, 310, 310S and 314. Machine Design--Ferrous Metals Book, 1961, p. 83-85.

Physical and mechanical properties; elevated temperature properties; treatment temperatures; characteristics; applications; fabrication; corrosion resistance. (A-general, P-general, Q-general, 2-61, 2-64; SS-e)

419-A. Stainless Steels--AISI Types 403, 410, 414, 416 and 416Se. Machine Design--Ferrous Metals Book, 1961, p. 86-88.

Physical and mechanical properties at low and elevated temperatures; characteristics; applications; fabrication; corrosion resistance. (A-general, P-general, Q-general, 2-60; SS-b)

420-A. Stainless Steels--AISI Types 405, 430, 430F, 430FSe and 446. Machine Design--Ferrous Metals Book, 1961, p. 89-91.

Physical and mechanical properties; elevated and low temperature properties; treatment temperatures; characteristics; applications, fabrication; corrosion resistance. (A-general, P-general, Q-general, 2-60, 2-64; SS-b)

421-A. Stainless Steels--AISI Types 431, 440A, 440B and 440C. Machine Design--Ferrous Metals Book, 1961, p. 92-94.

Physical and mechanical properties; elevated temperature properties; treatment temperatures; characteristics; applications; fabrication; corrosion resistance. (A-general, P-general, Q-general, 2-61, 2-64; SS)

422-A. Molybdenum Metal. L. F. C. Northcott. Alloy Metals Review, v. 9, June 1961, p. 2-8.

Extraction and refining. Production by arc melting or powder metallurgy techniques. Physical constants, structure, oxidation resistance, applications and mechanical properties. Effects of temperature and alloying additions on mechanical properties of Mo and Mo alloys. (A-general, C-general, M26, P-general, Q-general, R1h; Mo, 17-57)

423-A. Properties and Uses of Tantalum. Mechanical World and Engineering Record, v. 141, Aug. 1961, p. 281-282.

Review of recent research. Physical and mechanical properties and corrosion resistance. Alloying with Zr, Cb and W. Applications. (A9, P-general, Q-general, R-general; Ta, Zr, Cb, W, 17-57)

424-A. The Elements That Surround Us--Tantalum. Union Carbide Metals Review, v. 4, Summer 1961, p. 10-11.

History and development; ore sources; extraction and refining; corrosion resistance, fabricability, mechanical and physical properties with emphasis on dielectric properties; applications. (A-general, C-general, P-general, Q-general, R-general; Ta, 17-57)

425-A. Evolution of Ultrahigh-Strength Hardenable Steels for Solid-Propellant Rocket-Motor Cases. H. J. Hucek, A. R. Elsea and A. M. Hall. Defense Metals Information Center, Battelle Memorial Institute, DMIC Rept. 154, May 25, 1961, 40 p. (Available as PB 171423 from U. S. Office of Technical Services, Washington 25, D. C.)

Current roster of special steels from AISI 4130 through AISI 4340 including 5Cr-Mo-V steels (hot work die steels). Influence of composition and tempering on performance and mechanical properties. Benefits of vacuum melting. 36 ref. (A-general, D8m, Q-general, 2-60, 2-64; SGB-q, SGB-a, ST, TS-k)

426-A. (Translation-Brutcher no. 5162.) Data Sheet on High-Speed Steels of Increased Productivity. Metallovedenie i Termicheskaya Obrabota Metallov, Nov. 1959, p. 31-34.

Information on six new Russian HS steels: composition; heat treatment; red hardness; mechanical properties after quenching and tempering; propensity to surface decarburization; and hot hardness. (A-general, J-general; TS-m)

427-A. (Book.) Advances in Electron Tube Techniques. Fifth U. S. National Conference, Proceedings (Sept. 1960). 1961. 235 p. David Slater, Editor. Pergamon Press Inc., 122 E. 55th St., New York 22, N. Y. $15.

Evaluation of various metals and alloys and ceramics as to suitability for application in cathodes, envelopes and gettering systems of electron tubes. Description of vacuum equipment for study of the systems. Review of metallurgy and fabrication technology for metals and nonmetals in manufacturing electron tubes. Papers are abstracted separately. (A-general, T1j, 10-54, 17-57)

428-A. (Book-Translation.) Soviet Electrochemistry. v. 3. Applied. 1959. 231 p. Consultants Bureau, Inc., 227 W. 17th St., New York 11, N.Y.

Papers presented at the Fourth Conference on Electrochemistry, Oct. 1-6, 1956. Topics include electrodeposition, electrolysis in nonferrous metallurgy and operation of chemical sources of current. Papers are abstracted separately. (A-general, C23, L17, P15, 10-54)

429-A. Tungsten-Rhenium Size Range Grows. Steel, v. 149, Aug. 14, 1961, p. 155.

Tensile strength, melting point and ductility are given for a newly developed tungsten -26% Re alloy wire and strip. Applications. (A-general, P12n, Q23p, Q27a; W, Re, 17-57)

430-A. (German.) Corrosion and Precipitation Properties of Heat Resistant Alloyed Steels for Petrochemical and Oil Processing Engineering. Paul Hermann Huppertz. Erdol und Kohle, v. 14, May 1961, p. 371-374.

Review of chemical (corrosion and scaling resistance), physical (thermal conductivity, thermal expansion) and technological (microstructure, mechanical properties) properties of Cr-Ni alloyed heat resistant steels including cast and rolled 18/8, 26/9, 25/12 and 25/20 chromium-nickel steels. (A-general, M27, P11, Q-general, R-general; SGA-h, SS, Cr, Ni, 10-54)

431-A. (Book.) Symposium on Electrode Processes, Transactions. Ernest Yeager, Editor. 1961. 374 p. John Wiley & Sons, Inc., 440 Park Ave., New York 16, N. Y. $20.

Papers from symposium of the Theoretical Electrochemistry Div. of the Electrochemical Society held in Philadelphia, Pa., on May 4-6, 1959. Subjects covered include electrode kinetics, metallic ion adsorption, electrodeposition and dissolution processes, electrode reaction mechanisms, hydrogen evolution and faradaic impedance and rectification. Effects of double layer, acousto-electrochemical phenomena, electron transfer and isotopes on such processes. 493 ref. (A-general, L17, P15, 10-54)

432-A. Zirconium, Zircaloy and Hafnium--Safe Practice Guide for Shipping, Storing, Handling, Processing and Scrap Disposal. W. W. Allison. Westinghouse Electric Corp. U. S. Atomic Energy Commission, WAPD-TM-17, Dec. 1960, 33 p. $.75.

Procedures for safe handling, storage, shipping and processing. Topics covered include machining, pickling and scrap handling. (A5a, G17, L12g; Zr, Hf)

433-A. Metallurgy in the Navy. Office of Naval Research, PB 151110, Feb. 1960, 114 p. $2.50.

Review of metallurgical materials; problems associated with deep diving submarines; material requirements of hypersonic flight vehicles; direct energy conversion; the navy research and development program in metallurgy; the refractory metal program; semiconductor research; and irradiation effects in magnetic materials. (A-general)

434-A. (Book.) Columbian Metallurgy. v. 10. Metallurgical Society of AIME. D. L. Douglass and F. W. Kunz, Editors. 1961. 746 p. Interscience Publishers, Inc., 250 Fifth Ave., New York 1, N. Y.

Proceedings of a symposium sponsored by the Hudson-Mohawk Section, AIME, in cooperation with the Metallurgical Society, American Institute of Mining, Metallurgical and Petroleum Engineers, Bolton Landing,

New York, June 9-10, 1960. Papers are abstracted separately. (A-general; Cb)

435-A. A Critical Comparison of Columbium With Other Materials for Missile, Aircraft and Nuclear Applications. W. J. Harris, Jr. Paper from "Columbium Metallurgy". v. 10. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 3-10.

Corrosion resistance, oxidation and property levels of Cb in relation to Mo and other metals for application in re-entry vehicles such as the Dynasoar, in nuclear reactors and in energy conversion devices. (A-general; Cb, 17-57)

436-A. (Book-Translation.) Theory of Elasticity. V. V. Novozhilov. 1961. 448 p. Pergamon Press, Inc., 122 E. 55th St. New York 22, N. Y.

Review of the basic principles of the modern theory of elastic deformation. Application of mathematical physics in the solution of deformation problems of solid elastic bodies (plastic, rubber and polycrystalline metals and their alloys). Determination of the geometrical properties of the deformation of solid bodies, conditions of equilibrium and strain energy-stress relationship. (A-general, Q21, 10-54)

437-A. (Book.) Principles of Manufacturing Materials and Processes. James S. Campbell. 1961. 674 p. McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 36, N. Y. $9.75.

Review of commercial application of basic principles of physics and chemistry to the manufacturing and processing of metals, alloys and plastics. Topics include metallurgy and heat treating, mechanical working, foundry practice, cleaning and finishing, measuring and gaging, welding, brazing and soldering, material properties and design and applications of equipment. (A-general, 11-64)

438-A. (German.) Facts About Copper. Technik und Betrieb, v. 13, July 1961, p. 102.

Review of basic and well-known facts about Cu deposits, smelting and processing, physical, chemical and mechanical properties and applications. (A-general, 10-54; Cu)

439-A. Foote Mineral Offers Ultra-high Purity Lithium. Chemical and Engineering News, v. 39, Aug. 21, 1961, p. 48.

Development of a commercially available ultra high purity Li containing at least 99.92% Li and 60 and 70 ppm. N_2 for heat transfer applications which can be stored in stainless steel containers. Description of three other new Li products including high-purity lithium hydride, dry lithium metal powder and lithium peroxide. (A-general; Li)

440-A. Venturi Scrubber Wages War Against Air Pollution. Iron Age, v. 188, Aug. 31, 1961, p. 90-91.

Design and operation of a wet scrubber system for cleaning iron oxide fumes from openhearth furnace stocks. (A8a, 1-52)

441-A. New Low-Cost Stainless Steel Takes Severe Cold Working. Iron Age, v. 188, Aug. 31, 1961, p. 96-97.

Development of a new, low work-hardening stainless steel alloy designated Armco 18-9 LW for severe cold forming applications. Expected uses for fasteners, screws and related parts in automotive, aircraft, missile, chemical equipment and appliances where corrosion resistance is important. (A-general, Q23q, T-general; SS, 17-57)

442-A. Successful Cleaning of Open-Hearth Exhaust Gas With a High Energy Venturi Scrubber. C. A. Bishop, W. W. Campbell, D. L. Hunter and M. W. Lightner. Industrial Heating, v. 28, Aug. 1961, p. 1516, 1518, 1520.

An evaluation of the performance of a venturi scrubber system installed on a 225-ton openhearth furnace. Influence of the amount of scrubber pressure drop and outlet dust loading on cleaning efficiency. (A8a, 1-52)

443-A. A Materials System Program. A. P. Binsacca. Metals Engineering Quarterly, v. 1, Aug. 1961, p. 62-69.

Compression of the time schedules between preliminary design concept and delivered articles necessitates effective planning and controlling the type and direction of materials research, development effort and the manufacture of products. By utilizing sound management concepts through its Materials System Program, the Norair Div. of Northrup

Corp. attains the required level of proficiency to enable efficient, reliable design and manufacture of products. (A5)

444-A. A New High-Strength Aluminum Alloy. J. A. Neck, Jr., Marshall Holt and D. O. Sprowls. Metal Progress, v. 80, Sept. 1961, p. 87-91.

Initially introduced as an aircraft forging alloy for high stressed parts operating at 500-600° F., Alloy 2219 has demonstrated other outstanding characteristics--good weldability, high strength and resistance to stress-corrosion cracking--that make it suitable for applications in transportation, missiles and the chemical process industries. (A-general, Q-general, R-general, 2-60, 2-61, 3-66; Al)

445-A. "Metals for Today and Tomorrow"--An ASM Seminar at Monterey. Robert C. Bertossa. Metal Progress, v. 80, Sept. 1961, p. 142-158.

Review of high temperature properties, oxidation resistance and working of refractory metals; magnetic materials development; and metals for semiconductors. (A-general; EG-d37, EG-j31, SGA-n)

446-A. (Russian.) Using New Steel for Dies of Blank Cutters to Increase Their Durability. V. I. Zaleskii, F. P. Mikhailenko and V. V. Hubarev. Kuznechno-Shtampovochnoe Proizvodstvo, Mar. 1961, p. 9-16.

Newly developed 5KhHS steel contains 0.53% C, 0.98% Mn, 1.34% Si, 2.02% Cr, 0.015% P and 0.015% S. Parameters of heat treatment and machining technology. Tabulation of properties and comparisons with standard steels. (A-general, Q-general, 17-67; AY)

447-A. Commercial Production of Esshete 1250 and Vacuum Cast Steel. British Steelmaker, v. 27, Aug. 1961, p. 250-251.

An austenitic steel developed for oxidation and creep resistance at temperatures up to 675° C. Tabulation of mechanical properties. Parameters of production and applications for vacuum cast (stream degassed) steel ingots weighing up to 180 tons. (A-general, D9s, 1-73, 17-57; SS-e, ST)

448-A. (German.) New Investigations on Use of Lead. G. Heuser. Metall, v. 15, Aug. 1961, p. 772-775.

Review of new processing methods and technical applications for Pb, Pb alloys and Pb-containing enamels including production of hard and creep-resistant metals by powder metallurgy; continuous extrusion of tubes and cable coatings; use in noise abatement; use with metal-fiber reinforcements; and cladding of steel. Research on binary Pb compounds with Bi, Sb, As, Cu, Ag, Se, Te, Tl, Sn and Zn, and on Pb enamels. (A-general; Pb-b, 17-57)

449-A. (German.) Development of World's Lead and Zinc Production and Consumption. W. Macking. Metall, v. 15, Aug. 1961, p. 801-807.

Review of mining and melting production of Pb and Zn and consumption of refined Pb and of raw and refined Zn according to fields of application. (A4p, B12, C-general; Pb, Zn)

450-A. (German.) Economical and Technical Development of Zinc Pressure Die Casting in Europe. K. Bayer. Metall, v. 15, Aug. 1961, p. 813-817.

Review of production and consumption of Zn pressure die castings in Germany, Britain, France, Italy, Austria, Sweden and Spain in 1952-1960. Use of Zn castings in automobile parts. (A4p, T21; Zn, 5-61, 17-57)

451-A. (German.) Production and Use of Zinc in France. C. A. Wahl. Metall, v. 15, Aug. 1961, p. 817-820.

Review of research and production and applications of Zn and Zn alloys, rolled, galvanized and electroplated products, in cathodic protection system and in anticorrosive paints. (A-general, L-general; Zn, 17-57)

452-A, Metal Extraction and Chemical Metallurgy. F. D. Richardson. Chemistry & Industry, July 29, 1961, p. 1132-1142.

Pioneer work in the chemistry of melts is reviewed, beginning with the basic steelmaking process and the electrolytic process for Al; models and theories for solutions, molten salts and slags; silicate mixtures; and representation of equilibrium data by application of thermodynamics to metallurgical problems. (A2, A9, 10-54)

453-A. Work of the B. I. S. R. A. With Particular Reference to Fuel. W. C. L. Hessenberg. Institute of Fuel, Journal, v. 34, July 1961, p. 267-272.

Fuel economies are explored by considering the design of radiating furnaces and the use of induction heaters, quartz infrared heaters and fluidizer beds. Other investigations include automatic programming of electric-arc furnace operation and the design of a continuous strip annealing plant. (A-general, 10-52)

454-A. Cleaning Waste Gases From Open Hearth Steel Processes. W. Strauss. Mining & Chemical Engineering Review, v. 53, June 15, 1961, p. 50-55.

Methods discussed include collection by impingement, interception and diffusion; inertial separation; thermal precipitation; agglomeration; and magnetic separation. Parameters of design and operation of various systems and comparative efficiency of applications. 7 ref. (A8a, D2, 10-54)

455-A. (Book.) Thermoelectricity--Science and Engineering. Robert R. Heikes and Roland W. Ure, Jr. 1961. 576 p. Interscience Publishers, Inc., 250 Fifth Ave., New York 1, N. Y.

Review of the physics and chemistry of thermoelectric materials, the design of materials and device technology. Thermoelectric materials considered include semiconductors, semimetals, ionic crystals mixed valence materials and liquids. Chapters are abstracted separately. (A-general, P11, P15, 11-64; EG-j)

456-A. (Italian.) News on Fusion of 85-5-5-5 Alloys. Fonderia, v. 10, July 1961, p. 305-309.

Effect of pouring temperature, preheating, temperature of the chill, mold material, additions of Al, Si, Mn, Pb and Zn and pouring rate on tensile strength, elongation, fracture aspect, density, color and porosity of 85-5-5-5 Cu alloy. (A-general, P-general, Q-general, 1-52, 2-60, 3-67; Cu-b)

457-A. (Italian.) News on Aluminum Bronzes. Fonderia, v. 10, July 1961, p. 311-313.

Fusing, nitriding, cooling, casting and tempering of aluminum bronzes. Techniques of effecting phase transformations to improve hardness, tensile strength, ductility, grain size and corrosion wear and abrasion resistance. (A-general, P-general, Q-general; Cu-s, Al)

458-A. Cesium Picked for Stardom in Space. Steel, v. 149, Sept. 18, 1961, p. 139-141.

Application of Cs to ion propulsion, thermionics and magnetohydrodynamics (MHD). (A-general; Cs, 17-57)

459-A. Review of Recent Developments in the Technology of Beryllium. Webster Hodge. Defense Metals Information Center, Battelle Memorial Institute, DMIC Memo. 123, Aug. 18, 1961, 3 p.

Review of articles on the technology of Be, May-July 1961. Purification, casting, machining and reaction of Be with CO are noted and data presented on chemical and physical properties affected. 9 ref. (A-general, 10-54; Be)

460-A. (German.) Investigation of Medieval Charcoal-Hearth Smelting in Sauerland. Manfred Sonnecken. Stahl und Eisen, v. 81, Aug. 17, 1961, p. 1138-1143.

Historic investigation of 500 medieval charcoal-hearth smelters. Chemical analysis of ore, slag and metal relics. Reconstruction of design of charcoal hearths and determination of age of smelters by ceramic relics. (A2, D-general, 10-54)

461-A. Unimach No. 2 (High-Temperature Alloy Steel). Alloy Digest, SA-120, Sept. 1961, 2 p.

Deep-hardening steel which will harden throughout in large sections by air cooling from 1800-1900° F. It also exhibits secondary hardening characteristics and of particular significance is the fact that high temperatures are employed with the result that internal stresses are reduced to a minimum. (A-general, J5, 2-62; AY)

462-A. Carpenter Stainless 304+B (Corrosion Resisting Steel). Alloy Digest, SS-121, Sept. 1961, 2 p.

304+B is similar to conventional Type 304 with the addition of boron to give it a much higher thermal neutron absorption cross section than other austenitic stainless steels. (A-general, P18j, 2-60; SS, B)

463-A. Marvel (Hot Work Die Steel, Type H21). Alloy Digest, TS-109, Sept. 1961, 2 p.

Low-carbon, high-tungsten, hot work die steel, particularly adapted for dies which may become heated to a dull red heat while in operation. The alloy will withstand temperatures up to approximately 1100° F. without reduction from the maximum hardness attainable and will resist higher temperatures without loss of hardness when previously subjected to an equally higher tempering temperature. (A-general, Q29p, 2-64; TS-k)

464-A. Apex 400 (Aluminum Casting Alloy). Alloy Digest, Al-107, Sept. 1961, 2 p.

A 4% magnesium type aluminum-casting alloy having high corrosion resistance is not heat treatable and is recommended for marine applications and food processing equipment. (A-general, R-general; Al-b)

465-A. Eclipsaloy 520 (Magnesium Sand Casting Alloy). Alloy Digest, Mg-50, Sept. 1961, 2 p.

Heat treatable Mg sand casting alloy has excellent combination of high strength, toughness and resistence to weathering. The alloy has good ductility, excellent fatigue strength and reduced notch sensitivity. It is easily cast and is distinguished by extremely fine grain in both thick and thin sections. (A-general, Q-general; Mg-b)

466-A. Mueller 602 Bronze (Bearing Bronze Alloy). Alloy Digest, Cu-106, Sept. 1961, 2 p.

Bearing alloy for use with hard or soft mating members that do not have a high polish. The alloy can be used where high hardness and mechanical properties are not necessary. It will cold work lightly and has good machinability. (A-general, Q-general; Cu-s, SGA-c)

467-A. Ampco 22 (Aluminum Bronze). Alloy Digest, Cu-107, Sept. 1961, 2 p.

A hard, low ductility aluminum bronze recommended for drawing and forming dies. High alloy content of Ampco Metal 22 gives it a duplex structure of approximately 50% of each phase. The field of service of this alloy, with few exceptions, is limited to forming and/or drawing stainless and clean mild steels, especially when runs are long or gage is heavy and it is essential that tolerances be maintained. (A-general, Q23q, 2-60; SGA-j, Cu-s, Al)

468-A. N-A-Xtra (Super-Strength Structural Steel). Alloy Digest, SA-119, Sept. 1961, 2 p.

Low-carbon, low-alloy quenched and tempered steel recommended for structures and equipment requiring good abrasion resistance, atmospheric corrosion resistance, high tensile strength, high fatigue resistance, good formability and ease of welding. (A-general, Q-general; AY, SGB-s)

469-A. New Alloy Strengthens Valve Stems. Modern Castings, v. 40, Sept. 1961, p. 45-47.

Development of a new bronze alloy containing 7% Zn and 2% Al provides protection against both dezincification and dealuminization in valve stems. (A-general, T7b; Cu-s, 17-57)

470-A. (Italian.) Native Copper and Its Working in Prehistoric Times. H. H. Coghlan. Trattamenti Termici e Protettivi dei Metalli, v. 4, May-June 1961, p. 9-16.

Hammering, bending, grinding, annealing and fusion of native Cu in the stone and bronze age and its world distribution. Determination of Brinell hardness, elongation, tensile strength and structure. (A-general, A2, Q-general; Cu)

471-A. Design Information on AM 350 Stainless Steel for Aircraft and Missiles. R. J. Favor, O. L. Deel and W. P. Achbach. Defense Metals Information Center, Battelle Memorial Institute DMIC Rept. 156, July 26, 1961, 10 p.

Heat treating, forming, forging, welding and machining of semiaustenitic precipitation-hardenable steel in sheet, strip, foil, wire and other forms. Tentative room temperature design, allowable strengths and elevated temperature design curves are presented for various tensile, yield and shear stengths. 22 ref. (A-general, Q-general, T24, 10-54, 11-62, 17-51)

472-A. Fume Cleaning. Metal Industry, v. 99, Aug. 4, 1961, p. 92.

A transportable pilot venturi scrubber employs two complete cones of water for removal of dust particles from industrial fumes with an efficiency of 99.6%

in the range 5-0.01 microns. (A8a, W13c, 1-53)

473-A. An Up-To-Date Look at Prefinished Metals. R. J. Fabian. Materials in Design Engineering, v. 54, Aug. 1961, p. 129-140.

Availability, physical and mechanical properties, corrosion resistance, fabrication and joining techniques, design considerations and applications of preplated, prepainted, hot dipped, textured and embossed metals, plastics-metal laminates and special prefinished Al. (A-general, F-general, G-general, Q-general; 8)

474-A. (German.) Steels at Low Temperatures. Hermann Schumann. Abhandlungen der Deutschen Akademie der Wissenschaften zu Berlin, (Brochure), no. 10, 1960, 32 p.

Low-temperature technology of ferritic unalloyed, low alloyed and Ni steels and of austenitic Mn and CrNi steels. Mechanical properties of cast austenitic CrNi steels and of austenitic welding joints at temperatures between 20 and -180° C. Influence of delta ferrite on mechanical properties at temperatures from -180 to 20° C. (A-general, 2-63; ST)

475-A. (German.) The Rare Earth Metals--Occurrence, Production and Use. Franz Matthes. Chemische Technik, v. 13, May 1961, p. 290-292.

Review of occurrence of rare earth metals in mineral form; dressing and concentration operations; separation; extraction by electrolysis or reduction by metals such as Ca, Mg, Al or alkali metals; applications as alloying elements for Fe, steel and nonferrous metals and in semiconductor technology. (A-general, C-general, 17-57; EG-g45)

476-A. Columbium Treated Steel Promises Pipeline Savings. Steel, v. 149, Sept. 25, 1961, p. 160-162.

Development of XC-60 for pipeline construction requires thinner wall pipe for welding with standard equipment. The addition of Cb reduces grain size of steel and increases yield and tensile strengths. (A-general, M27c, Q-general, T26r, 17-57; ST, Cb)

477-A. (German.) Columbium and Tantalum as Materials. W. von Haken. Chemische Industrie, v. 13, May 1961, p. 314-320.

Physical, chemical and mechanical properties of Cb and Ta and their alloys; ore deposits; mining and extraction; statistics of Cb and Ta production and use. (A-general; Cb, Ta)

478-A. (German.) Magnesium Use, Extraction and Economical Importance. Chemische Industrie, v. 13, June 1961, p. 358-362.

Productive and mechanical properties of Mg and Mg alloys are reviewed in terms of applications in consumer goods and the automotive, electrical, aircraft and nuclear-component industries. (A-general, Q-general, 17-57)

479-A. Cryogenic Materials Data Handbook. T. F. Durham. Cryogenic Engineering Laboratory, National Bureau of Standards. (Ballistic Missile Div.). U. S. Office of Technical Services, PB 171809, Sept. 1961, 555 p. $7.

Covers the field of cryogenics from 1940 through 1959 and includes some previously unpublished laboratory test data. Information on Al, Co, Cu, Fe, Ni, Ti, carbides, nonmetals (such as ice, mylar and teflon), Be and Mo. Properties range from yield strength through expansivity to mechanical hysteresis. (A-general, P-general, Q-general, 2-63, 11-68)

480-A. Thermocouple Alloy for 5000° F. Materials in Design Engineering, v. 54, Sept. 1961, p. 13.

Temperatures up to 5000° F. can now be measured with thermocouples using newly available 25% Re-W alloy wire. The high-strength alloy retains room temperature ductility after heating to temperatures as high as 3600° F. (A-general, Q23p, 2-62; W, Re, 17-57)

481-A. (Translation-Brutcher no. 5182.) Some Problems in Physical Investigations of Metal and Alloys. I. B. Borovskii and A. A. Baikova. Trudy Institute Metallurgii Imeni, v. 4, 1960, p. 3-8.

Review of work done in recent years at Baikov Institute of Physical Methods of Investigation, such as on effect of trace amounts of impurities on the electron energy spectrum of the base material over a wide temperature range; on the nature of the bonding forces in intermetallic compounds of the electron

type; and in metal compounds having special properties. Work done on and with the microanalyzer, developed 12 yr. ago in the USSR. Problems now open to solution and being solved using the microanalyzer. (A-general)

482-A. (Translation-Brutcher no. 5143.) Service Performance and Applications of Hot Strength 12% Chromium Steel. G. Kruger. Neue Hutte, v. 6, Mar. 1961, p. 131-138.

Previously abstracted. See item 178-A, 1961. (A-general, Q-general, R-general, 2-60, 2-62; SS, 17-57)

483-A. 90Ta-10W Offers High Temperature Strength Plus Ductility. M. L. Torti. Space/Aeronautics, v. 36, Sept. 1961, p. 87-88, 90, 93.

Physical and mechanical properties, preliminary design data, actual and potential applications and workability of newly developed alloy. (A-general, P-general, Q-general; SGA-h, Ta, W, 17-57)

484-A. Beryllium Update--1961. Al. Knoerr and Mike Eigo. Engineering and Mining Journal, v. 162, Sept. 1961, p. 87-97.

Survey of Be industry including geology and statistics of ore development; recovery by Van Dornick flotation procedure; physical and mechanical properties of oxides; and applications including preparation of solid fuel rocket propellants. (A-general, B14h, P-general, Q-general, T24e; Be)

485-A. Quality Control in the Production of Steel Sheet for Deep Drawing and Pressing. W. O. Thomas. Sheet Metal Industries, v. 38, Sept. 1961, p. 659-674.

Processing of rimmed and stabilized steel includes deoxidation, pickling, cold reduction, annealing and temper rolling. Influence of annealing on surface quality and of temper rolling on mechanical properties. 9 ref. (A-general, G4, 2-64, 3-68, 17-54; ST)

486-A. A Review of Recent Developments in Titanium and Titanium Alloy Technology. R. A. Wood. Defense Metals Information Center, Battelle Memorial Institute, DMIC Memo. 126, Sept. 15, 1961, 8 p.

Developments from June-Aug. 1961, with reference to Ti-13V-11Cr-3Al all-beta alloy and Ti-8Al-1Mo-1V, Ti-7Al-12Zr and Ti-5Al-5Sn-5Zr super alpha alloys. Physical properties are related to fabrication procedures including brazing, welding, heat treating and cold rolling. 18 ref. (A-general, F23, 1-67, J-general, K-general, 10-54)

487-A. Rare-Earth Metals. Space/Aeronautics R & D Technical Handbook, v. 4, 1961-1962, p. H13-H15.

Electrical, thermal, magnetic, mechanical, thermodynamic and corrosion properties of the rare earths and Sc and Y. (A-general; EG-g45, EG-b40)

488-A. Production Engineering--State of the Art. Space/Aeronautics R & D Technical Handbook, v. 4, 1961-1962, p. I3-I9.

A survey of materials and methods employed in maching, conventional forming, high energy rate forming, joining and advanced processes such as plasma spraying, filament winding, diffusion bonding and electroforming. 39 ref. (A-general, 1-52, 17-57)

489-A. (Book.) Vacuum Metallurgy Conference, Transactions, 1960. Rointan F. Bunshah, Editor. Interscience Publishers, Inc., New York 1, N. Y. 1961. 352 p.

Papers presented at the fourth annual conference on vacuum metallurgy, sponsored by the Dept. of Metallurgical Engineering in co-operation with the Office of Special Service to Industry, New York University, June 1-3, 1960. Topics include melting and arc behavior, induction melting, electron beam melting and welding techniques, metallizing and evaporation, degassing, teeming and casting. Technological parameter is discussed for vacuum refining and alloying of refractory, reactive, light and transition metals, superalloys and steels with evaluation of resultant physical and mechanical properties, microstructures, compositions and impurity levels. (A-general, C-general, D9, K6, P-general, Q-general, 1-73)

490-A. (Italian.) Cooling Plants and Flue Gas Purification of L-D Converters. H. Rasworschegg. Metallurgia Italiana, v. 53, July 1961, p. 353-362.

Cooling and purifying high temperature (2000° C.) flue gases from L-D converters in order to remove dust (oxides) and to permit heat regeneration. Comparison of vapor production economy and cost of a simple cooling system. (A8a, A11e, D10a, 1-52)

491-A. Developments in Titanium. M. Schofield. Mining Magazine, v. 105, Aug. 1961, p. 76-79.

Methods of production including extraction from ilmenite and rutile sources by the Kroll magnesium reduction process. Applications in aircraft and chemical industries. (A-general, C-general; Ti, 17-57)

492-A. "Exotics" Move Ahead. Bernard S. Miller. Metalworking, v. 17, Oct. 1961, p. 11-13, 28-29.

Review of fabrication techniques, heat treatment and resultant physical and mechanical properties of refractory and heat resistant metals and alloys with particular reference to Cb, W, Mo, Ta and Be and their alloys with Al, Ti, V, Hf, Zr and Re. Topics include arc and electron beam welding, hot rolling, compaction and sintering, forging and spinning processes; and high temperature strength, oxidation, ductile-brittle transition, weldability and formability. Survey of applications of sheet and structural shapes including aircraft, rocket and reactor components. (A-general, F-general, G-general, P-general, Q-general; EG-d37, SGA-h, 10-54)

493-A. New Steel Machines Faster. Iron Age, v. 188, Oct. 5, 1961, p. 82.

A new Te-bearing free-machining steel, La-Led X, increases speeds and feeds in machining. High-speed screw machines are being designed to accommodate the steel which also contains Pb and sulphur. (A-general, G17k; SGA-k, ST, Te, Pb, S)

494-A. 'Theoretical Formability' Praised. John F. Judge. Missiles and Rockets, v. 9, Sept. 25, 1961, p. 40-41, 46.

Topics discussed at an Air Force sponsored symposium includes a new approach for selection of materials and fabricating methods for production of missile hardware; current and future developments in high temperature adhesives; joining of stainless steels with exothermic materials into metal sandwiches; and oxidation coatings on Cb, Mo and Ta. (A-general, G-general, K12, L21, T24c, 1-52, 2-62, 11-63, 17-57; SS, Cb, Mo, Ta)

495-A. Practical Steel Plant Research. Karl L. Fetters. Paper from "Regional Technical Meetings, 1960". American Iron and Steel Institute, New York 17, 1961, p. 187-206.

Review of techniques for welding high strength electrical resistance pipeline and eliminating the Bauschinger effect in steel tube by heat treatment. (A9, K-general, Q24; ST, 4-60, 10-54)

496-A. (Book.) Regional Technical Meetings, 1960. 1961. 507 p. American Iron and Steel Institute, 150 E. 42nd St., New York 17, N. Y.

Papers presented at the annual series of Regional Meetings dealing with workhardening and drawability of steels, production of coke, process control and automation, plant research, blast furnace processes and other related topics. (A-general, D-general, J-general, W-general, 11-64; Fe-b, ST)

497-A. Lead and Lead Alloys. Pt. 4. Lead Cable Sheathing Alloys and Alloy Development. S. A. Hiscock. Electrical Journal, v. 167, Aug. 4, 1961, p. 278-282.

Review of physical and mechanical properties, composition, installation and operational characteristics of Pb alloys. Tabulation of data for standard British, American and German specified Pb alloys. (A-general, R10e, T1b; Pb-b, 17-57)

498-A. (Book.) The Rare Earths. F. H. Spedding and A. H. Daane, Editors. 1961. 641 p. John Wiley & Sons, Inc., 440 Park Ave. South, New York 16, N. Y.

Papers presented at a symposium on the rare-earth metals in Nov. 1959, under the sponsorship of the American Society for Metals and the Atomic Energy Commission. Topics include separation of rare earths, preparation of rare-earth metals and properties of metals and alloys. Papers abstracted separately. (A-general, 11-64; EG-g45)

499-A. What's Happening to Beryllium? Journal of Metals, v. 13, Sept. 1961, p. 598-606.

Survey of ore deposits; direct, flotation and chemical extraction processes and plant expansion and market trends. (A-general; Be, 10-54)

500-A. (Swedish.) A Hundred Years Old Water Pipe of Cast Iron. Gjuteriet, v. 51, Jan. 1961, p. 5-6.

Examination of composition, degree of corrosion tensile strength, hardness, fracture characteristics, casting defects and microstructure of specimens taken from a water main. (A-general, T26r; CI, 17-57)

501-A. Meehanite HS (Heat Resisting Iron Casting). Alloy Digest, CI-31, Oct. 1961, 2 p.

Tough machinable metal which provides maximum resistance to scaling and growth up to 1700° F. (A-general, G17k; CI, SGA-h, SGA-g)

502-A. Mueller 604 (High-Leaded Bearing Alloy). Alloy Digest, Cu-108, Oct. 1961, 2 p.

Leaded Cu-base bearing alloy that can be used with hard or soft matting members possesses excellent bearing properties, high mechanical properties and good corrosion resistance. It is a free-cutting bearing bronze with self-aligning properties and excellent wear resistance. (A-general, Q-general, 2-60; Cu-s, SGA-c, SGA-m)

503-A. Climelt Molybdenum-0.5% Ti-0.08% Zr (High Temperature Alloy). Alloy Digest, Mo-3, Oct. 1961, 2p.

Mo-base alloy that offers substantial benefits for high temperature applications. It has higher recrystallization temperature and better stress-rupture strength than unalloyed Mo and Mo-0.5% Ti alloy. (A-general, N5, Q-general, 2-60; Mo-b, Ti)

504-A. Circle Lin (Heat and Corrosion Resisting Alloy). Alloy Digest, Ni-67, Oct. 1961, 2 p.

A Ni-base alloy with an excellent combination of high strength, resistance to ordinary forms of corrosion, good heat resistance and freedom from aging or stress corrosion. It is a structurally stable alloy and it does not lose its toughness or ductility due to internal structural changes even after long exposure to high temperatures. (A-general, Q-general, 2-62; Ni-b, SGA-h)

505-A. AISI 4650 (Nickel Molybdenum Steel). Alloy Digest, SA-121, Oct. 1961, 2 p.

Medium carbon alloy steel providing exceptionally uniform properties with good machining characteristics together with good resistance to warping and distortion in heat treatment. (A-general, G17k, Q-general, 2-64; AY)

506-A. General Alloys Q-60 (Corrosion Resisting Steel). Alloy Digest, SS-122, Oct. 1961, 2 p.

An Fe-Cr casting alloy providing excellent resistance to corrosion by nitric acid. It maintains an essentially ferritic structure and even at the high carbon levels only a small amount of ferrite transforms at elevated temperature to austenite for subsequent change to martensite upon rapid cooling. (A-general, N-general, 2-64; SS, SGA-g)

507-A. MST 431 (Titanium Sheet Alloy). Alloy Digest, Ti-30, Oct. 1961, 2 p.

Alpha-beta type Ti sheet alloy presently being supplied in the solution treated, solution treated and aged and annealed conditions. Its principal advantage is good formability in the solution treated condition with subsequent high strength capability through an aging treatment. Properties indicate good strength and thermal stability for sheet applications up to 800° F. for long times. (A-general, Q-general, 2-60, 2-62, 2-64; Ti-b, 4-53)

508-A. Circle C (High Speed Steel). Alloy Digest, TS-110, Oct. 1961, 2 p.

High production Co-W super high-speed steel recommended for difficult cutting operations. It is specially adapted for heavy duty lathe, planer, shaper and boring mill tools and can be used profitably on material where ordinary high-speed tools fail. (A-general, Q-general, 2-60; TS-m, Co, W)

509-A. Ultrahigh Strength Materials of the Future. John J. Gilman. Mechanical Engineering, v. 83, Sept. 1961, p. 55-59.

Strength evaluation for monocrystals composed of interstitial compounds of the transition metals or of covalent compounds of the light metals. Chemical and mechanical properties are evaluated for carbides, borides and nitrides of transitional metals. 17 ref. (A-general,

Q-general, P-general, 10-54; 14-61, 14-67, 14-68)

510-A. The International Conference at Copenhagen. G. Courtois. Microtechnic, v. 15, July 1961, p. 110-113.

Conference on use of radioactive elements in industry and in the physical sciences held Sept. 6-17, 1960. Discussion includes increased usage of tritium and problems relating to wear and lubrication. (A-general, Q9, 1-59)

511-A. (French.) Controlled Atmospheres. Jean Guingand. Journal des Industries du Gaz, v. 85, June 1961, p. 243-252.

Annealing, hardening, case hardening, brazing, sintering and arc welding of carbon steel, stainless steel, silicon steel, high-speed toolsteel and various ferrous and nonferrous alloys in atmospheres containing O, CO, CO_2, N, H, A and He. Chemical equilibria for various metallurgical processes as a function of temperature and description of metallurgical furnaces and equipment. (A-general, H15q, J2k, K1, K8, 1-52, 17-57)

512-A. Properties and Application of Allegheny Ludlum Electrical Steel 4750 Strip Products. Steel Horizons (Technical Horizons), v. 23, Fourth quarter 1961, 4 p. (Insert).

A high-permeability Ni-Fe alloy having low induction and high saturation points has applications in transformers. Techniques are given for high-temperature hydrogen annealing of laminations and other finished parts. (A-general, J2k, P15, T1; ST-f, 4-53, 7-59)

513-A. What Alloy Shall I Use...for High-Temperature Applications (Above 1200° F.)? Ward F. Simmons. Metal Progress, v. 80, Oct. 1961, p. 84.

Fe, Ni and Co-base superalloys for applications between 1200 and 1800° F., are likely to remain the only metallic materials for use at high temperatures under oxidizing conditions. (A-general, 2-62; SGA-h, SGB-s, Fe-b, Ni-b, Co-b, 17-57)

514-A. What Refractory Shall I Use... for Ultrahigh-Temperature Applications (Above 1800° F.)? D. J. Maykuth and H. R. Ogden. Metal Progress, v. 80, Oct. 1961, p. 92.

On the basis of strength, Mo alloys are recommended for service up to about 2800° F. At higher temperatures the strength advantage shifts to tungsten alloys. Cb and Ta alloys offer superior forming and welding properties and improved low-temperature ductility. (A-general, 2-62; EG-d37, Cb-b, Ta-b, 17-57)

515-A. What Tool Steel Shall I Use...for Applications in Structures and Components? Metal Progress, v. 80, Oct. 1961, p. 104.

Already used in aircraft structure, fasteners and wear parts, toolsteels are valuable as primary engineering materials because of their high hot hardness, strength, wear resistance and toughness. (A-general, Q-general, 2-62; TS, SGB-s, 17-57)

516-A. What Metal Shall I Use...for High-Strength Welded Structures?...Aluminum. Metal Progress, v. 80, Oct. 1961, p. 121-125.

Nominal composition, typical mechanical properties, characteristics governing selection and applications of 5456, 5083, 5086, 5154, 5454, 6061, 6062, 2219, 2014 and 7178 Al alloys. (A-general, T-general, Q-general; Al-b, 7-51, 17-57)

517-A. What Metal Shall I Use... for High-Strength Welded Structures?...Magnesium. Lloyd Lockwood. Metal Progress, v. 80, Oct. 1961, p. 125-127.

Composition, mechanical properties, outstanding characteristics and typical uses of AZ31B, ZE10A, HK31A, HM21A Mg alloy sheet and plate and ZK21A, AZ80A, HM31A, AZ61A, ZK60A Mg alloy extrusions. (A-general, Q-general, T-general, 2-60; Mg-b, 7-51, 17-57)

518-A. An Introduction to Aluminium and Its Alloys. D. M. Walker. New Zealand Engineering, v. 16, Aug. 15, 1961, p. 303-304.

Review of Al metallurgy including extraction processes with compositions, properties and applications given for some representative wrought and casting alloys. (A-general, C-general; Al-b, 10-54)

519-A. Heat-Treatable Titanium Sheet Alloys. D. Goold. Engineering Materials and Design, v. 4, Oct. 1961, p. 658-659.

B120VCA and Ex011 alloys containing additions of V, Cr, Al and Mo are

compared on the basis of density, formability, age hardening, weldability, creep strength, notch sensitivity and tensile strength. Applications for extrusions, rod and wire. (A-general, K9s, N7a, Q-general; Ti-b, 4-53)

520-A. Data Sheet No. 68: Cobalt-Base Super-Alloys. Engineering Materials and Design, v. 4, Oct. 1961, p. 687.

Rupture properties and compositions for Haynes alloys no. 25, 31 and 21 and Jessop alloys no. G. 65, G. 34 and G. 32 with high-temperature (920-1100° C.) applications. (A-general, Q3m, 11-62; Co-b, SGA-h)

521-A. Data Sheet No. 69: High Alloy Steels, Ni and Co Alloys for Investment Castings. Engineering Materials and Design, v. 4, Oct. 1961, p. 689.

Tensile strength, yield stress, elongation, corrosion resistance, heat resistance and creep strength are given for Ni and Co alloys containing C, Si, Mn, Cr, Mo, Cu, Ti, Fe, W, Mn, Al, Mg, S and P. (A-general, E15, Q-general, R-general, 11-62; SS, Ni, Co)

522-A. Essehete 1250. Iron & Steel, v. 34, Oct. 1, 1961, p. 464.

Austenitic creep-resisting steel containing 15% Cr, 10% Ni and 6% Mn has a high level of rupture strength with ductility. Physical properties and applications. Tabulation of mechanical properties in the solution-treated condition and of stress rupture data. (A-general, P-general, Q-general; SS-e, Cr, Mn, Ni)

523-A. Cast 9% Nickel Steel for Low Temperature Service. W. J. Jackson. Iron & Steel, v. 34, Oct. 1, 1961, p. 474-475.

Heat treatment cycles for the development of optimum low temperature impact properties in ASTM A353-58 alloy. Room temperature tensile properties and Charpy V-notch impact values obtained in the testing temperature range -196 to 100° C. are given. 7 ref. (A-general, J-general, Q27, 2-63; CN, Ni, 5)

524-A. Order Copper by the Numbers. Iron Age, v. 188, Oct. 12, 1961, p. 168-169.

The use of a three-digit number code to classify various coppers, brasses, bronzes and other Cu alloys. The composition previously accepted trade name of the Cu alloys and the numbers assigned to them. Use of the number code in data-processing applications. (A-general, 11-62, 11-69; Cu-b)

525-A. Review of Recent Developments in the Technology of Tungsten. V. D. Barth. Defense Metals Information Center, Battelle Memorial Institute, DMIC Memo. 127, Sept. 22, 1961, 7 p.

Review of literature covering consolidation, fabrication, plasma arc spraying, forging, centrifugal casting, electron beam melting, extrusion, oxidation (at 1300° C. to 3000° C.), protection, siliconizing and ductility as influenced by surface condition. 16 ref. (A-general, 10-54; W)

526-A. Action in Beryllium. Iron Age, v. 188, Oct. 19, 1961, p. 107.

The capacity and operations of a Be fabrication plant which includes a precision machine shop and an inspection setup including X-ray. Review of the government stockpiling program and of foreign and domestic sources of Be ore. (A-general, A11, G-general, 1-52; Be)

527-A. Trilay--A Noble Metal Composite Material. J. S. Hill. Engelhard Industries, Inc., Technical Bulletin, v. 11, Sept. 1961, p. 45-47.

Two outside layers of wrought Pt or Pt alloy are bonded to an inner layer of Pt, Pt alloy, Ag, Cu or Ni produced by powder metallurgy techniques. Applications in cement and glass industries include crucibles, outer sheaths of swaged thermocouples and small melting pots. (A-general, T29a; Pt-b, 7-59)

528-A. Review of Recent Developments in the Technology of Columbium and Tantalum. E. S. Bartlett and F. F. Schmidt. Defense Metals Information Center, Battelle Memorial Institute, DMIC Memo. 130, Oct. 10, 1961, 4 p.

Measurement of the tensile properties of Cb-1Zr alloy and several Ta alloys at very high temperatures. Production of Cb-base alloys in the form of sheet, strip, extrusions and forgings. Production of Ta alloy wire and sheet. Target properties for Ta alloys include good high-temperature strength and low-temperature ductility. 10 ref. (A-general, F-general, Q-general, 2-61; Cb-b)

529-A. Review of Recent Developments in the Technology of Molybdenum-Base Alloys. J. A. Houck. Defense Metals Information Center, Battelle Memorial Institute DMIC Memo. 129, Oct. 6, 1961, 3 p.

Production of high purity molybdenum by reducing MoS_2 with Sn. Improvements in the preparation of Ca-reduced Mo. Measurement at room temperature and/or very high temperatures of the tensile properties of Mo and of Mo-Ti and Mo-Zr-Ti alloys. Production and evaluation of Mo and Mo alloy sheet. 6 ref. (A-general, C26, F23, Q27, 2-61; Mo, Mo-b)

530-A. 1961 Metal Selector. Steel, v. 149, Oct. 16, 1961, p. 115-116.

Composition, physical and mechanical properties and applications are tabulated for refractory, high temperature, cast high, spring, Cu, Be, Al, Ti, Mg, Zn and Zr alloys, stainless, heat resistant, H, alloy, high strength and superstrength steels and ferrous castings. (A-general, P-general, Q-general, 11-62, 17-57; ST-b, EG-b, Al-b, Be-b, Cu-b, Mg-b, Ti-b, Zn-b, Zr-b)

531-A. (French.) Classification of Cast Steels. Journal d'Informations Techniques des Industries de la Fonderie, no. 128, July-Aug. 1961, p. 1-2.

Compositions are given for steels resistant to pressure and to temperatures up to 550° C., containing 0.40-1.20% Mo, 0.40-2.75% Cr and 0-0.50% V. Further data for wear-resistant steels containing 0-1.2% Cr, 0-4% Ni, 0-0.4% Mo and 0-14.5% Mn. (A-general, 2-60, 11-62; ST, SGA-h, SGA-m, Cr, Mn, Mo, Ni, V)

532-A. (Italian.) Titanium in the Chemical Industry. Acciaio Inossidabile, v. 18, July-Aug. 1961, p. 69-85.

Rolling, forging, pressing, arc and resistance welding, annealing, sanding, pickling; chemical composition, physical and mechanical properties of ATI 24 and ATI 45 titanium and its use for making pipes, bolts, nuts, tanks, plates, heat exchangers, valves, pumps, rotors and mixers used in chemical processing. (A-general, T29; Ti)

533-A. A Long Life Ahead For Oka Niobium. Charles R. Graham. Canadian Chemical Processing, v. 45, Sept. 1961, p. 61-62, 64.

Production of Cb and Ta from pyrochlore ores discovered in Oka, Quebec. Cb is shown to have high temperature strength, high corrosion resistance, good thermal neutron absorption properties, excellent heat transfer properties and resistance to weight loss when exposed to low melting metals. Major applications are in nuclear reactors, stainless steel alloys and space-craft components. (A11a, B-general, P11k, P17c, Q-general, R-general, 17-57; Cb, Ta)

534-A. New Ultra High Strength Steel. Materials in Design Engineering, v. 54, Oct. 1961, p. 9.

Development of a medium alloy steel, Vascojet M-A, which is consumable vacuum arc melted to provide more ductility and a smaller differential between longitudinal and transverse mechanical properties. (A-general, D8m, Q-general; SS, SGB-a)

535-A. (French.) New Metals. Rene Paris. Chimia, v. 15, Sept. 15, 1961, p. 443-449.

Preparation of Be, Ti, Zr, Ta and Cb from their ores. Densities, melting points and boiling points. Tensile strength and heat resistance of Ti alloys containing Al, Cr, Fe, Mn, Sn or V. Transformations in Ti. Ductility of Be as a function of temperature between 20-1000° C. 7 ref. (A-general, N-general, P10a, P12n, Q23, 2-61, 10-54; Be, Cb, Ta, Ti, Zr)

536-A. Recovery of Zinc and Tin From Secondary Products. P. M. Sullivan and D. H. Chambers. Metal Industry, v. 99, Sept. 22, 1961, p. 226-229.

Electrolytic recovery of Zn and Sn from galvanizer's dross containing Pb, Fe, Cd, Cu and Zn which is amalgamated with Hg and leached. The electrolytic product is analyzed in terms of efficiency, purity and cell operation parameters. 9 ref. (A11d, C29, 1-52; Sn, Zn)

537-A. (German.) The Rare-Earth Metals. Theor Pinkwasser. STZ (Schweiz. Technische Zeitschrift), v. 58, Sept. 14, 1961, p. 762-764.

Review of production by thermic reduction and electrolysis and of physical, chemical and mechanical properties of the rare-earth metals Ce, Dy, Er, Eu, Gd, Ho, La, Lu, Nd, Sm, Sc, Tb, Tm, Yb and Y. (A-general, C23, C26, P-general, Q-general, 10-54; EG-g45)

538-A. (German.) Current Status of Archeological Research on Double Pyramidal Shaped Iron Bars. Otto Kleemann. Archiv fur das Eisenhuttenwesen, v. 32, Sept. 1961, p. 581-585.

Review of today's knowledge of geographic distribution, production, age and use of forged Fe bar relics of typical double pyramidal shape. (A2; Fe, 4-55)

539-A. (German.) Investigation of Prehistoric Iron Bar Relics. Wilhelm Radeker and Friedrich Karl Naumann. Archiv fur das Eisenhuttenwesen, v. 32, Sept. 1961, p. 587-595.

Chemical analysis, microscopic investigation, mechanical testing and test forging of prehistoric Fe bar relics of typical double pyramidal shape, including extraction residues and analysis of slag inclusions. Attempts to determine age and origin of relics. (A2; Fe, 4-55)

540-A. Guide for Use of Clad-Steel Plate. Tappi (Technical Assoc. of the Pulp and Paper Industry), v. 44, Oct. 1961, p. 154A-155A.

Bond strength and corrosion resistance factors with reference to handling, flame cutting, welding, heating and passivation of 300 and 400 stainless steel cladding metal and A-285 Grade C, A-201, A-202 and A-212 steel backing metal. (A-general, 10-54; ST, SS, 7-59)

541-A. Refractory Metals in Europe. Robert I. Jaffe. Journal of Metals, v. 13, Oct. 1961, p. 714-716.

Review of industrial application, research and production procedures for Co, Ta, Mo, W, Re and their alloys. (A-general, 10-54; Co, Mo, Re, Ta, W)

542-A. (German.) Electrostatic Dust Precipitation in Iron Works. Kurt Guthmann. Staub, v. 21, Sept. 1, 1961, p. 398-402.

Dust removal is discussed with emphasis on electrostatic precipitation from waste gases produced by blast furnace and Krupp-Renn smelting and conventional and oxygen steel refining in converters, openhearth and electro-furnaces, Kaldo and Graef rotors. (A8a, D-general, 1-52)

543-A. The Metallurgist in the Heavy Steel Industry. L. Reeve. Metallurgist, v. 11, Sept. 1961, p. 348-356.

A review is given of the relationship of the metallurgist to quality and production control and to the development of new steels. The report includes a tabulation of tensile and impact properties for the N.D. series of steels to BS. 2762 and to the related Lloyds Grades D and E, transition curves and representative microstructures. (A9m, M27, N8g, Q-general; ST)

544-A. A Look at Steel in Japan. T. J. Ess. Iron and Steel Engineer, v. 38, Oct. 1961, p. 71-87.

Survey of steel production in Japan including ore sources, production methods, productivity, capacity and economic factors. (A-general; ST)

545-A. Beryllium and Its Uses in Other Light Metals. Light Metals, v. 24, Oct. 1961, p. 264-265.

Effects of Be additions on oxidation rate, workability, gas porosity, thermal stability, dross formation and activity of Mg-Al alloys. 18 ref. (A-general; Be, 10-54)

546-A. Aluminum 2219--New Alloy for High-Strength Welded Structures. F. R. Collins, F. G. Nelson and I. B. Robinson. Metal Progress, v. 80, Nov. 1961, p. 82-87.

A heat treatable alloy which retains its high strength at temperatures of 450-700^{O} F., Al 2219, also has demonstrated superior weldability. Weldments perform well at subzero and at elevated temperatures. (A-general, K9s, Q-general; Al-b)

547-A. Properties and Applications of Malleable Iron Castings (Data Sheet). Metal Progress, v. 80, Nov. 1961, p. 96-B.

Mechanical properties and applications of 35018, 32510, 45010, 45007, 48004, 50007, 53004, 60003 and 80002 castings. Recommended cutting conditions for turning 32510, 48004, 60003 and 80002. (A-general, G17, Q-general; CI-s, 5, 17-57)

SECTION B

RAW MATERIALS and ORE PREPARATION

1-B. (French.) Ore Crushing. Pt. 1. A. Masson. Revue Universelle des Mines, de la Metallurgie, de la Mecanique, v. 16, Aug. 1960, p. 341-349.

Theory of crushing with reference to characterization of size of crushed product and power requirements for a given reduction. 14 ref. (B13)

2-B. Magnetic Roasting of Iron Ores in a Traveling Grate Roaster. H. H. Wade and N. F. Schulz. Mining Engineering, v. 12, Nov. 1960, p. 1161-1165.

Continuous roasting of low-grade Fe ores in an experimental traveling grate roaster using a continuous gas-permeable bed at 1250-1300° F. (B15, W15a; Fe)

3-B. Pure Beryllium Via the Fluoride Process. N. P. Chopey. Chemical Engineering, v. 67, Oct. 31, 1960, p. 82-85.

Processing of beryl ore into Be ingots by precipitation with NaOH, slurrying with ammonium bifluoride, vacuum salting and reduction with Mg. Ingots are vacuum cast to remove impurities. (B-general, C-general; Be)

4-B. (Russian.) Use of Preheated and Oxygen-Enriched Air in Sintering of Iron Ores. N. E. Sidorov, V. K. Antonov, N. M. Myshchenko and F. F. Pilipaitis. Stal', Oct. 1960, p. 878-883.

Use of preheated air enriched by 3-4% oxygen to reduce coke consumption, improve grain quality of the sintered cake and increase production rates. (B16a; Fe)

5-B. Beneficiation of Iron Ore by Conductivity Separation. M. B. Mairs. Iron and Steel Engineer, v. 37, Oct. 1960, p. 167-169.

High tension process for beneficiation of nonmagnetic Fe ores using a grounded rotor in a static field to separate high conductivity minerals such as hematite or magnetite from poor conductors such as silica. 3 ref. (B14n; Fe)

6-B. (Norwegian.) Flotation of Copper Ore With Silver Nitrate. Anders M. Heltzen. Tidsskrift for Kjemi, Bergvesen og Metallurgi, v. 20, Sept. 20, 1960, p. 183-184.

Effect of $AgNO_3$ on the Cu concentration after flotation of ores containing 3.5% Cu and a concentrate with 14.6% Cu. (B14h, 2-66; Cu)

7-B. Beneficiation of Domestic Chromium Ores. Lloyd H. Banning and William A. Stickney. Paper from "Electric Furnace Proceedings, 1959", v. 17. American Institute of Mining, Metallurgical and Petroleum Engineers, Inc., New York, 1960, p. 157-174.

Beneficiation research on sinkfloating, tabling, flotation and electrostatic separation of Cr ores. Use of flotation to treat Cr pulps in the presence of slime and of high tension electrostatic processes to treat table middlings. (B14; Cr)

8-B. Arizona Copper Silicates Respond to Segregation. Engineering and Mining Journal, v. 161, Nov. 1960, p. 86-87.

Crushed and calcined minus 10-mesh ore is heated at 1400-1500° F. with NaCl and coke in a segregation process to produce fine metallic Cu which is recovered by flotation. (B14, C26; Cu)

9-B. Alumina From Anorthosite--A Report From California. Engineering and Mining Journal, v. 161, Nov. 1960, p. 93.

Recovery of alumina from anorthosite by the lime-soda sinter process in which ore is mixed with limestone and soda ash so that dicalcium silicate and sodium aluminate are formed during sintering. A caustic solution dissolves the latter from the

insoluble silicate and alumina is recovered by precipitation. (B16a, C19n; Al, Si)

10-B. (Japanese.) Sintering Tests of Hematite Foreign Fine Ores in Production of Self-Fluxing Sinter. Takiji Sanematsu, Shizuo Kiriyama and Hiroki Toyozawa. Sumitomo Metals, v. 12, Apr. 1960, p. 380-386.

Productivity of ore sintering operations and properties of the sinter obtained from charges containing 10-20% screened fires of Temangan, Dungun, Goa and Indian ores with 4% coke addition. (B16a; Fe)

11-B. (Italian.) Sintered Ores With Flux Addition. G. Sironi. Metallurgia Italiana, v. 52, Sept. 1960, p. 607-614.

An ore-lime mixture containing 51.19% Fe, 8.37% SiO_2, 2.60% Al_2O_3, 4.20% CaO, 2.50% MgO, 0.76% Mn and 0.675% S is sintered experimentally and reduced in a hydrogen stream at 850° C. Effect of lime additions on basicity and permeability of the sinter ore. 9 ref. (B16a, C-general; Fe, Al, Mg)

12-B. (Translation-ConBur.) Industrial Methods of Processing Poor Uranium Ores. G. E. Kaplan, B. N. Laskorin and B. V. Nevskii. Soviet Journal of Atomic Energy, v. 6, Sept. 1960, p. 57-64.

Review of mechanical enrichment, radiometric sorting, flotation enrichment, pyrometallurgical and hydrometallurgical processes, leaching and sorption methods as processes for treatment of low-grade uranium ore. 28 ref. (B-general, C-general; U)

13-B. (Russian.) Ore Dressing of Oxidized, Finely Dissimilated Tin Bearing Ore. Tyan Chzhun-Chen and I. N. Plaksin. Tsvetnaya Metallurgiya, May 1960, p. 30-36.

Extraction method for tin ores containing finely dissimilated cassiferrite and considerable amounts of gangue, comprising centrifugal separation of the gangue fraction, jigging, magnetic roasting and separation by electromagnetic vibrator and gravitation concentration techniques. 8 ref. (B14, B15; Sn)

14-B. (Russian.) Chemico-Metallurgical Methods of Treating Oxidized Lead-Zinc Ores. A. V. Astafeva, M. D. Ivanovskii and S. K. Shabarin. Tsvetnaya Metallurgiya, May 1960, p. 49-57.

Test beneficiation methods, including chlorination with sodium chloride to sublimate Pb, Au and Ag; leaching by solution of chlorides, or by sulphatizing in ammonium sulphate and leaching by H_2SO_4. 6 ref. (B14; Pb-b, Zn-b)

15-B. (Japanese.) Sintering of Iron Ores. Pt. 1. Koji Sanborgi, Nobunao Nishida and Akikazu Suzawa. Tetsu-to-Hagane (Iron and Steel Institute of Japan, Journal), v. 46, Nov. 1960, p. 1527-1532.

Influence of air flow, coke content and moisture content on the temperature distribution of the sintering bed and the rate of movement of the sintering zone studied for GOA hematite and Larap magnetite ores. 8 ref. (B16; Fe)

16-B. Effects of Structure and Unsaturation of Collector on Soap Flotation of Iron Ores. Strathmore R. B. Cooke, Iwao Iwasaki and Hyung Sup Choi. AIME Transactions, Society of Mining Engineers, v. 214, 1959, p. 920-927.

Flotation tests on ore wash tailings containing hematite, goethite and quartz using fatty acid collectors varying in degree of unsaturation and chain length. Iron oxide is floated from gangue or gangue is activated and floated above the iron oxide. 6 ref. (B14h; Fe)

17-B. The Reduction of the Iron Values of Ilmenite to Metallic Iron at Less Than Slagging Temperatures. R. H. Walsh, H. W. Hockin, D. R. Bradt, P. L. Dietz and P. R. Girardot. Metallurgical Society of AIME, Transactions, v. 218, Dec. 1960, p. 994-1003.

New Jersey, Florida and Canadian ilmenites are reduced with hydrogen or coke under various experimental conditions and the phase changes occurring in the ilmenite upon reduction are studied by microscopic examination of polished sections and X-ray diffraction. Effect of the type of ilmenite, temperature, time and reducing agent on the type of product formed. 49 ref. (B15, P1n, M-general; Fe-b, Ti-b)

18-B. Magnetite-Hematite Ore Concentrated With Separators and Spirals at New Swedish Mill. Sven E. Sjoberg. Mining World, v. 23, Jan. 1961, p. 29-31.

Design of a new magnetic and gravity concentration mill in which magnetite-hematite ore is processed in magnetic

separators to remove the magnetite portions and in shaking tables, cyclones and Humphreys spirals to remove hematite concentrates. (B14, W15r; Fe)

19-B. (Russian.) Suspension Roasting of Copper-Zinc Concentrates Using Oxygen Blowing. M. I. Kochnev, A. I. Okunev, P. A. Myasnikov, S. A. Vermenichev, B. I. Sergin and G. F. Strizhov. Tsvetnye Metally, Oct. 1960, p. 20-23.

Technique for production of sulphide Cu-Zn concentrates using oxygen enriched blowing at 970-1140° C. 4 ref. (B15; Cu, Zn)

20-B. (Russian.) Pyrite Behavior During the Roasting of Sulphide Gold-Bearing Concentrate. V. V. Lodeishchikov, I. K. Skobeev and S. I. Khrachmenko. Tsvetnye Metally, Oct. 1960, p. 44-51.

Temperature dependence of structural transformations in pyrite. Optimum temperature parameters for roasting operation are developed with consideration of possible overheating due to the oxidation reaction heat. Computation of overheating value based on relation to desulphurizing rate and heat exchange. 7 ref. (B15; Au)

21-B. Electric-Arc Furnace Produces Pig-Iron From Steel Scrap. Commonwealth Engineer, v. 48, Oct. 5, 1960, p. 46-47.

Production of pig iron, spheroidal graphite iron and nonmagnetic gray cast iron from mild steel scrap in a 3 ton electric furnace having a refractory lined shell with three triangularly spaced electrodes projecting vertically through the roof. (B23, D5)

22-B. Experiments in Concentrating Iron Ore From the Pea Ridge Deposit, Missouri. M. M. Fine and D. W. Frommer. American Institute of Mining, Metallurgical and Petroleum Engineers, Transactions, v. 214, 1959, p. 325-328.

Magnetic separation and flotation of hematite and magnetite ores to obtain concentrates of 60-71.4% Fe at recoveries of 89.9-97.6%. (B14j, B14h; Fe)

23-B. Processing California Bastanite Ore. Charles J. Baroch, Morton Smutz and Edwin H. Olson. American Institute of Mining, Metallurgical and Petroleum Engineers, Transactions, v. 214, 1959, p. 315-319.

98% rare earth recovery from an ore containing 10% rare earth oxides (La, Ce, Nd, Pr, Sn) is achieved by calcination, leaching with 57% HNO_3 and solvent extraction with tributyl phosphate. (B15, C19n; EG-g45)

24-B. Beneficiation of Autunitic Ores. William C. Aitkenhead and John A. Jaekel. American Institute of Mining, Metallurgical and Petroleum Engineers, Transactions, v. 214, 1959, p. 66-67.

An aqueous emulsion of stearic acid, sodium oleate and kerosene is used as a collector in the froth flotation of autunite from low (0.12-0.39%) and high (1.27-1.49%) uranium ores. (B14h; U)

25-B. Concentration of a Nickel Ore From New Caledonia. S. B. Hudson. Commonwealth Scientific and Industrial Research Organization, Australia, Report no. 593, Apr. 1960, 4 p.

Test evaluation of electrostatic and magnetic separation methods for yielding a 3% Ni concentration in ore samples assaying 2.7% Ni after crushing, classifying and tabling treatment with magnetic separation proving more effective. (B14; Ni)

26-B. The Significance of Microscopic Investigation in the Course of Beneficiation of the "Brunswick Ore". George Aletan. Canadian Mining and Metallurgical Bulletin, v. 53, Dec. 1960, p. 945-952.

Effect of crystal structure, grain size, flotation selectivity and oxidation sensitivity of ore bodies on beneficiation of Cu and Pb ores, as determined by microscopic examinations and statistical counts. 3 ref. (B14, 2-59, M27; Cu, Pb)

27-B. Slime Coatings in Galena Flotation. A. M. Gaudin, D. W. Fuerstenaus and H. L. Miaw. Canadian Mining and Metallurgical Bulletin, v. 53, Dec. 1960, p. 960-963.

The effect of pH and positively charged slime coatings and particles composed of Fe_2O_3, Al_2O_3 and CaF_2 on the flotation of galena. 9 ref. (B14h; Pb)

28-B. (Swedish.) Ore Grinding in the Vassbo Mine. Per H:son Fahlstrom. Teknisk Tidskrift, v. 90, Dec. 9, 1960, p. 1237-1245.

Lead ore containing 6.9% galena, 0.8% zinc blende, 2.0% pyrite and 85%

quartz is ground and sorted by special equipment. Relationship between size of ground ore and Pb content. (B13; Pb)

29-B. Gravity, Dense Media, Magnetic and Electrical Separation. G. A. Cox. Mine & Quarry Engineering, Nov. 1960, p. 480-486.

Review of papers presented at the International Mineral Processing Conference held in London in 1960. Topics include electrostatic separation of low conductivity minerals, electrical high tension minerals beneficiation, wet separation of parmagnetic materials and magnetizing reduction, tabling, jigging and gravity and dense media separation of various Fe ores. (B14, 10-54; Fe)

30-B. Sinter in Focus. Iron & Steel, v. 34, Jan. 1961, p. 11, 15.

Sintering of low phosphorus Fe ore (65% Fe) at new single-strand continuous sinter plant in Norway. Plant is designed to produce 12,500 tons of self-fluxing sinter per week. (B16a; Fe)

31-B. (English.) The Thermal Reduction of Magnesium Oxide. J. M. Toguri. Kjemi, Bergvesen og Metallurgi, v. 20, Nov. 18, 1960, p. 211-214.

Ore or raw material containing Mg as $MgCO_3$ or $MgCl_2$ is subjected to oxidizing roasting. MgO formed is reduced by C, Si, CaC_2 or Al. Description of individual processes. 23 ref. (B15, C26; Mg, 14-68)

32-B. Gold Is Where You Find it. Oilways, v. 27, Jan. 1961, p. 15-20.

Description of processing methods for Al, Cu and steel scrap including cutting by hydraulic machine, flame cutting, briquetting and melting. (B23; Al, Cu, ST)

33-B. Ferrograde Concentrates From Arkansas Manganiferous Limestone. M. M. Fine. American Institute of Mining, Metallurgical and Petroleum Engineers, Transactions, v. 214, 1959, p. 810-812.

Beneficiation of low grade Mn ores by tabling, flotation and leaching. (B14; Mn)

34-B. High-Intensity Magnetic Separation of Iron Ores. O. E. Palasvirta. American Institute of Mining, Metallurgical and Petroleum Engineers, Transactions, v. 214, 1959, p. 1244-1248.

Principles of rotor-induced separation in a high intensity field. Design of magnetic circuits, pole pieces, rotor surfaces and drive and feed mechanisms in a magnetic separator. Application to separation of specularite and hematite ore. (B14j, W15r, 17-57; Fe)

35-B. Chemistry and Mining. E. T. Pinkney. South African Industrial Chemist, v. 14, Oct. 1960, p. 191-199.

Review of the hydrometallurgy of Cu, Sn, Zn, Hg, Fe, Au and Ag. Development of the flotation technique, differential flotation, electrolytic refining, electrolytic winning and liquid-liquid extraction. (B14h, C19; Ag, Au, Cu, Fe, Hg, Sn, Zn)

36-B. (Russian.) Fluidized Magnetic Enrichment of Iron Ores. V. V. Chukin and V. Ya. Miller. Stal', Nov. 1960, p. 965-971.

Fluid bed roasting of ore containing 35-37% Fe, 0.23% FeO and 26-28% SiO_2 in a laboratory furnace with rapid heating to 700-900° C in a slightly reducing atmosphere containing 3% CO. Data are given for productivity and fuel economy of the process. (B15q; Fe)

37-B. New Trends in the Beneficiation of Ferrous and Nonferrous Metal Ores. O. S. Bogdanon, R. B. Shapiro and E. V. Danilova. Paper from "Contemporary Problems of Metallurgy". Consultants Bureau, Inc., New York, 1960, p. 29-42.

Review of ore dressing, roasting and sintering processes on Fe, Mn, Cu, Pb, Zn, Sn and other ores. Concentration methods include gravity and magnetic separation, flotation tabling and jugging, desliming and washing, agglomeration filtration and heavy media suspension. 8 ref. (B-general, 10-54; Fe, Mn, Cu, Pb, Sn, Zn)

38-B. The Beneficiation of Minerals. Mining Journal, v. 256, Jan. 13, 1961, p. 41-42.

Review of papers covering theory of grinding; flotation theory and practice, with emphasis on sulphides, Mn ores and beach sands containing zircon, ilmenite and monazite; heavy media separation; phase separation methods applied to coal and graphite and methods of chemical processing. (B13, B14; Mn)

39-B. (German.) Effect of Uniform Grain Distribution on Temperature Progress in Strand Sintering. Otto Steinhauer and Klaus Zehe. Stahl und Eisen, v. 81, Jan. 19, 1961, p. 88-95.

Production testing during Dwight-Lloyd sintering of basic Bessemer sinter, with temperature measurements being made by thermocouples without interrupting test operations. Correlations between temperature, gas permeability and draft; segregation phenomena in charging raw mixture. (B16; Fe)

40-B. (German.) Influence of Return Sinter on Downdraft Sintering of Iron Ores. Hans Rausch and Fred Cappel. Stahl und Eisen, v. 81, Jan. 19, 1961, p. 96-102.

Test sintering of various Fe ore and return sinter mixtures in a sintering pan with 0.17 m^2 draft area. Dumping and drum tests are used to evaluate sinter strength and reductibility by CO reduction at 950° C. Measurements of microporosity are used to evaluate influence of return sinter on sinter properties. (B16a; Fe)

41-B. Treatment of Dump Ore From Webb's Silver Mine, Emmaville, New England District, N. S. W. J. S. Henkel. Commonwealth Scientific and Industrial Research Organization and the Mining Dept., University of Melbourne, Ore-Dressing Investigations, Rept. no. 594, Apr. 1960, 10 p.

Concentration of valuable metals by flotation from a partly oxidized dump material assaying 0.48% Cu and 9.3 oz. per ton Ag. Recovery of 62% of the Cu and 68% of the Ag in a concentrate assaying 5.1% Cu and 112 oz. per ton Ag. (B14h; Cu, Ag)

42-B. Investigation of Cyanidation Residues From Hill 50 Gold Mine N. L., Mount Magnet, W. A. G. H. Muskett, E. Tasker and R. A. Hobson. Commonwealth Scientific and Industrial Research Organization and the School of Mines of Western Australia, Kalgoorlie, Ore-Dressing Investigations, Rept. no. 713, May 1960, 9 p.

Straking, amalgamation, screen sizing analysis and flotation testing on samples of cyanidation residues and ore samples to determine distribution of Au in the milled products and behavior of the Au under certain flotation conditions. (B14h; Au)

43-B. (Italian.) Use of Leucite in Alumina Production. Aldo Spada. Industria Mineraria, v. 11, Oct. 1960, p. 711-729.

Flotation concentration methods and production by reaction with HCl, HNO_3, H_2SO_4 or a base. Utilization of by-products. (B14h, C19; Al)

44-B. Blending Iron Ore at Stanton. Mining Journal, v. 256, Feb. 10, 1961, p. 152-153.

Design of a layout for crushing and blending Fe ores and sintering the fines to obtain blast furnace burdens of even chemical compositions. (B13, B16a; Fe)

45-B. Methods and Costs of Producing Brown Iron Ore at Two Small Southern Missouri Mines. H. D. Kline. U. S. Bureau of Mines, Report of Investigations 7983, 1960, 18 p.

Open pit mining and washing methods for producing a brown ore containing 35-58% Fe. Review of deposit history, location and physical features, geology, prospecting and exploration techniques, transportation and cost factors in ore production. 6 ref. (B12, B14f, A4; Fe, RM-n)

46-B. Chemical Copper Chalks Up First Customer. Chemical Week, v. 88, Feb. 11, 1961, p. 35-36.

In a new process which eliminates the usual smelting and refining steps, low-grade ores (one having 25% Cu, another 16% Cu) are converted into a 99.95% pure Cu powder which is then made into high-quality strips, tubing and wire. Ore is concentrated by crushing and flotation techniques, then pressurized under ammonia and air at 125 psi. The resulting solution is thickened, distilled and reduced to the powder. (B13, B14h, C26; Cu)

47-B. Semi-Taconite Yields Iron. Steel, v. 148, Mar. 13, 1961, p. 107.

Processing of semi-taconite, an ore containing 25-38% Fe, by roasting at 1300° F. in a revolving, horizontal kiln. Magnetic separators remove iron bearing particles from waste rock. (B15; Fe)

48-B. Minerals Beneficiation. L. J. Bechaud, Jr. Mining Congress Journal, v. 47, Feb. 1961, p. 60-64.

Survey of process developments including autogenous grinding and direct reduction of iron ores, application of hydrometallurgy to Pb ores, Cu and Ag segregation and developments in reagents for flotation. (B14, B15, 10-54)

49-B. Fluid Bed Roasting of Nickel Sulphide. W. Curlook and H. J. Roorda. Canadian Mining and Metallurgical Bulletin, v. 54, Feb. 1961, p. 152-156.

Fluid bed roasting process for the continuous production of coarse, granular nickel oxide from fine sulphide concentrate. Sulphide concentrate is pelletized and then roasted at 2000° F. Description of the 4 ft. diameter roaster and pilot plant development of the process. (B15q; Ni)

50-B. (German.) Industrial Methods for Processing Low-Grade Uranium Ores. Ge. E. Kaplan, B. N. Laskorin and B. V. Nevskij. Kernenergie, v. 2, Oct-Nov. 1960, p. 956-964.

Ore dressing by mechanical methods, flotation and radiometric separation and uranium production by wet metallurgical methods such as sorption from solutions by exchanger resins, leaching and extraction by liquid extractors. (B14h, C19; U)

51-B. (Translation-Brutcher no. 4942.) Investigation of Effect of Gas Vibrations Upon the Reduction of Iron Oxides. H. Schenck and J. Cloth. Stahl und Eisen, v. 80, no. 22, 1960, p. 1453-1457.

Exploration of possibilities of accelerating the reduction of Fe ores by vibrating the reducing gas (CO and H) and the reaction gases in general. Vibration frequencies and gas pressure amplitudes used in experiments. Effect of various vibration frequencies ranging from 0.6-430,000 cps. and gas flows on rate of reduction with dense and porous ores. (B15p; Fe)

52-B. (German.) History of Draft Sintering (Agglomerating) of Iron Ores. W. Troeller. Revue Technique Luxembourgeoise, v. 52, Oct-Dec. 1960, p. 227-229.

Development of Fe and Pb ore, calcined pyrite and flue dust sintering in converter processes (Job converter, Huntington-Heberlein converter) and on sinter strands (Dwight-Lloyd strand). (B16)

53-B. (German.) Control of Sinter Plant Operation. Bernhardt Weilandt and Nikolaus Petrusch. Stahl und Eisen, v. 81, Feb. 16, 1961, p. 235-238.

Method and equipment for control of sintering process by measurement of amount, temperature and composition (CO, CO_2 and H_2O content) of waste gas. Control of optimum humidity and fuel content of sinter. (B16a)

54-B. Beneficiating Manganese Oxide Ores From the Butte-Philipsburg Federal Stockpile. R. C. Bush, G. V. Sullivan and W. A. Stickney. U. S. Bureau of Mines, Report of Investigations 5728, 1961, 19 p.

Continuous circuit flotation used to concentrate straight oxide ore and mixed oxide-carbonate ore by an oil emulsion scheme to produce a concentrate for sintering to meet requirements for smelting using less flux. Evaluation of chemical composition and physical properties. (B14h, B16a; Mn)

55-B. Iron Ore Agglomeration--Sintering and Pelletizing. Alan English. Iron and Steel Engineer, v. 38, Mar. 1961, p. 113-119.

Comparison of sintering to pelletizing for applicability in blast furnace burdening practices, the sintering process being flexible, with utilization of a variety of materials whereas the pelletizing process uses a finely divided material. Plant layout and design and production methods for pellets and sinter, with attention to self-fluxing materials. (B16a, B16b, D1a; Fe)

56-B. New Sinter Line Increases J & L's Blast Furnace Capacity. Iron and Steel Engineer, v. 38, Mar. 1961, p. 151-152, 155-156.

An automatic sintering plant is used to produce self-fluxing sinter composed of flux dust, mill scale, iron ore, limestone and dolomite for use in a blast furnace. (B16a, 1-52; Fe)

57-B. (English.) Milling Low Grade Tin Ore at Kamativi Tin Mines Limited. C. J. A. Van Lummel. Geologie en Mijnbouw, v. 39, Oct. 1960, p. 560-564.

Concentration of cassiterite ores using treatment on Humphrey's spirals for recovering grains between 0.8 mm.

and 37 microns. Recovery of undersize grains by cycloning and jigging. (B14; Sn)

58-B. The Dry Concentration of Ores and Minerals. R. A. Kipp. Canadian Mining and Metallurgical Bulletin, v. 54, Mar. 1961, p. 241-243.

Dry concentration of materials such as wolfram, chrome, zircon, rutile, sands, diamonds and Sn tailings with air flotation table and electrostatic separator. Effect of particle shape, size, speed and friction on separation efficiency. (B14)

59-B. Some Reasons for Selectivity in Copper Activation of Minerals. C. H. G. Bushell, C. J. Krauss and G. Brown. Canadian Mining and Metallurgical Bulletin, v. 54, Mar. 1961, p. 244-251.

Activation of sphalerite, marmatite and pyrrhotite with copper sulphate in the flotation process for extraction of Pb, Zn and Fe. Effect of solution pH and oxygen and nitrogen content on recovery efficiency. Thermodynamic analysis of the process. (B14h; Pb, Zn, Fe)

60-B. (Japanese.) Reduction of Iron Oxide. Preparation Temperature of Ferric Oxide and Reduction Efficiency. Seiichi Takagi. Nagoya Institute of Technology, Bulletin, Dec. 1960, p. 329-333.

Reduction of ferric oxide as produced by the roasting of ferrous oxalate at 700-1200° C. with town gas. Effect of temperature on crystal and powder grain size, acid solubility, chemical reactivity, porosity and reduction rate. 16 ref. (B15p; Fe-b)

61-B. (German.) Sintering of Ore Fines by the Shaft Sintering Process. Werner Wenzel and Hermann Schenck. Stahl und Eisen, v. 81, Mar. 30, 1961, p. 404-407.

Test sintering of Fe ores in a pilot transverse flow shaft furnace. Strength, reducibility and degree of oxidation of sinter are compared to sinter-pan method products. (B16a, 1-52; Fe)

62-B. Chlorination of an Idaho Ilmenite. E. C. Perkins, H. Dolezal and R. S. Lang. U. S. Bureau of Mines, Report of Investigations 5763, 1961, 16 p.

Chlorination of an ilmenite containing 46.5% TiO_2 and 35.6% Fe at 1000° C. in a quartz tube using Cl_2, NaCl, coke and caustic as reagents to produce $TiCl_4$. Calculation of production rate and chlorination efficiency. 102 ref. (B15r; Ti-b, Fe)

63-B. Effect of Particle Size Upon the Green Strength of Iron Oxide Pellets. R. P. Jewett, C. E. Wood and J. P. Hansen. U. S. Bureau of Mines, Report of Investigations 5762, 1961, 15 p.

Balling tests on crushed magnetite and hematite ore concentrates containing 47.9-69.4% Fe. Effect of moisture content, surface diameter, particle size, porosity and density on green crushing strength. (B13, B16b, H11n; Fe-b)

64-B. Flotation of Beryl From Northeastern Pegmatites. J. E. Shelton. U. S. Bureau of Mines, Report of Investigation 5767, 1961, 10 p.

Direct, cationic and anionic flotation of ground pegmatites containing 0.43-1.16% BeO using reagents of H_2SO_4, NaOH, HCl, NaF, H_2SiF_6, HF and acetic acid. (B14h; Be)

65-B. (German.) Use of Flame Coal and Hot Blast on Sintering Strands in Sintering Minette Ores. Karl Heyden. Stahl und Eisen, v. 81, Apr. 13, 1961, p. 498-501.

Sintering of basic Bessemer sinter (41-42% Fe) from minette ore fines and minette flue dust using flame coal (80% of fuel) as fuel with a hot blast. Fuel and heat savings are compared to sintering with cold blast. (B16a; Fe)

66-B. (German.) Results in Briquetting of Flue Dust. Wilhelm Wolf and Helmut Wysocki. Stahl und Eisen, v. 81, Apr. 27, 1961, p. 559-561.

Procedure and mechanical equipment for production of blast furnace burden briquets from flue dust and openhearth slag with sulphide liquor as the binder. Quality control by cold compression and drop testing of the briquets after annealing in blast furnace waste gas, with subsequent smelting trials in the blast furnace as up to 25% of the burden. (B16d, D1a; Fe)

67-B. Beneficiation of Red Iron Ore Fines From Pyne Mine, Bessemer, Ala. W. E. Lamont, I. D. Feld and B. H. Clemmons. U. S. Bureau of Mines, Report of Investigations 5779, 1961, 16 p.

Refining of red iron ore by gravity concentration, flotation and pyrometallurgical treatment. 14 ref. (B14, C21; Fe)

68-B. Recent Progress in Milling and Gold Extraction at Giant Yellowknife Gold Mines, Limited. R. J. C. Tait. Canadian Mining and Metallurgical Bulletin, v. 54, Apr. 1961, p. 302-314.

Recovery of Au from pyrite, arsenopyrite, stibnite and antimony sulphosalts by flotation, roasting of flotation concentrate and subsequent cyanidation of the calcine. (B14h, B15, C19p; Au)

69-B. Fluid Bed Roasting--Principles and Practice. R. B. Thompson and G. Roesner. Paper from "Extractive Metallurgy of Copper, Nickel and Cobalt". Interscience Publishers, Inc., New York 1, 1961, p. 3-32.

Extraction of nonferrous metals from sulphide concentrates of Cu, Co and Ni by fluid bed roasting. Types of reactors and bed design and fluidization characteristics are reviewed with examples for hydrometallurgy and pyrometallurgy of Cu concentrates. 14 ref. (B15q, B15r; Cu, Co, Ni)

70-B. (Portuguese.) Sintering Degree and Reducibility of Sintered Ore. Tharcisio D. de Souza Santos and Sergio Bresciani. Boletim da Associacao Brasileira de Metais, v. 17, no. 62, 1961, p. 133-144.

The degree of sintering of ore used in the preparation of ferronickel is determined by rotating the sinter in drums and measuring the quantity of fines obtained after 1000 rotations. A reducibility index is found by holding known quantities of sinter ore and charcoal in a recipient for 4 hr. at 800° C. and subsequent melting in a laboratory furnace. Computation from the Ni contained in the sinter, the Ni content of the ferronickel obtained, the quantity of reduced sinter and the quantity of ferronickel. 6 ref. (B16a; Fe, Ni)

71-B. (Russian.) Magnetic Conversion of Krivoi-Rog Quartzites by Roasting in Fluidized Bed. V. A. Sorokin, V. I. Karmazin, L. G. Katsen, A. I. Ivanov and P. E. Ostapenko. Stal', Dec. 1960, p. 1057-1060.

Iron ore containing 63.45% particles of a diameter less than 1 mm. is fluid-bed roasted in a stream of a mixture of 10% coke oven gas and 90% blast furnace gas, serving as a reducing agent and subsequently subjected to magnetic separation. A concentrate containing 67% Fe is obtained. 5 ref. (B15q; Fe)

72-B. (Russian.) Processing of a Fe-V Concentrate Obtained From Volkov Ores. D. G. Khokhlov, A. I. Pastukhov, S. A. El'kin, V. A. Shamarin, I. E. Ruchkin, A. I. Bychin and K. B. Khusnoyarov. Stal', Dec. 1960, p. 1061-1063.

Sintering of Volkov and other concentrate with coke and limestone additions. Composition, basicity, reducibility and degree of sintering of the product obtained. (B16; Fe, V)

73-B. Reduction of Low Grade Iron Ore With Carbon: Influence of Time and Temperature. Francis J. Lecznar. Journal of Scientific & Industrial Research, v. 20D, Mar. 1961, p. 85-90.

Influence of time and temperature on reduction of limonite sand with charcoal. Optimum temperatures for obtaining Fe_3O_4, FeO and Fe are 700-800, 800-900 and 900° C. respectively. Reduction time decreases with temperature increase. 19 ref. (B15p; Fe)

74-B. Flotation Studies on Copper-Nickel Sulfide Ores From Deposits Near Rockport, Maine. John E. Shelton. U. S. Bureau of Mines, Report of Investigations 5793, 1961, 17 p.

Beneficiation tests on pyrrhotite disseminated in talc and hypersthene using selective Cu and Ni flotation with sulph-hydric collectors in an alkaline circuit. Data are given for Ni and Cu content of the concentrates. (B14h; Cu, Ni)

75-B. (English.) Investigation of Behavior and Recovery of Rhenium on Roasting of Molybdenite Concentrates in Fluidized-Bed Furnaces. A. N. Zelikman, V. I. Bibikova, V. M. Petrov, S. V. Postnikova, G. I. Abashin, V. F. Pritulo and L. N. Nikitina. Planseeberichte fur Pulvermetallurgie, v. 8, Jan. 1961, p. 166-172.

Roasting of preroasted and nonpreheated Mo concentrate with 0.025-0.04% Re at 540-630° C. in a fluidized bed and in a tubular rotary furnace. Subsequent recovery of Re from flue dust by electrofilter and gas washer. (B15q, B15r; Mo, Re)

76-B. A Review of Iron Ore Sintering. J. H. Porteus. Iron and Steel Engineer, v. 38, May 1961, p. 144-155.

Use of concentrates, ore fines and fluxes in sinters. Sintering, pelletizing and briquetting processes. Equipment for materials handling, screening, sintering and cooling operations. (B16a; Fe)

77-B. Factors in the Life of Open Hearth Refractories. Pt. 2. W. S. Debenham. Industrial Heating, v. 28, May 1961, p. 977-978, 980, 982, 984.

Effect of composition of refractories for roofs, walls and bottoms on performance characteristics and life in furnaces. Importance of furnace operating conditions. (B19d; RM-h, 17-57)

78-B. Experimental Extraction of Strategic Components From S-816 Alloy Scrap. H. Kenworthy, V. A. Nieberlein and A. G. Starliper. U. S. Bureau of Mines, Report of Investigations 5786, 1961, 27 p.

Study of the recovery of Ni, Co and Cr from S-816 Co alloy scrap. Methods investigated include size degradation by steam jet granulation, catastrophic, direct and selective oxidation using vanadium pentoxide, molybdenum trioxide, nickelic oxide or an oxygen jet; carbonyl treatment, selective carburization, roasting, leaching and electrolytic corrosion in acidic, alkaline or salt medium. (B23; Co-b)

79-B. (Portuguese.) Experimental Sintering of Garnierite. Tharcisio D. de Souza Santos and Sergio Bresciani. Boletim da Associacao Brasileira de Metais, v. 17, no. 62, 1961, p. 103-116.

Garnierite fines containing 2.68% NiO, 5.55% moisture and 10.6% volatile materials are charged in a sintering furnace after addition of 6-12% charcoal powder. Effect of water addition (up to 18%) and charge composition on the furnace efficiency. Temperature and development of gaseous substances as a function of time. (B16a; Fe, Mg, Ni)

80-B. Mincon BeO Process Uses Domestic Ores. Sidney Levine. Nonmetallic Minerals Processing, v. 2, May 1961, p. 15-19.

Heat flotation method of extraction which includes the sintering of raw ore and calcination of the finished oxide is used for recovery of BeO from low-grade Be ore. Operation, equipment and flow diagram of processing plant. (B14h; Be)

81-B. (Slovak.) Kinetics of the Reducing Roasting of Albanian Hematite. Viktor Jesenak and A. Jantula. Hutnicke Listy, v. 16, Apr. 1961, p. 266-269.

Dehydrated hematite containing 1.38% NiO is reduced in a hydrogen-steam mixture of varying composition from 560-700° C. to find the optimum temperature and hydrogen concentration for the manufacture of Fe_3O_4 and Ni. 13 ref. (B15; Fe)

82-B. Magnesium Producer Shuns Electrolysis. B. E. Barnes. Chemical Engineering, v. 68, May 29, 1961, p. 70-72.

Production of Mg based on the calcining of dolomite ore, mixing the calcine with a ferrosilicon reducing agent and fluospar and thermally reducing the mixture to yield pure Mg. (B15, C26; Mg)

83-B. Laboratory Concentration of Seven Titanium-Bearing Ores of the Pacific Northwest. J. W. Town and C. W. Sanders. U. S. Bureau of Mines, Report of Investigations 5771, 1961, 12 p.

Results of testing Ti ores for amenability to various beneficiation techniques. Magnetic and electrostatic separation, chlorination, gravity concentration, flotation and roast-leach magnetic separation. Sizing studies. Application of a sulphurization process for upgrading Ti content. (B14, B13, B15r; Ti, RM-n)

84-B. The Chlorination of Ilmenite. I. B. Ketteridge. British Chemical Engineering, v. 6, June 1961, p. 405, 407.

Design parameters for fluid bed reactors for the manufacture of rutile are expressed in terms of retention times, reaction rates and reactor efficiency. (B15q, 1-52, 17-51; Ti)

85-B. The Agglomeration of Iron Ores and Concentrates. D. J. Hains. Canadian Mining and Metallurgical Bulletin, v. 54, June 1961, p. 430-436.

Review of principles and process parameters for ore dressing and pelletizing and sintering production of blast furnace burdens from ore fines and concentrates. 5 ref. (B13, B16; Fe)

86-B. (Russian.) Neutralization of Ores at Blast Furnace and Agglomeration Plants. E. S. Glikman. Izvestiya VUZ--Chernaya Metallurgiya, Feb. 1961, p. 191-196.

Development of a standard method for calculating necessary size of areas where ores are crushed and mixed before entering blast furnaces and agglomeration plants in order to obtain the most effective mixing of ores and thereby avoid variations in chemical composition and sizes. 6 ref. (B13)

87-B. (Japanese.) Heat Transfer During the Sintering Process. Pt. 2. Study of the Sintering of Iron Ores. Koji Sanbongi and Nobunao Nishida. Tetsu-to-Hagane (Iron and Steel Institute of Japan, Journal), v. 47, May 1961, p. 687-692.

Temperature distribution and rate of heat transfer during sintering of Goa hematite and Larap magnetite ores by heating with hot air at 800° C. Effect of air flow rate and charge moisture content on heat and flame front rates in sintered and nonsintered layers and on temperatures in the combustion zone. 5 ref. (B16; Fe)

88-B. Flotation Used to Concentrate Beryllium Ore. Chemical & Engineering News, v. 39, July 3, 1961, p. 46.

Various ores, especially bertrandite (a hydrated beryllium silicate) are processed by drying, crushing and grinding, followed by concentration in a series of flotation cells. Special reagents are used, producing a 3.5% BeO concentration from 0.8% ore. (B14h; Be)

89-B. (Translation-Brutcher no. 4857.) Secondary Breaking of Iron Ores by High Frequency Current. M. I. Agoshkin and A. S. Voronyuk. Izvestiya Akademii Nauk, OTN Metallurgiya i Topliva, Jan. 1960, p. 138-144.

Description of two methods--magnetic technique and its application to ores with magnetic characteristics; contact method with merits of breaking in drift, scraping or screening entries. (B12; Fe)

90-B. Space Uses Push Beryllium Development. Chemical & Engineering News, v. 39, June 26, 1961, p. 21-22.

The concentration of domestic low grade Be ores is discussed in its commercial applications in nuclear, electronic and missile industries. Domestic and foreign sources of Be ores are reviewed. (B14h, A11a, 17-57; Be)

91-B. (Translation-Brutcher no. 5037.) Investigation of the Reduction Kinetics of Ferrous Oxide by Solid Carbon at Temperatures Above 1400° C. V. V. Kondakov, D. I. Ryzhonkov and D. M. Golenko. Izvestiya VUZ--Chernaya Metallurgiya, Apr. 1960, p. 23-28.

Effect of charge weight on rate and completeness of reduction of FeO; effect of temperature on reduction rate; data on rate coefficient and activation energy. (B15p; Fe)

92-B. (Translation-Brutcher no. 5104.) Combustion of Carbon During the Sintering of Iron Ores. A. A. Sigov and V. A. Shurkhal. Izvestiya VUZ--Chernaya Metallurgiya, Dec. 1960, p. 23-30.

Laboratory experiments on sintering wet sand and coke fines; temperatures, combustion products composition, sintering of Krivoi-Rog (hematite + 10% magnetite and brown) ore. (B16a; Fe)

93-B. (Translation-Brutcher no. 5181.) Some Peculiarities of the Reduction of Hardened Pellets From Southern Concentrates by Gases. G. V. Gubin. Izvestiya Akademii Nauk SSSR, OTN Metallurgiya i Topliva, Jan. 1961, p. 147-149.

Comparative study of hardened pellets from Southern U.S.S.R. (chiefly hematite) concentrates for reducibility in natural gas (98.3% CH_4), dry and moist, hydrogen and carbon monoxide. Effect of reduction time and temperature on degree of reduction by the three gases. (B15p; Fe)

94-B. (Translation-Brutcher no. 5054.) Production of Sinters of Increased Basicity and Smelting Them in the Blast Furnace. L. von Bogdandy. Stahl und Eisen, v. 81, Jan. 1961, p. 12-22.

Advantages to be gained by the production and use of self-fluxing sinters. Production of increased basicity sinters, fuel consumption, relation of coke rate to CO_2 content in limestone. Statistical evaluation of operating data from numerous blast furnaces. (B16a, D1)

95-B. (Translation-Brutcher no. 5063.) Effect of Uneven Particle Size Distribution on the Strand-Sintering Temperature of Iron Ores. O. Steinhauer and K. Zehe. Stahl und Eisen, v. 81, Feb. 1961, p. 88-95.

Previously abstracted from original. See item 39-B, 1961. (B16a; Fe)

96-B. (Translation-Brutcher no. 5157.) Study of Reducibility of Sinter. J. Willems and G. Quade. Stahl und Eisen, Sept. 1961, p. 552-558.

Previously abstracted from original. See item 336-D, 1961. (B16a; Fe)

97-B. (Translation-ConBur.) Study of Reducing Roasting of Zinc and Magnesium Sulphate. V. V. Pechkouskii. Journal of Applied Chemistry of the USSR, v. 33, May 1960, p. 1020-1024.

Mixtures containing 0.5-8 moles of carbon per mole of dehydrated $ZnSO_4$ or $MgSO_4$ are roasted in a current of pure dry N_2 or in a current of N_2 containing 7.5% SO_2 from 550-900° C. in a tubular furnace. Effect of temperature and carbon content in the charge on the degree of reduction. Influence of roasting time and temperature and additives MgO, ZnO, CaO and Mn_2O_3 on the degree of conversion of sulphate S into sulphide form. 14 ref. (B15p; Zn-b, Mg-b, S)

98-B. (Translation-ConBur.) Investigation of the Combustion of Copper-Zinc Concentrates in a Current of Oxygen. S. A. Vermenichev, V. I. Deev and M. I. Kochnev. Journal of Applied Chemistry of the USSR, v. 33, May 1960, p. 1030-1035.

Laboratory studies of the combustion of CuS-ZnS concentrates in a current of O_2 are conducted in a vertical reaction chamber of a resistance furnace from 900-1200° C. Determination of the effects of varying O_2 excess on the dust yield, solid oxidation product yield and the elemental distribution in the products. 14 ref. (B15n; Cu-b, Zn-b, S)

99-B. (Japanese.) The Fluidizing and Selective Chlorination Roasting of Pyrite Cinders. Pt. 3. Study of Dry Decopperizing of Pyrite Cinders. Kazuhisa Okajima, Michio Inouye and Kokichi Sano. Tetsu-to-Hagane (Iron and Steel Institute of Japan), v. 47, June 1961, p. 795-800.

Removal of Cu, Zn and S from pyrite cinders by roasting in chlorinating atmospheres from 500-1050° C. for various times. Effect of particle size and roasting time and temperature on Fe and impurity content. (B15q, 2-61, 3-67, 3-73; Fe-b, Cu, Zn, S)

100-B. Platinum Mining at Rustenburg. C. B. Beath, R. J. Westwood and C. A. Cousins. Platinum Metals Review, v. 5, July 1961, p. 102-108.

Geology of Pt deposits, mining methods and stopping practice and metallurgical treatment of the ore. (B-general, A11a; Pt)

101-B. Beneficiation of Ferruginous Sandstones of the Northampton Sand Ironstone Formation. G. E. Davies. Iron and Steel Institute, Journal, v. 198, July 1961, p. 282-289.

Classification by screening and magnetic separation after low-temperature reduction roasting removes silica and increases Fe concentration from 20-50%. 8 ref. (B13d, B14j; Fe)

102-B. (Russian.) Concentration of Molybdenum Ores. V. K. Apollonov. Tsvetnye Metally, Feb. 1961, p. 5-10.

Concentration of an ore containing 57% quartz, 28% microcline, 5% plagioclase, 5% muscovite, 2% sericite and 1% molybdenite, powellite or pyrite by flotation. About 8-14% of the total Mo contained in the ore is present in the form of oxides. Effect of two-stage grinding in ball mills on concentration. 9 ref. (B14h, B13; Mo)

103-B. (Russian.) Separation of Collective Cu-Pb-Zn-Pyrite Concentrates Containing Secondary Sulphides and Oxides of Copper. V. A. Nagaenko. Tsvetnye Metally, Mar. 1961, p. 1-4.

Selective hydrometallurgy and flotation of ore containing 3.03% Cu, 15.18% Pb and 30.51% Zn. The results are a Pb concentrate containing approx. 39% Pb, 11-12% Zn and 4% Cu and a Zn concentrate with approx. 47% Zn, 4% Pb and 1% Cu. (B14h, C19; Pb, Zn, Cu)

104-B. (Russian.) Final Treatment of Unconditioned and Crude Bulk Concentrates. V. A. Skorov. Tsvetnye Metally, Mar. 1961, p. 4-10.

Concentrates containing 67.85-70.56% WO_3, 1.42-2.02% As, 1-1.32% Sn, 0.48-0.65% S, 0-0.04% P, 0-2% SiO_2, 0-0.04% Cu and 0-5.52% MnO are treated by magnetic separation, roasting and flotation to obtain a W concentrate with 68.43% WO_3, 0.10% Sn, 2.15% As and 0.035% P, a Sn concentrate with 53.84% Sn and 1.15% WO_3; and sulphide mixture containing 25.4% As, 0.71% WO_3 and 0.20% Sn. (B14; W, Sn, S)

105-B. (Russian.) Fluid Bed Roasting of Nickel Concentrate Obtained in the Selective Flotation of Converter Matte. Zh. R. Nadzhar'yan and V. G. Bryndin. Tsvetnye Metally, Mar. 1961, p. 52-55.

Concentrates containing 68-69% Ni, 3.5-4% Cu, 1% Co, 22% Si, 3-3.5% Fe and 7.5% moisture are roasted to obtain a product containing 67-68% Ni, 4% Cu, 1-1.2% Co and 2-2.5% S. The sulphur content is determined as a function of particle size. (B15q; Ni)

106-B. The Treatment of Tin Ores in the Rooiberg Concentrator. R. C. M. van der Spuy. South African Institute of Mining and Metallurgy, Journal, v. 61, May 1961, p. 468-488.

Crushing, washing, concentration and regrinding. Description of the tube mill, slime plant, dressing plant and regrind plant. Production and by-products and extraction and recovery statistics. (B-general; Sn)

107-B. (Czech.) Partial Replacement of the Solid Fuel With Another Source of Heat in the Sintering of Iron Ores. Emil Seidler. Hutnicke Listy, v. 16, May 1961, p. 307-311.

Operational and economic advantages of gaseous fuel injection during sintering of an ore-coke mixture. Temperature, reducibility and compressive strength of sintered ore as functions of sintering time and solid-gaseous fuel ratio. 4 ref. (B16a, Q28g; Fe, RM-n)

108-B. (Swedish.) Titanium Tetrachloride and Iron From Ilmenite. A. Bergholm. Jernkontorets Annaler, v. 145, Apr. 1961, p. 205-221.

Partial reduction, partial chlorination and total chlorination methods. Review of the inherent possibilities of these several routes. 34 ref. (B15r; Fe, Ti)

109-B. (Translation-ConBur.) Chlorination in the Metallurgy of Rare and Nonferrous Metals. I. S. Morozov. Journal of Applied Chemistry of the USSR, v. 33, Aug. 1960, p. 1669-1682.

Chlorination processes for Cb_2O_5, TiO_2 and ZrO_2. Physicochemical principles of purification and separation of rare-metal chlorides. Review of work done in 1958-1959 on chlorination of Zr, Hf, BiO, W, Mo, Re, Ta-Cb concentrates and various ores. 57 ref. (B15r, 10-54; Zr, Hf, Be, W, Mo, Re, Ta, Cb)

110-B. (Translation-Brutcher no. 5194.) Pelletizing Iron Ore Fines Preparatory to Strand Sintering. S. Zielinski, A. Maslanka and M. Kowalewski. Hutnik, v. 28, Feb. 1961, p. 44-49.

Economic reasons for the pelletizing of fine sinter mixes prior to sintering; best pellet sizes compared with size of pellets for use directly in blast furnace. Theory underlying the formation of pellets out of sinter mixes. (B16b; Fe)

111-B. (German.) Laboratory Investigation of Reduction of Domestic Iron Ores in the Fluidized Bed. Kurt Sauberlich and Ulrich Rabe. Neue Hutte, v. 6, June 1961, p. 333-342.

Investigation of reduction behavior of "Buchenberger" iron ore in the fluidized bed (grain size 0-2 mm.) at 600-800° C. in a laboratory furnace using blast furnace waste gas, water gas and pure CO as reducing agents. (B15q; Fe)

112-B. (Russian.) Sulphating Fluid Bed Roasting of Iron Ores. L. A. Petrov, E. K. Fedorov and L. M. Tsylev. Izvestiya Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk, Metallurgiya i Toplivo, Jan. 1961, p. 31-38.

Russian ores containing Cu and Co are experimentally fluid-bed roasted at 525-625° C. in a mixed stream of SO_2 and O and subsequently leached in water of a 3% H_2SO_4 solution. Effects of SO_2 contained in the gas, roasting temperature and time, particle size and rate of gas stream on the relative quantity of Cu and Co extracted in leaching. 12 ref. (B15, C19n; Fe)

113-B. (Russian.) Increase of the Effectiveness of Hydroxyl Collectors in Flotation. L. A. Barskii, I. N. Plaksin and V. I. Tyurnikova. Izvestiya Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk, Metallurgiya i Toplivo, Jan. 1961, p. 152-158.

Flotation of tailings containing 0.011% Mo. Effect of surface active substances such as sodium tridecylate and sodium alkyl sulphate added to the pulp on collector dispersion and final Mo concentration. 14 ref. (B14h; Mo)

114-B. First International Agglomeration Symposium. Journal of Metals, v. 13, Aug. 1961, p. 571-574.

Summaries of papers presented at the First International Symposium on Agglomeration held in Philadelphia, Pa., April 12-14, 1961, including an evaluation of the properties of dolomites affecting self-fluxing sinter rates; advances in balling and pelletizing; hat briquetting of partially reduced iron oxide ores and dusts; properties of sinter smelted in the electrothermic zinc furnace. (B16; Fe, Mg)

115-B. Some Aspects of Airflow Through Sinter Beds. D. W. Mitchell. Iron and Steel Institute, Journal, v. 198, Aug. 1961, p. 358-363.

Correlation of measured and calculated values based on flow, bed area, bed height, applied suction, turbulence, Reynolds number, voidage, fluid density, fluid volumn, fluid viscosity and particle surface area. 15 ref. ($B15_q$)

116-B. (Ukranian.) Flotation of Iron Ore From Waste Rock Minerals With the Aid of Combined Depressor. F. N. Belash and P. A. Hontarenko. Dopovidi Akademii Nauk Ukrainskoi SSR, May 1961, p. 640-643.

Flotation of Fe ore from Fe quartzites by combined depressor consisting of thallic oil soap, water glass and small additions of sulphuric acid and sodium bichromate. 4 ref. (B14h; Fe)

117-B. (Italian.) Plastic Refractory Bricks of Silicon-Alumina. I. Ferro. Fonderia, v. 10, July 1961, p. 295-298.

Data on plastic refractory bricks and a comparison with traditional refractories. Preparation, control and applications of plastic refractories. (B19, 2-60; RM-h40, Al, Si, NM-d)

118-B. The Second Challenge to the Lake Superior District. M. O. Holowaty and G. H. Craig. Blast Furnace and Steel Plant, v. 49, Sept. 1961, p. 883-890.

Utilization of nonmagnetic taconites and semitaconites; roasting, pelletizing and beneficiation; and production of synthetic scrap of uniform quality are discussed as solutions to the problem of providing Fe rather than oxides to the market. (B-general, A11b: Fe)

119-B. (English.) Manufacture of Coke for Special Pig Iron. Pt. 1. Coke for Low Phosphorous Pig Iron. Menoiu Nakahara, Kazuto Takesue and Takashi Shibata. Yawata Technical Report, no. 231, June 1960, p. 89-94.

Factors in selection of coking coal suitable for producing low-phosphorus coke. Comparison of phosphorus contents in American and Japanese coals and effect of coke composition on compositions of various Bessemer and openhearth steels. (B18n)

120-B. (Translation-ConBur.) Heat Transfer From a Fluidized Bed of Granular Material to a Heat-Exchange Surface. Pt. 3. D. C. Traber, V. B. Sarkits and I. P. Mukhlenov. Journal of Applied Chemistry of the USSR, v. 33, Oct. 1960, p. 2167-2174.

Influence of bulk density and specific heat of the solid phase (vanadium, alumina-nickel, iron-magnesia and Fe-Cr catalysts, silica gel, marble, quartz, chamotte and coke) on heat transfer under various hydrodynamic conditions. 7 ref. ($B15_q$)

121-B. (Translation-ConBur.) Heat Transfer From a Fluidized Bed of Granular Material to a Heat-Exchange Surface. Pt. 4. I. P. Mukhlenov, D. G. Traber and V. B. Sarkits. Journal of Applied Chemistry of the USSR, v. 33, Oct. 1960, p. 2175-2180.

Derivation of equations for calculating maximum coefficients of heat transfer and the corresponding optimum gas velocities from fluidized beds based on vanadium, alumina-nickel and Fe-Cr catalysts, silica gel, marble, quartz, chamotte and coke. 16 ref. ($B15_q$)

122-B. (Translation-ConBur.) Reduction of Ferric Oxide and Magnetite by Mixtures of Hydrogen and Carbon Monoxide at Low Temperatures. A. G. Maskvicheva and G. I. Chufarov. Journal of Applied Chemistry of the USSR, v. 33, Oct. 1960, p. 2181-2184.

CO and H mixtures of varying concentrations are used to reduce iron oxides at 275° C. under 240-260 mm. pressure. At low temperatures the most active reducing agent for Fe_2O_3 is CO and H for Fe_3O_4. 6 ref. ($B15_p$; Fe)

123-B. (Japanese.) Operating Conditions a Pilot Plant Fluidizing Roaster. Pt. 1. Pilot Plant Tests on the Selective

Chlorination Roasting of Pyrite Cinders. Kazuhisa Okajima, Michio Inouye and Kokichi Sano. Tetsu-To-Hagane (Iron and Steel Institute of Japan, Journal), v. 47, Aug. 1961, p. 1137-1143.

The pressure drop through the bed and variation of particle size distribution of overflow cinders are determined for chlorination and roasting of various pyrites at 525-1050° C. at different pressures and gas velocities. 9 ref. (B15q; Fe-b)

124-B. Pilot Milling of Bagacay Copper-Zinc Ore. R. B. Quicho, L. O. Pedron and F. C. deLeon. U.S. Bureau of Mines, Philippines, Manila, Report of Investigation no. 30, May 1961, 9 p.

Feasibility of producing bulk concentrate assaying 14.14% Cu and 15.55% Zn at 65.5% recovery for Cu and 67.7% for Zn using Z-200 as collector-frother at pH 10. Differential flotation of a bulk concentrate containing 12.03% Cu and 10.58% Zn preground to 95% minus 325-mesh produces a Cu concentrate assaying 21.19% Cu and 10.38% Zn and a Zn concentrate assaying 15.24% Zn and 18.58% Cu. (B13c, A9j; Cu, Zn)

125-B. Screw Feeder Raises Ore Yield. Iron Age, v. 188, Sept. 14, 1961, p. 186.

Flotation process using sodium fluoride powder additions controlled by screw feeder to separate Fe from crude martite ore. (B14h, 1-52; Fe)

126-B. (Translation-Brutcher no. 5172.) Use of Bituminous Coals and Hot Blast in the Strand Sintering of Minette Iron Ores. K. Heyden. Stahl und Eisen, v. 81, no. 8, 1961, p. 498-501.

Previously abstracted. See item 65-B, 1961. (B16a; Fe)

127-B. Oxygen Boosts Risdon's Zinc Output. R. W. Pickering and D. J. Gaffney. Engineering and Mining Journal, v. 162, Sept. 1961, p. 106-107.

Use of byproduct oxygen from ammonium sulphate production in Zn hearth, flash and fluid-bed roasting plant to reduce sulphide content of calcine while maintaining high ratio of oxidation. Process achieves full economy and high Zn solubility while holding low Fe solubility in the furnaces. (B15, A11c; Zn)

128-B. (Russian.) Increased Output of Electric Separators. N. M. Karnaukhov and T. B. Tarasova. Tsvetnye Metally, Apr. 1961, p. 3-8.

Separation of sintered concentrate containing TiO_2, SiO_2 and ZrO_2 by an electric separator employing corona discharge and electrostatic field; influence of rotation rate of grounded electrode and of the thickness of the fed sinter layer on the output of the separator. 4 ref. (B14n, 1-69; Si, Ti, Zr, 14-68)

129-B. (Russian.) Obtaining Metallic Columbium From Carbide-Oxide Mixture. H. P. Shveikin and P. V. Held. Tsvetnye Metally, Apr. 1961, p. 39-42.

Processes for obtaining carbide-oxide mixture of Cb in the presence of CO, H and Ar and for obtaining metallic Cb from a carbide-oxide mixture of Cb by briquetting and calcining in a vacuum furnace. 6 ref. (B15, B16b, 1-73; Cb, 14-68)

130-B. How Magnesium Is Produced in Alabama. Southern Power & Industry, v. 79, Sept. 1961, p. 22-23.

Production of high purity Mg from calcined dolomite ore, blended and briquetted with ferrosilicon and a small amount of fluorspear. Mg is liberated from the briquetted material by a vacuum distillation process. (B-general, C22, 1-73; Mg)

131-B. (Russian.) Fluosolids Roasting of Sulphide Gold-Bearing Concentrates. I. I. Kershanski and H. S. Hubaidullin. Tsvetnye Metally, June 1961, p. 45-50.

Roasting and desulphurization in a newly designed furnace with Silit heaters using hot compressed air. Rust is recovered by sleeve filters. 8 ref. (B15; Au)

132-B. J & L Operating Largest Single Strand Iron Ore Sintering Line. Industrial Heating, v. 28, Sept. 1961, p. 1682-1686, 1688, 1690.

Equipment, layout and operation of the world's largest iron ore sinter line, capable of producing more than 225,000 net tons per month of high quality feed for blast furnace at the Aliquippa, Pa., works of Jones & Laughlin Steel Corp. (B16, W15a, 1-52; Fe, RM-n)

133-B. (Translation-ConBur.) Reduction of Sulphide Ore With Petroleum Gas-Steam Mixtures. V. P. Rozhdestvenskii

and S. S. Krivolapov. Journal of Applied Chemistry of the USSR, v. 33, Dec. 1960, p. 2588-2592.

Study of the reduction of a rich sulphide Fe ore concentrate containing 1.1% S at 950° C. in a flow-type laboratory unit with a fixed permeable bed of ore. Effects of steam and reducing gas concentrations on the degree of reduction, carbon formation and removal of sulphur from the ore. 7 ref. (B15q; Fe-b, S)

134-B. Roasting Rates and Elementary Mechanisms. E. Peters. Canadian Mining and Metallurgical Bulletin, v. 54, Aug. 1961, p. 580-584.

Reaction mechanisms between solid phases and with furnace atmospheres during roasting including heat transfer, gas-solid interactions with accompanying mass transfer between the bed and furnace atmosphere, vapor phase transport processes in solid-solid interactions and solid phase diffusion processes. Effect of composition, sintering time and temperature on the composition of the sinter product and on the decomposition rate. 5 ref. (B15, B16a, 2-60, 2-61)

135-B. Multiple Hearth Roasting of Sulphides in the Zinc Roasting Plant of the Hudson Bay Mining and Smelting Co., Ltd. Flin Flon, Manitoba. Ben Schneider. Canadian Mining and Metallurgical Bulletin, v. 54, Aug. 1961, p. 585-588.

The split-draft process is used for controlling the amount of sulphation and the hearth temperature and limiting the formation of Zn ferrite by regulating the draft. Layout and operation of the roasting plant and the multiple hearth wedge furnaces. (B15, W15a; Zn)

136-B. Suspension Roasting of Zinc Concentrate at Trail, British Columbia. R. E. Eyre. Canadian Mining and Metallurgical Bulletin, v. 54, Aug. 1961, p. 589-594.

Suspension roasting of marmatite concentrates by the Cominco process, drying, grinding and calcine machining. Consideration is given to the composition and fineness of the concentrate, temperature and time for roasting, oxygen concentration in the roaster and gas recirculation techniques. (B15n, 2-60, 2-61, 3-73; Zn)

137-B. Fluid Bed Roasting Practice in the Red Lake Camp. K. P. Wright. Canadian Mining and Metallurgical Bulletin, v. 54, Aug. 1961, p. 595-600.

Autogenous fluid-bed roasting of a flotation concentrate for subsequent Au recovery by cyanidation. Roaster operations and calcine roasting and cyanidation techniques used by three mining companies. (B15q, C19p, 1-52; Au)

138-B. The Falconbridge Iron Ore Process. P. G. Thornhill. Canadian Mining and Metallurgical Bulletin, v. 54, Aug. 1961, p. 601-608.

Feed preparation, reduction and precipitation process and calcine leaching used in a sulphate roast-leach method for recovering Ni, Cu and Co from nickeliferous pyrrhotite ore. Design and operation of fluid-bed roasters with consideration of corrosion and erosion effects on its stainless steel components. 8 ref. (B15q, C19n, W15a, 1-52; Ni-b, Cu, Co)

139-B. Roasting in the Iron and Steel Industry. H. U. Ross. Canadian Mining and Metallurgical Bulletin, v. 54, Aug. 1961, p. 609-614.

Review of gas-solid chemical reactions occurring in roasting. Study of roasting of siderite, pyrite and pyrrhotite; magnetic roasting of limonite, goethite and hematite and removal of sulphur by sintering. (B15, B16a, 10-54; Fe)

140-B. Experimental and Commercial Magnetic Roasting. R. L. Cavanagh and A. J. Last. Canadian Mining and Metallurgical Bulletin, v. 54, Aug. 1961, p. 615-622.

Production of magnetic oxides using shaft, rotary kiln, fluid bed, traveling grate, rotating hearth and flash roasters. Application to processing of hematite, limonite and siderite. (B15, W15a, 1-52; Fe)

141-B. Roasting Practices at International Nickel. R. R. Saddington, W. Curlook and H. J. Roorda. Canadian Mining and Metallurgical Bulletin, v. 54, Aug. 1961, p. 623-630.

Fluid bed and multiple hearth roasting of Ni concentrates and pyrrhotite. Effects of furnace temperature, gas velocity and sulphide concentration on process efficiency. 12 ref. (B15, W15a; Ni, Cu, Fe)

142-B. Application of the Jones Wet Magnetic Separator to the Beneficiation of Iron Ore. W. J. D. Stone. Canadian Mining and Metallurgical Bulletin, v. 54, Sept. 1961, p. 677.

Results of tests on various types of Fe deposits using separator which functions on a frequency of 10-15 cycles per min. (B14j; Fe, RM-n)

143-B. (Russian.) Sintering Process and Structure of Tungsten Carbide-Cobalt and Tungsten Carbide-Nickel Alloys Characterized by Carbon Deficiency. I. N. Chaporova and E. I. Shchetilina. Izvestiya Akademii Nauk SSSR--Metallurgiya i Toplivo, Mar. 1961, p. 37-41.

Vacuum roasting of WC-Co and WC-Ni alloys at 1350-1500° C. followed by cooling at various rates. Crystal heterogeneity is evaluated as a function of carbon deficiency prior to roasting and carbonization after roasting. 7 ref. (B15, B16, 2-60; W, Co, Ni)

144-B. (Russian.) Shrinkage Intensification During Powder Roasting. H. A. Meyerson and I. V. Vitagni. Izvestiya Akademii Nauk SSSR--Metallurgiya i Toplivo, Mar. 1961, p. 42-49.

Reduction, briquetting and sintering of Ni and Mo oxides. Shrinkage is measured as a function of composition. Strength and density are tested by electric resistance. 6 ref. (B16, 1-52, S11c; Ni, Mo. 14-68)

145-B. Pelletizing of Iron-Ore Blue Dust. S. Jayaram, D. D. Bhuptani and V. G. Paranjpe. Tisco (Tata Iron & Steel Co., Journal), v. 8, Oct. 1961, p. 210-219.

Effects of process variables including rolling method and duration, disk angle, pellet size and distribution, rotation speed, moisture content and nature and amount of additives. Pellet hardening and influencing factors such as moisture evaporation and temperature. 26 ref. (B16b, 1-52)

146-B. Processing the Rammelsberg Ores. Mine & Quarry Engineering, v. 27, Oct. 1961, p. 452-461.

Production of Zn, Fe and Pb-Cu concentrates by crushing, grinding, xanthate flotation, thickening and filtering ores of galena, zinc blende, copper pyrite and pyrite containing barytes and carbonates. Equipment design and plant operation are given for separate processing of massive and banded ores at two mills. (B-general, 18-67; Cu, Fe, Pb, Zn)

147-B. Ore Dressing in Europe and North America. K. S. Blaskett. Mining & Chemical Engineering Review, v. 53, Aug. 15, 1961, p. 49-54.

Review of mining methods and separating processes including crushing and grinding, flotation, gravity concentration, magnetic and electrostatic separation, filtration and instrumentation. Use of higher strength metals and improved design and control. (B-general, B14, 17-51, 17-57)

148-B. The Flotation of Slimes. William E. Foreman. Canadian Mining Manual, 1961, p. 98-101.

Froth flotation is used to beneficiate metallic and nonmetallic particles of less than 10 microns in size. Settling rates in the collection zone are increased by the use of centrifugal force, having an adverse effect on collection and tending to give better grade of float but a poor recovery. (B14h)

149-B. (Slovak.) Use of Oxygen in Some Metallurgical Processes. Jaroslav Malkovsky, Juraj Schmiedl, Julius Holeczy and Frantisek Sehnalek. Hutnicke Listy, v. 16, Aug. 1961, p. 573-581.

Use of oxygen in the roasting of ores and concentrates containing CdS, PbS or CuS in their smelting and refining of mattes in converters. Effects of air stream rate and oxygen enrichment on roasting speed and of the oxygen in the blast or blow, respectively, on converter or furnace efficiency. 6 ref. (B15, C21, 1-52; Cd, Cu, Pb)

150-B. St. Lawrence Columbium Project Starts Production in Quebec. Engineering and Mining Journal, v. 162, Oct. 1961, p. 99-104.

Equipment, plant layout and process flowsheet for the production of high grade Cb-bearing pyrochlore concentrates. Geology of the deposit, tabulation of waste-ore tonnage and chemical analysis of the produced concentrate. (B-general, 1-52; Cb)

151-B. New Methods, New Ore Sources Attract Aluminum Industry Research Efforts. Finn B. Domaas. Engineering and Mining Journal, v. 162, Oct. 1961, p. 105-109.

Report of progress in the laboratory and pilot-plant research projects covering the direct reduction of Al and the extraction of high-grade alumina from materials other than bauxite. Flowsheets are given for Aluminium Ltd.'s direct reduction process, Perchiney's reduction circuit and low stack furnace, Kretzschmar's reduction scheme which produces no wastes and Anaconda's alternate methods of treating crude alumina with caustic soda or soda sinter. (B-general, 10-54; Al)

152-B. African Alumina Plant Reshapes Bayer Process to Optimize Profits From Low-Grade Ore. Chemical Engineering, v. 68, Oct. 2, 1961, p. 42-44.

Plant development data with modified flowsheet illustrating process steps from raw bauxite to finished alumina. (B13, B14, 1-52)

153-B. Blast Furnace Refractory Resists Carbon Monoxide. Steel, v. 149, Oct. 30, 1961, p. 70, 72.

Development of a low Fe aggregate, high alumina castable material which resists carbon monoxide disintegration. Density, thermal shock resistance, dimensional stability, workability and rebound loss properties of refractory usable up to 2800° F. (B19d, P10, Q10a, Q23q, 2-66; RM-h40)

154-B. (Russian.) The Effect of Caustic Soda on Beryllium Mineral Surface When Preparing It for Flotation. I. N. Plaksin and V. I. Solnyshkin. Izvestiya VUZ--Tsvetnaya Metallurgiya, Mar. 1961, p. 28-35.

Use of infrared spectroscopy to study the surface structure of Be, rutile, ilmenite, Zr and magnetite ore particles treated by caustic soda and deposited on NaCl plates. 19 ref. (B14h, M21g; RM-n, Be, Zr)

155-B. Copper Segregation Process Shows Promise at Lake Shore Mine. G. A. Freeman, Carl Rampacek and L. G. Evans. Mining Engineer, v. 13, Oct. 1961, p. 1152-1155.

Oxidized and mixed oxide sulphide Cu ore is selectively ground and heated with NaCl and coke at 1400-1500° F. in a segregated reactor with subsequent grinding and flotation producing concentrates of 65% Cu. Process mechanics and plant layout with emphasis on reactor design. (B14h, 1-52; Cu)

SECTION C

NONFERROUS EXTRACTION and REFINING

1-C. (German.) Production of Very Pure Metals From Their Iodides. Robert F. Rolsten. Zeitschrift fur Anorganische und Allgemeine Chemie, v. 305, Aug. 1960, p. 25-39.

Method and apparatus for production of Cr, Cu, Fe, Si, Ti, Ta and Cb by thermal decomposition of their volatile iodides in a simplified De Boer bulb at temperatures from 223-2000° C. Microstructure and hardness of the deposited metals. (C1p, M27a, Q29n; Cr, Cu, Fe, Cb, Si, Ti, Ta)

2-C. (Italian.) An Improved Apparatus for Purification of Metals by the Zone Melting Method. D. Gelli and T. Federighi. Alluminio, v. 29, Sept. 1960, p. 403-409.

Purification of Al and other low melting point metals in a zone melting apparatus controlled by an automatic programming device. 12 ref. (C28k; Al)

3-C. High-Purity Electrolytic Chromium. M. J. Ferrante, P. C. Good, F. E. Block and D. H. Yee. Journal of Metals, v. 12, Nov. 1960, p. 861-865.

Kilogram quantities of high-purity, ductile Cr are prepared by electrodeposition from chromic acid solutions at high temperature. Deposit has a lower Sn and oxygen content than metal from fluoride electrolytes. 22 ref. (C23, 2-62; Cr)

4-C. Consumable Electrode Melting of Reactive Metals. S. J. Noesen. Journal of Metals, v. 12, Nov. 1960, p. 842-849.

Effect of melting temperature and pressure on the purity of vacuum arc melted Ta, Mo, Cb, W, Cu and Cr-Mo-Ni steel. 17 ref. (C5h, 1-73, D8m, 2-61, 3-74; Cb, Cu, Mo, Ta)

5-C. (German.) Continuous Casting of Nonferrous Metals. Pt. 1. Copper and Its Alloys. E. Herrmann. Metall, v. 14, Nov. 1960, p. 1098-1105.

Horizontal continuous casting of round stock composed of gray cast iron and Cu alloys using water-cooled graphite molds. Microstructure after casting. (C5q, M27; Cu-b, CI-n)

6-C. (German.) Thermodynamics of the Reduction of Uranium-Tetrafluoride by Magnesium. I. M. Dubrovin and A. K. Evseev. Kernernergie, v. 3, June 1960, p. 577-579.

Computation of free enthalpy, equilibrium constant and equilibrium vapor pressure of Mg during reduction of UF_4 by Mg assuming that the system U-Mg-$MgFe_2$-UF_4 can be taken as unvariant at 1400° C. (C26, P12; Mg, U)

7-C. Reactive Metal Melting Furnace Eliminates Water Cooling Hazard. M. L. Torti and John L. Ham. Mining & Chemical Engineering Review, v. 52, Sept. 15, 1960, p. 74-75.

Vacuum arc skull melting of Ti alloy castings using a rapid melting vacuum arc furnace with a heavy skull which acts as a heat sink. (C5h, W18s, 1-73; Ti-b, 5)

8-C. (Japanese.) Applications of Thorium and Rare Earth Atoms. Takeshi Kojima. Metals, v. 30, Aug. 1, 1960, p. 46-48.

Separation of Th from monazite sand by solvent extraction or adsorption. Mechanical properties of Mg alloys containing Th or rare earth metals. 9 ref. (C28, Q-general; Th, Mg-b)

9-C. (German.) Influence of Alloying Elements on Casting Structure of Aluminum

and the Behavior of Aluminum During Recrystallization. Franz Lihl, Eduard Nachtigall and Gertraud Piesslinger. Zeitschrift fur Metallkunde, v. 51, Oct. 1960, p. 580-589.

Casting of pure Al and Al alloyed with Fe, Si, Ti, Cr, Cu, Mg, Mn or Zn at 680-1000° C. Effect of alloying elements and casting temperature on recrystallization of cold worked and annealed specimens. (C5, N5, 2-60, 2-61; Al-b, Cr, Cu, Fe, Mg, Mn, Si, Ti, Zn)

10-C. Thermoelectric Alloy Has High Efficiency. Electronics, Oct. 7, 1960, p. 80.

Production of a thermoelectric alloy composed of Ag, Sb and Te by direct fusion and zone refining. Data are given for microstructure and thermal properties. (C28k, M27, P11; Ag-b, Sb, Te)

11-C. Casting and Cold Extrusion of Aluminium Bar Stock. Australasian Manufacturer, v. 45, Oct. 15, 1960, p. 44-49.

Production of Al alloy rod and bar stock using a continuous single-strand, horizontal billet casting machine and cold extrusion presses of varying capacities. (C5q, G5; Al, 4-55)

12-C. (French.) Purification of High Purity Copper by the "Floating Zone Melting Technique". Jacques Le Hericy. Comptes Rendus, v. 251, Oct. 10, 1960, p. 1509-1511.

Pure Cu (99.99%) is purified by levitation melting, rolled and wire-drawn to 1 mm. diam. and annealed under vacuum for 14 hr. at 500° C. Purity of wire is determined by measurement of electrical resistivity at 20° C. and at temperature of liquid hydrogen and is compared with purity obtained by conventional zone melting technique. 8 ref. (C28; Cu)

13-C. (French.) Preparation of Calcium by Distillation of Liquid Aluminum-Silicon-Calcium Alloys. E. Bonnier, P. Poyet and R. Caboz. Comptes Rendus, v. 251, Oct. 10, 1960, p. 1512-1514.

Ratios of average speeds of distillation of Al and Si to distillation of Ca make it possible to select, from combinations of commercial Al-Ca and Si-Ca alloys, ternary starting compositions which provide Ca of greater purity at a higher rate of extraction than by distillation of the binary compounds. Theoretical calculations are compared with some experimental results. 9 ref. (C22; Ca-b, Al, Si)

14-C. (French.) Investigation of the Coprecipitation of Palladium and Tellurium. Comparison of Coprecipitates to Alloys Formed by a Heating Process. M. Segu-Cros and H. Triche. Comptes Rendus, v. 251, Sept. 5, 1960, p. 1127-1129.

Heating of Pd and Te under vacuum at 900° C. and reduction of mixed solutions of palladium chloride and sodium tellurite in a solution of hydrazine sulphate with HCl concentration of 0.1-2N. Analysis of phases in alloys and coprecipitates and formation of solid solutions of Te and Se in Pd. 5 ref. (C27, 1-73, N-general; Pd-b, Te, Se)

15-C. (French.) Purification of Copper by the Zone Melting Method. Jacques Le Hericy. Comptes Rendus, v. 251, Oct. 3, 1960, p. 1385-1387.

Zone melting of OFHC Cu in argon atmosphere and graphite vessel of nuclear purity, with inverse segregation of Fe toward head of ingot and massing of impurities near tail. Electrical resistivity of OFHC wire in cold worked condition and of zone-melted specimens annealed between 500 and 1050° C. under vacuum and in current of pure-dry hydrogen is compared. 3 ref. (C28k, P15g, 2-64, 3-68; Cu)

16-C. (Czech.) Intensification of Vanadium Extraction by Leaching. Drahomir Trojka. Hutnicke Listy, v. 15, Oct. 1960, p. 781-791.

Slags containing 2.60-6.07% vanadium are leached in water at 20-100° C. Effects of the addition of 1-30% Na_2CO_3, H_2SO_4 or NaOH to the water and of temperature. Influence of HCl and NaCl quantities present on the precipitation of vanadium compounds. 3 ref. (C19n; V)

17-C. (Japanese.) Zone Refining of Pure Copper. Tomisaburo Nara and Yoshito Yamada. Japan Institute of Metals Journal, v. 24, July 1960, p. 460-464.

Vacuum melted Cu ingots are refined by zone melting. Purity and distribution coefficients are determined by spectrographic analysis, with electrical resistivity measurements being made on the ingots and on annealed, cold drawn wire specimens. 22 ref. (C28k; Cu-a)

18-C. Operations at Canadian Copper Refiners, Limited. G. Bidgstock, E. M. Elkin and S. S. Forbes. Canadian Mining and Metallurgical Bulletin, v. 53, Oct. 1960, p. 773-787.

Refining of Cu, Ag, Au, Se, Te and $CuSO_4$. Design of equipment used in sampling, melting, roasting and casting. 4 ref. (C-general, 1-52; Cu)

19-C. Experiences in Induction Vacuum Melting. Industrial Heating, v. 27, Nov. 1960, p. 2354-2356, 2358, 2360.

Induction vacuum melting of heat resisting Ni-Cr alloys, Cu-Be alloys and soft magnetic alloys based on Ni-Fe. Design and operation of 40 lb. capacity tilting furnace. (C5j, 1-73, W18a; Ni-b, Cu-b, Fe-b, SGA-h)

20-C. Developments in the Consumable Electrode Melting of Reactive Metals. S. J. Noesen. Paper from "Electric Furnace Proceedings, 1959", v. 17. American Institute of Mining, Metallurgical and Petroleum Engineers, Inc., New York, 1960, p. 27-45.

Vacuum melting and purification of Mo, W, Ta, Cb, Zr and Ti. Data for electrode melt-off rate as a function of current strength and crucible diameter and for composition of the purified ingots. 18 ref. (C5h, 1-73; Cb, Mo, Ta, Ti, W, Zr)

21-C. Degassing of Steel in Vacuum for Use in Aircraft Castings. John K. Dietz. Paper from "Electric Furnace Proceedings, 1959", v. 17. American Institute of Mining, Metallurgical and Petroleum Engineers, Inc., New York, 1960, 1. 223-225.

Degassing of high Ni-high Co base alloy and stainless steel melts using a degassing chamber with induction furnace. (C5m, D9s, 1-73; Co-b, Ni-b, SS)

22-C. Recent Developments in Strategic-Udy Smelting Processes. Murray C. Udy. Paper from "Electric Furnace Proceedings, 1959", v. 17. American Institute of Mining, Metallurgical and Petroleum Engineers, Inc., New York, 1960 p. 301-315.

Applications of the Strategic-Udy pyrometallurgical process, a smelting technique using combinations of rotary kilns, reverbatory furnaces and electric furnaces in the recovery of metallic values from ores, concentrates or waste products. (C21; RM-n)

23-C. Report of Symposium on Refractory Metals (Methods of Melting and Purification). Industrial Heating, v. 27, Nov. 1960, p. 2367-2368, 2370, 2372, 2376, 2378, 2382.

Electron beam melting, vacuum arc melting, vacuum sintering and other method of melting and purifying of Cb, Mo and Ta. Control of melting parameters to achieve high degree of purity. (C5, 1-73; Cb, Mo, Ta)

24-C. Iron Ore Reduction--Kinetics and Thermodynamics. Pt. 2. Industrial Heating, v. 27, Nov. 1960, p. 2406, 2408.

Kinetics of the hydrogen reduction of hematite at 350-700° C. are measured with a thermal conductivity cell. (C26; Fe, RM-n)

25-C. Contribution to the Theory of the Electrolytic Production of Aluminum. R. Pion telli. Metallurgia Italiana, v. 52, Aug. 1960, p. 469-477 and 546.

Phenomena of overvoltage, anodic effect and concentration polarization discussed in relation to laboratory experiments and basic laws governing operation of cell for production of Al. 12 ref. (C23, 10-51; Al)

26-C. (Italian.) Use of Electrolytic Processes in Titanium and Zirconium Metallurgy. M. Socci. Metallurgia Italiana, v. 52, Aug. 1960, p. 547-550.

Thermal processes in use on industrial scale for production of metallic Zr and Ti; electrolytic process still in experimental stage. Electrolytic refining of otherwise unusable Ti and Zr scrap; possible adaptation of this process for electrolytic extraction of these metals from oxides and other compounds. (C23; Ti, Zr)

27-C. (Italian.) Electrowinning of Manganese. G. Scacciati. Metallurgia Italiana, v. 52, Aug. 1960, p. 551-560, 564.

Electrochemical and technological problems and operating conditions imposed thereby; types of electrolytic cells in use; characteristics of metal produced; power consumption. 21 ref. (C23n; Mn)

28-C. (English.) Electrowinning and Electrorefining of Titanium. Some Proposals in Recent Patent Literature. C. A. Goethals. Metallurgia Italiana, v. 52, Aug. 1960, p. 561-564.

Problems of composition of electrolyte, cell construction and removal of

deposited metal from cell. 54 ref. (C23; Ti)

29-C. (Italian.) Manufacture of Lithium by Igneous Electrolysis. Applications of Lithium. C. Merli. Metallurgia Italiana, v. 52, Aug. 1960, p. 565-569.

Physical and chemical properties of Li; uses of Li metal and Li compounds in chemical, petroleum, pharmaceutical, atomic energy and metallurgical industries. Electrowinning of Li. Influence of Li on mechanical properties of metals to which it is added as an alloying element. 56 ref. (C23n, P-general, Q-general; Li, 17-57)

30-C. (Italian.) Production and Use of Magnesium. S. Zanier and M. Enrici. Metallurgia Italiana, v. 52, Aug. 1960, p. 570-576.

Preparation of raw materials for electrolytic production of metallic Mg, with special reference to process based on sea water. Thermal reduction processes using carbon, calcium carbide and ferrosilicon as reducers. Industrial and experimental furnaces for silicothermic process. 11 ref. (C-general, W18; Mg)

31-C. (Italian.) Production of Foundry Silicon. M. Cavigli. Metallurgia Italiana, v. 52, Aug. 1960, p. 577-583.

Thermodynamic reactions during production of metallic Si. Principal features of electrothermal process in smothered-arc furnace. Methods of controlling purity of product. 4 ref. (C21d; Si)

32-C. Process Shakeup Brewing in Aluminum. Chemical Engineering, Oct. 17, 1960, p. 90-91.

Partial description of a new method for producing Al in which Al_2O_3 is reduced to metal in the presence of all the impurities in the ore and the metal is distilled out. (C-general; Al)

33-C. (Translation-PERA.) A New Method of Obtaining Products and Tubes Directly From Molten Metal. A. V. Stepanov. Russian, Nov. 1959, p. 35-37.

Tubes, plate and bars of Zn, brass, Al alloys, plastics, intermetallic and organic compounds are produced directly from the molten state by a molding process using capillary action are described. (C52; Al-b, Cu-n, Zn, 14-60)

34-C. Preparation and Crystal Structure of Americium Metal. D. B. McWhan, J. C. Wallmann, B. B. Cunningham, L. B. Asprey, F. H. Ellinger and W. H. Zachariasen. Journal of Inorganic and Nuclear Chemistry, v. 15, Sept. 1960, p. 185-187.

Preparation of Am by reduction of AmF_3 with Ba vapor or by reduction of AmO_2 with La metal; subsequent X-ray diffraction analysis. (C26, M22g, M26; Am)

35-C. (Russian.) Autoclave Leaching of Gold and Silver From Products of Complex Composition. A. I. Sinelnikova and I. N. Pcaksin. Tsvetnaya Metallurgiya, May 1960, p. 95-98.

Technological parameters for oxygen autoclave process of flotation concentration. Effect of ammonia concentration in leaching solution, time, temperature and partial oxygen pressure on the rate of dissolution of useful metal particles and on percentage of Au and Ag extraction. 11 ref. (C19n, B14h, Ag, Au)

36-C. Separation of Sulphur, Selenium and Tellurium From Arsenic. J. M. Whelan, J. D. Struthers and J. A. Ditzenberger. Electrochemical Society, Journal, v. 107, Dec. 1960, p. 982-985.

Investigation of vacuum sublimation, sublimation in hydrogen and distillation from Pb solution as methods for obtaining semiconductor-grade As. 10 ref. (C19a, C22, N15g; As, S, Se, Te)

37-C. Electrolytic Vanadium and Its Properties. D. H. Baker, Jr., and J. C. Ramsdell. Electrochemical Society, Journal, v. 107, Dec. 1960, p. 985-989.

Vanadium is produced by a fused salt electrorefining technique using an NaCl electrolyte containing VCl_2. Data for mechanical and physical properties of arc melted, cold rolled and annealed ingots. (C23p, P-general, Q-general; V)

38-C. Electrodeposition of Pure Copper. Sidney Barnartt. Electrochemical Society, Journal, v. 107, Dec. 1960, p. 1004-1006.

Description of a one-step electrodeposition process which yields Cu of 99.999+ 90 purity without subsequent melting. (C23; Cu-a)

39-C. Methods for Improving Quality of Ti Sponge Produced by the Kroll Process. W. M. Mark, S. Yih, C. L. Lo and D. H. Baker. U. S. Bureau of Mines, Report of Investigations 5665, 1960, 29 p.

High-quality, ductile Ti sponge with a Brinell hardness number of 110 is produced by the Kroll Process, which involves purification of crude $TiCl_4$ with H_2S, degassing, fractional distillation, filtration and reduction with Mg in a pot-type reactor at 690-710° C. (C26; Ti, 6-74)

40-C. Aluminium Production at Hirakud. Research and Industry, v. 4, Sept. 1959, p. 224-227.

Design and operation of a new Al smelter in India which has capacity of 10,000 tons per year. Main units are electrolytic cells (pots), furnaces and paste plant. Raw material and power requirements. (C21, C23, 1-52; Al)

41-C. (Japanese.) Effects of Added Elements on the Removal of Copper in Liquid Lead by Addition of Sulphur. Hisato Hagiwara. Japan Institute of Metals, Journal, v. 24, Sept. 1960, p. 601-603.

Effects of As, Sb, Ag and Sn on the removal of Cu from liquid Pb studied at 500-800° C. Relation of Cu and S activity coefficient in Pb. 10 ref. (C28, P12b, 2-60; Pb, Cu, S)

42-C. (Japanese.) Magnesium Deposits Produced by Reduction of Dolomite With Fe-Si Alloy. Hisashi Ito and Masao Ikeda. Japan Institute of Metals, Journal, v. 24, Sept. 1960, p. 549-552.

The crystal size of Mg deposited in vacuum at 1050-1200° C. is studied to determine temperature range of condensation and impurity distribution. 5 ref. (C26, 1-73, M26; Mg)

43-C. (Russian.) Refining of Beryllium by Vacuum Distillation. V. E. Ivanov, V. M. Amonenko, G. F. Tikhinsky and A. A. Kruglykh. Fizika Metallov i Metallovedenie, v. 10, Apr. 1960, p. 581-585.

Production of high purity Be (99.987%) using vacuum distillation method with condensation of vapors on the heated surface at 900-1200° C. Hardness measurements for Be of various purities. Reduction of plasticity attributed to presence of oxygen and carbon in produced metal. 16 ref. (C22h, Q29, Q23p, 3-69; Be)

44-C. (German.) Preparation of Iron Single Crystals by Zone Melting. Hans Hillmann and Albrecht Mager. Zeitschrift fur Metallkunde, v. 51, Nov. 1960, p. 663-666.

Cylindric rods of carbonyl iron of 0.04% impurity are induction heated in a mixture of argon and humid hydrogen, with the molten zone advancing at a rate of 0.3 to 6 mm./min. High purity single crystals with 6 ppm. oxygen, 1-2 ppm. nitrogen and no more than 1 ppm. carbon are obtained. Data for orientation and delta-alpha transformation. 13 ref. (C28k; Fe, 14-61)

45-C. Purification Factor Characterization of Zone Refining. Louis Gold and Virginia Johnson. Franklin Institute, Journal, v. 270, Nov. 1960, p. 367-381.

The purification factor which defines the potential state of purity realizable in a specimen that has undergone zone-refining is evaluated for various distribution coefficients and zone dimensions involving a maximum of 10 passes. 3 ref. (C28k)

46-C. (Spanish.) Manufacture of Aluminum Castings. D. Iturrioz. Metalurgia y Electricidad, v. 24, Oct. 1960, p. 73-82.

Casting of conventional and interlocking Al ingots. Layout and preparation of patterns and pattern plates. (C5; Al)

47-C. (Rumanian.) Preparation of Metallic Calcium From Industrial Calcium Alloys. Stefan Mantea and Nicolae Petrescu. Studii si Cercetari de Metalurgie, v. 5, no. 3, p. 365-370.

Vacuum distillation of Ca-Si alloys containing 30-40% Al and 27-30% Fe at 1100-1200° C. Effect of Al and Fe on purity of Ca obtained. 6 ref. (C22, 1-73, 2-60; Ca-b, Al, Fe, Si)

48-C. Process Changes Brewing in Aluminum Making. Metalworking Production, v. 104, Nov. 23, 1960, p. 74.

Al_2O_3 is reduced to metal in the presence of all the impurities in the ore in a process which by-passes the usual alumina-from-bauxite extraction step. Al is then distilled out in a reactor operating at 1000-1200° C. and 1 atm. pressure. (C26, C22; Al)

49-C. (Russian.) Refining of Nickel Concentrates Containing Iron. Yu. V. Alekseev. Tsvetnye Metally, Sept. 1960, p. 42-46.

Reduction of Fe in a powdered Ni-concentrate by melting the concentrate in a vacuum crucible at 700-1200° C. and dividing the molten concentrate

into a S-Ni layer and an Fe containing layer. Influence of melting temperature and soaking time on separability of Fe. (C26, 2-61; Ni, Fe)

50-C. (Russian.) New Composition of Electrolyte for Magnesium Electrolytic Cell. Kh. L. Strilets and N. V. Bondarenko. Tsvetnye Metally, Sept. 1960, p. 62-66.

Electrolytic production of Mg using a solution of $MgCl_2$, NaCl, KCl and $BaCl_2$ as electrolyte. Effect of $BaCl_2$ on electroconductivity, viscosity, specific gravity and surface tension of the solution on the deposition of Mg upon the cathode. 5 ref. (C23; Mg)

51-C. Ingot Casting. Metal Industry, v. 97, Nov. 26, 1960, p. 443-444.

Casting of Zn ingots and slabs using a molten metering pump to deliver accurate quantities of metal from the holding furnace to the mold. Ingots are stacked automatically with each layer arranged in a predetermined pattern and with the bottom layer forming a pallet for lifting by fork truck. (C5; Zn)

52-C. (Japanese.) Vacuum Arc Melting of Molybdenum. Kazuo Tsuya. Japan Institute of Metals, Journal, v. 24, Oct. 1960, p. 625-629.

Consumable-electrode vacuum-arc melting of arc cast Mo ingots using carbon as the deoxidant. Effect of deoxidation on grain size, hardness and microstructure. 3 ref. (C5h, 1-73, M27, Q29; Mo)

53-C. New Pulsating Burner Saves Fuel and Operating Overhead. Industrial Gas, v. 39, Dec. 1960, p. 3-4.

Melting of Al in a reverberatory furnace using a pulsating gas burner to prevent incomplete combustion and prolong life of furnace lining. (C5; Al)

54-C. (German.) Materials of High Purity. H. Psille. VDI Berichte, no. 46, 1960, p. 31-34.

Production of 99.99% pure Al by three layer electrolysis and subsequent zone refining, 99.99% pure Zn by electrolysis of $ZnSO_4$, pure Ge and Si by reduction with hydrogen and subsequent zone refining, very pure Fe by zone refining, 99.999% Cu by electrolysis or sintering and 99.995% pure Se by sublimation of SeO_2 and Si. Properties, applications and testing of very pure materials. (C-general; Al, Cu, Fe, Ge, Se, Si, Zn)

55-C. A Vertical-Flow Reactor. W. A. Lloyd and N. R. Amundson. I/EC (Industrial and Engineering Chemistry), v. 53, Jan. 1961, p. 19-22.

Use of the reactor for reduction of powdered Fe oxide. When most of the ferric oxide is reduced to magnetite, a new period occurs where reduction rate is accelerated. 9 ref. (C26, 1-52; Fe)

56-C. A Tubular Reactor. I. G. Dalla Lana and N. R. Amundson. I/EC (Industrial and Engineering Chemistry), v. 53, Jan. 1961, p. 22-26.

Use of the reactor for reduction of powdered Fe oxide. Special attention given to complications resulting from large particle sizes. 11 ref. (C26, 1-52; Fe)

57-C. Vacuum Melted Materials Trim Space Age Forging Problems. Lynn E. Sprague. Steel, v. 148, Jan. 9, 1961, p. 62-64.

Vacuum melting of high-strength, high-temperature alloys and superalloys to reduce surface tearing, increase center soundness of billets, increase yield and equalize high values of mechanical properties in all directions. (C25; SGB-a, SGA-h)

58-C. (Czech.) Arc Zone Melting. Josef Zboril. Hutnicke Listy, v. 15, Nov. 1960, p. 861-864.

A rod-shaped sample of CSN 12020 Cu in a water cooled tube, also comprised of Cu, is zone melted by an arc produced with a tungsten electrode. After zone melting the average amount of impurity change with distance is measured from the end of the sample. 5 ref. (C28k; Cu)

59-C. Refractory Metal Powders. T. P. Whaley and W. J. McCreary. Inorganic Syntheses, v. 6, 1960, p. 47-50.

Method of reducing refractory Ti oxide using freshly cut Na metal and anhydrous calcium chloride. (C26; Ti)

60-C. The Preparation and Properties of Barium, Barium Telluride and Barium Selenide. Edward Miller, Kunt Komarek and Irving Cadoff. Metallurgical Society of AIME, Transactions, v. 218, Dec. 1960, p. 978-980.

Purification of Ba by equilibration with Ti and determination of melting point at 726.2° C. by thermal analyses. X-ray diffraction determination of lattice parameter at room temperature of BaSe and BaTe specimens, with electrical resistivity measurements at 300-830° K. and melting point determinations by visual observation at 1830 and 1510° C., respectively. 11 ref. (C26, M26, P-general; Ba, Se, Te, Ti)

61-C. Metallurgy in Nuclear Power Technology. Pt. 5. Fuel Element Canning Materials. J. C. Wright. Metal Treatment and Drop Forging, v. 27, Dec. 1960, p. 511-517.

Extraction and refining, melting and casting, powder metallurgy and fabrication of Be and Cb. (C-general, T11g; Be, Cb)

62-C. (German.) Magnesium Losses in Undereutectic AlSi Cast Alloys. Maja Krumnacker. Giesserei-Technik, v. 6, Oct. 1960, p. 306-307.

Investigation of melting losses during 5 and 10 min. chlorination in a gas furnace and during melting in an electrical furnace of G AlSi 10 Mg and G AlSi 5 Cu 1 alloys. Influence of melting temperature (675-780° C.) and killing time. (C5; Al-b, Si)

63-C. Development Procedures in the Production of Ultra High Strength Cast Steel. K. D. Holmes. Current Engineering Practice, v. 3, Sept. 1960, p. 10-16.

Production of 4340 cast steel having high tensile strength at required ductility and toughness levels by vacuum melting and casting. Influence of heat treatment, type of furnace and composition on tensile and yield strength, ductility, elongation and impact resistance. (C5, D8m, 1-73, Q27a, Q-general, 2-64; ST)

64-C. (Translation-ConBur.) Aspects of the Metallurgy of Uranium and Constructional Metals. G. A. Meerson. Soviet Journal of Atomic Energy, v. 6, Sept. 1960, p. 69-72.

Methods of uranium production including reductive melting, casting, pressure treatment and powder metallurgy; Zr metallurgy including new data on the technological scheme, nature of sponge and dimensions of ingots; production of the new constructional metals, Cb and V by metallothermal, vacuum carbothermal and electrolytic refining; production of Be tubes for fuel element sheaths; use of Zr hydride as a moderator and of Zr, U and H alloys for fuel element cores. (C-general, T11; Be, Cb, U, V)

65-C. (Book.) Zone Refining and Allied Techniques. N. L. Parr. 179 p. 1960. George Newnes Ltd., Lower House, Southampton St., Strand, W. C. 2, England.

The solidification process; molten zone refining; practical considerations in zone refining; choice and design of zone refining equipment; manipulation of high purity materials. Review of floating-zone, continuous zone and other techniques. (C28k)

66-C. (French.) Most Favorable Conditions for the Preparation of High-Purity Tin by Zone Melting. Robert Reich and Frederic Montariol. Comptes Rendus, v. 251, Nov. 21, 1960, p. 2350-2352.

To test the contamination by the container material one Sn bar is zone melted in a sheath of pyrex glass and another in a sheath of graphite. Purity is determined by measurement of the electrical resistivity. 3 ref. (C28k; Sn-a)

67-C. (Russian.) Increasing Efficiency in Copper Production. D. Kh. Baybulov and G. A. Komlev. Tsvetnye Metally, Oct. 1960, p. 24-26.

Charge preparation in the treatment of Cu concentrates and cinders for obtaining higher productivity of shaft furnaces, more complete extraction of Cu in the matte and increased amounts of Au containing quartz. Jigging operation with subsequent sintering of the fine fraction for decrease of dust losses and better gas permeability of the charge. 3 ref. (C5f, B-general; Cu)

68-C. (Russian.) Complex Treatment of Uchalinskii Pyrite Concentrates. V. S. Gulin. Tsvetnye Metally, Oct. 1960, p. 26-30.

Method for pyrometallurgical extraction of S, Fe and nonferrous and noble metals from pyrite concentrates of Cu-Zn ores. Technique for fluidized bed roasting, magnetic separation, sintering and treatment of nonmagnetic fraction. (C21, B-general)

69-C. (Russian.) Protective Layer Against Heat Losses from the Electrolyte

Surface During Copper Refining. M. L. Pertsovskii and E. G. Volkov. Tsvetnye Metally, Oct. 1960, p. 31-34.

Means for preventing reduction of electrolyte temperature caused by evaporation. Effect of transformer oil layer, its thickness and additions of surface active substances, as well as protective layers of glass, cork or froth plastic on the rate of heat losses is investigated. 3 ref. (C23p; Cu)

70-C. (Russian.) Material and Heat Balances of Pechenganickel Plant Ore-Smelting Furances. Ya. Kh. Osipov, G. I. Talovikov, Ya. L. Serebryanyi and V. A. Sudarkina. Tsvetnye Metally, Oct. 1960, p. 35-38.

Experimental smelting of Ni ores in electric furnaces of 20.5, 23.0 and 25.0 megawatt power capacity. Heat efficiency, output, power consumption, bath height, electrode consumption, extraction of Ni in matte and depth of electrode submersion are investigated in relation to various furnace power capacities. (C21d; Ni)

71-C. (Russian.) Effect of Chromospinelides on Smelting of Silicate-Nickel Ores. A. Ya. Macevskii. Tsvetnye Metally, Oct. 1960, p. 38-44.

Interference with the blast furnace smelting process by excess of Cr_2O_3 (over 1.7%) content resulting in formation of chromospinelide layer on slag and matte interface and Cr_2O_3 crust deposition on the furnace walls. Alleviation of condition by mixing ores of rich and lean Cr_2O_3 concentration. (C21a, 2-60; Ni, RM-n, 14-68)

72-C. (Japanese.) Recent Development of Uranium Ore Processing and Metal Production at Atomic Fuel Corporation. Yoshiki Imai. Atomic Energy Society of Japan, Journal, v. 2, Nov. 1960, p. 685-697.

Review of ore dressing and extraction and refining techniques in pilot plants of Tokai Refinery, Atomic Fuel Corp., Tokaimura, Ibaraki, in the production of uranium, including acid leaching, solvent and amine extraction, solid-liquid separation and ion exchange, ionic cell and electrolytic methods. 3 ref. (C-general, B-general, A9; U)

73-C. (Japanese.) Study of Staining on Primary Aluminum. Minoru Takemoto, Taro Yoshimoto, Kyuya Oida and Kiyomi Yanagida. Light Metals, July 1960, p. 7-18.

Effect of holding time on the staining of Al ingots. Correlation of data for appropriate holding time with ratio of the surface area to the amount of molten metal. 9 ref. (C5n; Al, 5-59)

74-C. (Japanese.) Study of Staining on Primary Aluminum. Minoru Takemato, Taro Yoshimoto, Kyuya Oida and Kiyomi Yanagida. Light Metals, July 1960, p. 19-24.

Study of the behavior of Na, Al carbide and alumina in primary molten Al to determine whether the small particles of metal oxide produced from these compounds during holding and diffused into the metal are the cause of staining. 25 ref. (C5n, 2-60; Al)

75-C. Electrodeposition of Cobalt-Molybdenum Alloys. Albertine Krohn and Theodore M. Brown. Electrochemical Society, Journal, v. 108, Jan. 1961, p. 60-61.

Use of a pyrophosphate bath containing hydrazine sulphate to deposit alloys composed of 56% Mo, 37% Co and 7% nonmetallic material. Effect of plating variables on deposit composition and quality. 10 ref. (C23p; Mo-b, Co-b)

76-C. Electrodeposition of Nickel-Cobalt Alloys From the Pyrophosphate Bath. Vasanta Sree and T. L. Rama Char. Electrochemical Society, Journal, v. 108, Jan. 1961, p. 64-70.

Results of studies on alloy composition, cathode efficiency and potential are used to determine optimum conditions for obtaining alloy plates of 10-91% Ni. Structures of the deposits are determined by X-ray diffraction. (C23p, N12d, M22g; Ni-b, Co)

77-C. Preparation of High-Purity Vanadium Metal by the Iodide Refining Process. O. N. Carlson and C. V. Owen. Electrochemical Society, Journal, v. 108, Jan. 1961, p. 88-93.

Preparation of vanadium of 99.95+% purity through the formation and decomposition of the volatilized iodide. Effect of retort composition, feed material composition and temperature on impurity content of the final product. 9 ref. (C1p; V)

78-C. Preparation of Nickel Polyhedra by Reduction in Fused Salt Systems. Robert A. Lefever. Electrochemical Society, Journal, v. 108, Jan. 1961, p. 107-108.

Preparation of Ni powders containing uniform polyhedra by reduction of $NiCl_2$ in KCl. Effects of various reducing agents, temperature, reaction time and other variables on particle size and surface. 6 ref. (C23p; Ni, 6-68)

79-C. Twin Structures in Silver Dendrites. J. W. Faust, Jr., and H. F. John. Electrochemical Society, Journal, v. 108, Jan. 1961, p. 109-110.

Evidence is presented to show that a twin mechanism can contribute to the growth of Ag dendrites during electrodeposition. (C23, M27, Q24b; Ag)

80-C. (Rumanian.) Preparation of High-Purity Silicon for Semiconductors. Pt. 1. P. Roman and Gh. Mozes. Revista de Chimie, v. 11, Aug. 1960, p. 464-468.

$LiAlH_4$ is prepared by reacting LiH with $AlCl_3$. The reaction $SiCl_4 + LiAlH_4$ gives SiH_4 from which metallic Si is obtained by thermal decomposition at 1000° C. 18 ref. (C1n; Si)

81-C. Forgeable Tungsten. Metal Industry, v. 97, Dec. 30, 1960, p. 543-544.

Development of an electron-beam processing technique which, when combined with composition control, results in tungsten and Mo alloy ingots of reduced grain size, better workability, increased shock resistance and improved ultimate strength. (C5k, F22, 17-52; Mo, W, 5-59)

82-C. Metallurgy of Process of Drossing and Sulphur Treatment of Lead Bullion. Pt. 1. S. Sarkar. Indian Journal of Applied Chemistry, v. 23, Feb. 1960, p. 81-83.

Purification of Pb bullion by removal of sulphur dross through the addition of fluxing agents using a 90 lb. capacity electric blast furnace pilot plant. Resin and blast furnace granulated slag additions are most effective. (C-general; Pb)

83-C. Low Pressure Metallurgy. Vacuum as an Inert Atmosphere. A. S. Darling. Metallurgia, v. 62, Nov. 1960, p. 187-191.

Discussion of contamination during vacuum melting of Fe, Ni and U and of vacuum oxidation processes in the solid state. Data are given for the dissociation pressures of several metallic oxides and compared with the oxidizing potential of vacuum systems. (C25, D8m, R1h, 1-73; Fe, Ni, U)

84-C. Modern Plant Produces Oxygen-Free Copper. Dragoslav Janicijevic. Metal Progress, v. 79, Feb. 1961, p. 112-115, 126, 128, 130, 132, 134, 136, 138.

The entire output of oxygen-free Cu at this Yugoslav plant is cast as wire bars in a continuous casting machine. Contamination of molten cathode Cu is prevented by melting and holding the metal in enclosed induction furnaces and by protecting it with an atmosphere composed of carbon monoxide and nitrogen. (C5q; Cu-a)

85-C. Refractory Metals. Clifford A. Hampel. I/EC (Industrial and Engineering Chemistry), v. 53, Feb. 1961, p. 90-96.

Methods of reclaiming W, Mo, Re, Ta and Cb from their ores and working them into sheet, wire and foil to provide chemically inert metals with high hot strength and high melting points. 15 ref. (C-general, R6, R7, P12n; Cb, Mo, Re, Ta, W)

86-C. Chromium and Vanadium. Earl T. Hayes. I/EC (Industrial and Engineering Chemistry), v. 53, Feb. 1960, p. 105-107.

Electrolysis of chromium chlorides and Ca reduction of vanadium chloride to produce high purity ductile metal. Data are given for physical and mechanical properties, corrosion resistance and alloying characteristics. (C23, C26, P-general, Q-general, R6, R7; Cr, V)

87-C. Titanium in the Aeroplane Industry. W. Schweisheimer. Australasian Engineer, Nov. 1960, p. 93-94.

Double melting of Ti by a consumable electrode process to eliminate brittleness caused by hydrogen content. Applications of Ti in aircraft industry. Sources of Ti. (C5h, T24; Ti, 17-57)

88-C. Present State of the Problem of the Use of Oxygen-Enriched Air in Nonferrous Metallurgy. D. D. Chizhikov. Paper from "Contemporary Problems of

Metallurgy". Consultants Bureau, Inc., New York, 1960, p. 349-369.

Theoretical principles and the result of experimental investigation of pyrometallurgical and hydrometallurgical processes using oxygen-enriched air applications during oxidation roasting of sulphide materials, reduction smelting of oxidized products and oxidizing refining of crude ores. Treated materials include Cu, Pb, Zn, Ni and noble metals. 48 ref. (C-general, B15n; O, 17-57)

89-C. The Electrolysis of Fused Slags. O. A. Esin. Paper from "Contemporary Problems of Metallurgy". Consultants Bureau, Inc., New York, 1960, p. 370-380.

Cathodic precipitation of Fe, Co, Mn, Cr, Si, Al, ferrovanadium and ferrophosphorous from fused slag systems by electrolysis. Application of electrolysis to the electrochemical desulphurization and deoxidation of Fe and steel. 23 ref. (C-general; RM-q)

90-C. (Translation-ConBur.) The Electrolytic Recovery of Lead From Factory Crudes and Bismuth Containing Drosses by the Use of Fused Electrolytes. I. D. Panchenko and Yu. K. Delimarskii. Journal of Applied Chemistry of the USSR., v. 33, Jan. 1960, p. 147-150.

Experiments with factory crudes are made on ternary eutectics of Pb, Na and K chlorides and eutectics of $PbCl_2$ and PbO. Two drosses containing 5 and 13% Bi are also tested. Electrolysis is at 500° C. with 25, 50 and 75% recovery as cathodic Pb. 6 ref. (C23; Pb)

91-C. (Translation-ConBur.) Extraction of Radioactive Cesium With Mixed Heavy Metal Ferrocyanides. V. V. Pushkarev, L. D. Skrylev and V. F. Bagrestsov. Journal of Applied Chemistry of the USSR., v. 33, Jan. 1960, p. 78-81.

Study of the extraction of Cs from aqueous solutions by sorption on heavy metal ferrocyanides and subsequent isolation of the solid phase by foam formation. 6 ref. (C19a; Cs)

92-C. (Translation-ConBur.) An Investigation of the Electrochemical Production of Gallium. N. I. Eremin and V. M. Gus'kov. Journal of Applied Chemistry of the USSR., v. 33, Jan. 1960, p. 151-156.

Problems in the electrodeposition of Ga from aluminate-gallate solutions of low gallate content. 6 ref. (C23; Ga)

93-C. (Translation-ConBur.) Extraction of Metals With Alkyl Acid Phosphates. A. S. Chernyak and M. L. Navtanovich. Journal of Applied Chemistry of the USSR., v. 33, Jan. 1960, p. 82-85.

Study of the ionic mechanism of metal extraction by alkyl acid phosphates to show possibilities for use in strong and weak acid solutions. Emphasis is placed on methods of synthesizing the phosphates. 8 ref. (C19)

94-C. (Translation-ConBur.) Electrolysis of Lead Concentrates in Fused Salts. I. T. Gul'din, A. V. Buzhinskaya, V. P. Baiseg'yan and V. K. Ruppul'. Journal of Applied Chemistry of the USSR., v. 33, Feb. 1960, p. 374-378.

Development of a large-scale (1500 amp.) electrolyzer for production of Pb concentrate in fused salts at a liquid Pb cathode. Pb extraction obtained is 96-97%. 6 ref. (C23; Pb)

95-C. (Translation-ConBur.) Melting of Chromium in the Suspended State. N. V. Ageev, A. A. Fogel, T. A. Sidorova and V. A. Trapeznikov. Journal of Applied Chemistry of the USSR., v. 33, Feb. 1960, p. 330-333.

Crucible-less fusion of electrolytic and iodide Cr suspended in an electromagnetic field by induction heating in an atmosphere of purified He. Data are given for nitrogen and oxygen impurity content in the metal and mechanical properties. 5 ref. (C5j, Q-general; Cr)

96-C. (Translation.) Purification of Tellurium by the Zone Melting Method. N. F. Shvartsenaur. Soviet Physics--Solid State, v. 2, Nov. 1960, p. 797-799.

Degree of purity obtainable by zone melting of Te. Measurement of electrical resistance and Hall effect at liquid nitrogen and room temperature. (C28k, P15, 2-61; Te)

97-C. Melting and Casting of the Refractory Metals Molybdenum, Columbium, Tantalum and Tungsten. W. H. Johnson. Defense Metals Information Center, Battelle

Memorial Institute, DMIC Rept. 139, Nov. 18, 1960, 30 p. (Available as PB 151098 from U. S. Office of Technical Services, Washington 25, D. C.)

Powder-metallurgy and arc, electron-beam and induction melting techniques for consolidating refractory metal powder or sponge. Application of these methods to production of ingots and shaped castings. 33 ref. (C5, H15; Cb, Mo, Ta, W)

98-C. (German.) Kinetics of Indirect Reduction. Hermann Schenck and Hans-Peter Schulz. Archiv fur das Eisenhuttenwesen, v. 31, Dec. 1960, p. 691-702.

Use of circulating CO/CO_2 gas mixtures for indirect reduction of natural and synthetic annealed or sintered hematite at varying gas flow rates and 850° C. Reduction rate as a function of specimen size and shape, concentration of reduction gas, pressure and temperature. (C26; Fe, RM-n)

99-C. (English.) Distillation Process of Zinc, Lead and Cadmium From Black Ores With Iron Reduction. Hachie Sawamoto, Takeo Sugiura and Akira Nishina. Nagoya University, Memoirs of the Faculty of Engineering, v. 11, Nov. 1959, p. 171-174.

Extraction of Zn, Pb and Cd from sulphide ores by Fe reduction and vacuum distillation. Effect or reaction temperature and ratio of ore to Fe powder on the purity and percentage yield. (C22g; Cd, Pb, Zn, RM-n)

100-C. Reducibility of Salem Magnetite Ore. M. Subramaniam and P. P. Bhatnagar. Journal of Scientific and Industrial Research (India), v. 19, Dec. 1960, p. 620-624.

Reducibility of Salem (India) magnetite Fe ore in hydrogen gas studied at 700-1000° C. on lumps and briquettes of the ore to determine effect of H_2 flow rate, ore mesh size and temperature on the rate of reduction. 8 ref. (C26; Fe, RM-n)

101-C. Laboratory Casting High-Temperature Metals. P. G. Clites and E. D. Calvert. Journal of Metals, v. 13, Feb. 1961, p. 136-138.

Development of modified arc melting ingot furnace for studying the application of skull casting techniques to production of small Ti, Zr, Ta, Hf, Cb, Mo, W, Cr, Cu and Fe castings. (C5, W18s; SGA-h)

102-C. Cold-Crucible Induction Melting of Reactive Metals. G. H. Schippereit, A. F. Reatherman and D. Evers. Journal of Metals, v. 13, Feb. 1961, p. 140-143.

Induction melting of Ti billets in a newly designed water-cooled Cu crucible. Power, water cooling requirements and electrical operating characteristics are measured to determine the commercial feasibility of the process. (C5j; Ti, 4-52)

103-C. Removing Volatile Metals From Lead and Tin by Vacuum Distillation. H. S. Caldwell, Jr., M. J. Spendlove and H. W. St. Clair. U. S. Bureau of Mines, Report of Investigations 5703, 1960, 12 p.

Vacuum distillation of Pb and Sn to remove Cd, Zn, Mg, Te, Sb and Bi. Rate and selectivity of distillation are found to depend primarily on volatility, molal ratios and chemical activity of the alloy metals. (C22, 1-73; Pb, Sn)

104-C. Metallic Reduction of Thorium Tetrachloride. P. C. Good and F. E. Block. U. S. Bureau of Mines, Report of Investigations 5702, 1960 12 p.

Purification of crude Th tetrachloride by double vacuum distillation at 800-900° C., then reduced to Th metal by metallic Na or Mg and consolidated to ingot form by vacuum arc melting. Data are given for physical and chemical properties. (C26, P-general; Th)

105-C. Separation of Hafnium From Zirconium by Anion Exchange. J. L. Hague and L. A. Machlan. Journal of Research--Physics and Chemistry, v. 65A, Jan-Feb. 1961, p. 75-77.

Study of the elution of Hf and Zr in diluted H_2SO_4 and in solutions of HCl and H_2SO_4 in water. Data characterize the behavior of the sulphate anion complexes of these elements on a strong quaternary-amine anion-exchange resin column. 12 ref. (C19s; Hf, Zr)

106-C. New Plant for Refining Nickel at Clydach--Mond Carbonyl Process. Australasian Engineer, Dec. 1960, p. 59.

Grinding, calcination and reduction of sintered Ni oxide concentrate produces Ni carbonyl which is decomposed by heating to produce Ni pellets. (C1m; Ni)

107-C. Why High Purity Zinc (99.99+%) Is Vital to Zinc Die Cast Products. Asarco Nonferrous Metals Digest, v. 2, Feb. 1961, p. 3-4.

Reducing and refining Zn ore to produce high-purity Zn castings. Properties of Zn which favor its use in die castings. Effect of additions on intercrystalline corrosion of high-purity Zn. (C-general, E13, R2h; Zn)

108-C. Copper, Nickel and Iron Alloys for the Quantitative Recovery of the Platinum Metals in Ores and Concentrates. M. E. V. Plummer, J. M. Kavanagh, J. C. Hale and F. E. Beamish. Metallurgical Society of AIME, Transactions, v. 221, Feb. 1961, p. 145-150.

The atomic and molecular structure and bonding mechanism of Fe-Cu-Ni alloys with the platinum metals are investigated to show that the Fe-Cu-Ni content of Pt concentrates may be reduced by carbon to form a collecting alloy for the Pt metals in a manner exactly analogous to the formation of the Pb fire assay button. Pd and probably some of the other Pt metals form solid solutions with these alloys for efficable extractions. 39 ref. (C-general, P13c; EG-c, Fe-b, Ni, Cu, 17-57)

109-C. Philippines Gets New Copper Plant. Chemical & Engineering News, v. 39, Feb. 13, 1961, p. 46-47.

Establishment of a new Cu plant in the Philippines for the meltless production of Cu, Zn and $(NH_4)_2SO_4$. Ore is converted into Zn metal, $(NH_4)_2SO_4$ and Cu powder by leaching in ammonia, oxidation at 470-400° F. with 700 psi. of pressure and H_2 reduction (400 psi.) Cu powder is then fabricated into Cu strip at 1976° F. and 60,000 psi. pressure on compacting rolls. (C26, H14j; Cu)

110-C. Production and Availability of Some High-Purity Metals. Defense Metals Information Center, Battelle Memorial Institute, DMIC Memo. 76, Dec. 1960, 58 p. (Available as PB 161226 from U. S. Office of Technical Services, Washington 25, D. C.)

Electrolysis, leaching, vacuum distillation and reduction of Be, B, Cr, Cb, Fe, Mo, Ni, Re, Ta, Ti, W, V and Zr and the effect of the method of preparation on the purity of the product. (C-general)

111-C. (Russian.) Arc Furnace With Electrode in the Molten Metal. P. V. Serheev and H. A. Sidorenko. Vestnik Electropromishlennosti, Oct. 1960, p. 45-48.

Melting of nonferrous metals in an electric arc furnace with submersion of the electrode into the melt. Design of protective tubing, isolation air chamber for arc, electrode and mechanism for adjustment of the depth of submerged electrode. Reduction of metal loss due to burning. (C5h, W18s)

112-C. Application of Sorption and Solvent Extraction Processes in the Hydrometallurgy of Uranium. B. S. Kolychev. Soviet Journal of Atomic Energy, v. 6, Dec. 1960, p. 368-380.

Review of sorption processes, particularly for recovery of uranium from pulps. Comparison of organophosphorus compounds and amines as extraction solvents. Solvent extraction processes as influenced by surface tension of effluent, concentration of extraction solvents and type of acid. (C19a; U)

113-C. (Translation.) Rare-Earth Elements and the General Method of Their Production. D. I. Ryabchikov, Yu. S. Sklyarenko and M. M. Senyavin. Rare Earth Elements, 1959, p. 7-26.

Separation and purification of rare earths by fractional crystallization, electrolytic reduction and ion-exchange chromatography. Rare earth elements are extracted from monazite (66%), parisite (63%), xenotime (62%), fluocerite (80%), apatite (17%) and titanite (5%) deposits. 70 ref. (C19, C23; EG-g45)

114-C. Degassed Nickel and Nickel Alloys for the Electron Tube Industry. Richard P. Waugh. Wire and Wire Products, v. 36, Jan. 1961, p. 61-63.

Degassing of "A" and "D" Ni wire by long time, high temperature (800-1000° C.) annealing in wet hydrogen or dissociated ammonia atmosphere. Effect of gas content on microstructure and physical properties. Application in power, rectifier and cathode ray tube. (C5m, Q-general, Ti; Ni, 4-61, 17-57)

115-C. Production of Aluminum Redraw Rod by the Southern Electrical Company

Method. T. E. Colston and C. M. Fredrickson. Wire and Wire Products, v. 36, Jan. 1961, p. 69, 72, 114.

Production of high quality Al redraw rod for electrical wire and cable production from Al pig by low frequency induction melting, continuous horizontal casting and subsequent rolling in a ten stand tandem rod mill after preheating. (C5j, C5q, F23; Al, 4-55)

116-C. Coil Design in Levitation Melting. W. J. Slater, J. W. Barton and R. Taggert. Philips Science and Industry, v. 7, Mar. 1960, p. 89-96.

Investigation of electromagnetic field configuration within a levitation coil and effect on field of inserting solid metallic charge within coil. Arbitrary determination of levitation force for various coil configurations. Design of a levitation coil which supports a molten metallic charge of up to 36 grams Ti permitting the charge to be chill cast. 11 ref. (C28, 17-51; Ti)

117-C. (Italian.) Segregation and Control of the Distribution of Impurities in the Production of Germanium and Silicon. J. Goorissen. Alluminio, v. 29, Dec. 1960, p. 567-575.

Two variants of the zone melting method for the production of Ge and Si monocrystals, permitting the preparation of a product in which the concentration of impurities is constant in each zone. 7 ref. (C28k, 9-69; Ge, Si, 14-61)

118-C. A New Acid Alumina Process. T. R. Scott. Research Applied in Industry, v. 14, Feb. 1961, p. 50-54.

Production of pure alumina from low grade bauxite ore by hydrolyzing the ore at 220° C. with sulphuric acid and using bauxite to partially neutralize the digestion liquors. (C19n; Al)

119-C. (French.) Fiftieth Anniversary of the Advent of Aluminum Nitrate. R. Pitaval. Journal du Four Electrique, v. 65, May 1960, p. 213-214.

Review of Al extraction processes, with attention to principles of the Serpek process of direct chemical reduction of bauxite. Comparison of the Serpek process with the Bayes and Heroult processes. (C19; Al)

120-C. (Japanese.) Behavior of Sn in Liquid-Liquid Extraction of Nb and Ta. Sanji Nishimura, Jyoichiro Moriyama and Isao Kushima. Japan Institute of Metals, Journal, v. 24, Dec. 1960, p. 798-802.

The distribution coefficients of Sn, Cb and Ta in the extractive systems HF hexone, HF-HCl hexone, HF-H_2SO_4 hexone and HF-HNO_3 hexone are measured to determine solvent efficiency in separating Sn from Ta and Cb and in producing Ta and Cb of high purity from Ta_2O_5, Cb_2O_5 and tantalite concentrates containing SnO_2 and other metallic oxides. 13 ref. (C19n, 2-60; Cb, Ta, Sn)

121-C. (Russian.) Effect of Catalysts on the Reduction With Graphite of Nickel and Cobalt Oxides and Ferrites. M. G. Zhuravleva, V. N. Bogoslovskii and G. I. Chufarov. Zhurnal Fizicheskoi Khimii, v. 34, Dec. 1960, p. 2704-2708.

Graphite reduction process at 700-950° C. as affected by additions of Na_2CO_3 and K_2CO_3. 8 ref. (C26; Co, Ni, 14-68)

122-C. Aluminum Bar Casting and Rod Rolling. A. H. Tessman. Wire Industry, v. 28, Feb. 1961, p. 162-163.

Continuous casting of Al using a highly finished, lubricated Cu mold. Mold friction is reduced so that there is no tearing of the initially formed solid skin and cooling rate is sufficient to prevent any surface remelting, without being high enough to cause internal cracking or shrinkage porosity. (C5q; Al)

123-C. (German.) The Zone Melting Process and Its Application to Metals. H. Hillmann. Metall, v. 15, Feb. 1961, p. 102-113.

Melting of very pure metals by zone refining is discussed in terms of reaction mechanism depending on solidification interval of alloy. Method and apparatus for repeated and continuous zone melting and for zone melting without crucible. Degrees of purity obtained for Al, Fe, Cu, Sb, Sn, Ge, Si, Ti, V, Co, Zn, Ga, U, Re, Bi, Mo, Pt, Ru and Ir. (C28k)

124-C. (German.) X-Ray Investigation of Setting of Silver-Tin Amalgams. Pt. 2. H. Winterhager and H. Dreiner. Metall, v. 15, Feb. 1961, p. 114-123.

Setting of 50-70% Ag containing amalgams specimens with and without

traces of Zn is X-ray investigated after 30 sec. trituration of specimens. Hardening of amalgam is examined by X-ray intensity vs. time curves. Time law of setting process. Influence of trituration time. (C29; Ag-b, Sn-b, Zn)

125-C. Continuous Casting of Aluminum Bar. A. H. Tessman. Machinery (London), v. 98, Feb. 15, 1961, p. 390-391.

Operating sequence and sectional diagrams of equipment developed for continuous casting of Al bar 2 1/4 in. diameter at a rate of 80 in. per min. (C5q; Al)

126-C. Copper Concentrates to Metal Shape in Marinduque's New Philippine Plant. George O. Argall, Jr. Mining World, v. 23, Mar. 1961, p. 31-33.

Production of Cu wire, tubing and strip from low tonnage Cu concentrate by a new process involving chemical leaching with ammonia and gaseous reduction of concentrate to Cu powder with H_2 and CO_2. Powder is then compacted, sintered, annealed, rolled and shaped into final products. All smelting is eliminated. (C19n, C26, H14, H15, F26, F23; Cu)

127-C. Aluminum Sheet Fabricator Starts With Molten Metal. Steel, v. 148, Mar. 20, 1961, p. 107.

Continuous casting and sheet rolling are combined to produce Al sheet. Continuous strip from the casting rolls is reduced on a four high, single stand mill. (C5q, F23; Al)

128-C. Electrorefining Chromium. F. R. Cattoir and D. H. Baker. U.S. Bureau of Mines, Report of Investigations 5682, 1960, 15 p.

Electrolysis of fused molten NaCl-$CrCl_2$ electrolytes at 820° C. in a Ni lined electrolytic cell to produce Cr of low O and N content. Data are given for ductility, hardness, crystal structure and content of Fe and other impurities. (C23p, Q-general, 2-60; Cr)

129-C. (French.) Vacuum Melting of Some Nonferrous Metals. R. Syre. Revue de Metallurgie, v. 57, Dec. 1960, p. 1107-1116.

Consumable-electrode, skull-melting and electron-bombardment vacuum melting of Be, Ti and Zr (reactive metals) and Cb, Mo, Ta and W (reactive and refractory metals). (C5, 1-73, C25; Be, Ti, Zr, Cb, Mo, Ta, W)

130-C. (Russian.) Method of Calculating Optimum Parameters for a Continuous Self Roasting Aluminum Electrolyzer Anode. M. A. Korobov. Tsvetnye Metally, Dec. 1960, p. 33-38.

Effect of electrode holder spacing and number and the related coule effect on thermal balance and electrode efficiency in the electrolytic refining of Al. Dependence of anodic potential drop on dimensions of anode, electrode holders, resistance and current density. 3 ref. (C23p; Al)

131-C. (Russian.) Decomposition of Loparitovyi, Perovskitovyi and Sfenovyi Concentrates by H_2SO_4. Ya. G. Goroshchenko, D. L. Motov and G. V. Trofimov. Tsvetnye Metally, Dec. 1960, p. 38-42.

Decomposition of Ti ore concentrates by H_2SO_4 containing ammonium sulphate salt at 230-300° C. Dissociation rate and yield as a function of particle size, concentrate composition and amounts of H_2SO_4 and $(NH_4)_2SO_4$ used. 3 ref. (C1q; Ti)

132-C. (Russian.) Electrolytic Refining of Be. G. F. Silina and L. L. Grinberg. Tsvetnye Metally, Dec. 1960, p. 47-53.

Electrolytic purification of Be using Be anodes, Ni cathodes and a KCl-$BeCl_2$-NaCl electrolyte. Dependence of Be purity on per cent BeCl and purity of electrolyte. Effect of current and electrolysis time on amount of Be refined. (C23p; Be)

133-C. Vacuum Melting Produces Cleaner, Better Performing High Temperature Brazing Alloys. C. R. Benson. Welding Journal, v. 40, Mar. 1961, p. 232-236.

Advantages and industrial application of vacuum melting process in the production of brazing alloys, including increased cleanliness, lower gas content, vaporizing of impurities, closer composition control, uniform brazing temperatures and improved erosion resistance. 5 ref. (C5, 1-73; SGA-f)

134-C. (Translation-ConBur.) Electrolytic Production of Metallic Chromium From

Chromium Sulphate Solutions. S. E. Gurevich. Journal of Applied Chemistry of the USSR, v. 33, Mar. 1960, p. 656-661.

Determination of optimum current density, pH and electrolyte temperature for production of Cr in a diaphragm cell with separation of anolyte and catholyte. 13 ref. (C23; Cr)

135-C. (Translation-ConBur.) Influence of Organic Additions on the Rate of Reduction of Nickel in Acid and Alkaline Solutions. A. I. Lipin and M. M. Livshits. Journal of Applied Chemistry of the USSR, v. 33, Mar. 1960, p. 662-665.

Nature of the organic additive, number of carboxyl and methylene groups and the presence of amino or hydroxy groups in the molecule as they affect reduction rate. 3 ref. (C26; Ni)

136-C. (Translation-ConBur.) Electrolytic Refining of Tin in Solutions Containing Aminosulphites. A. E. Levin and Chang Kuo-heng. Journal of Applied Chemistry of the USSR, v. 33, Mar. 1960, p. 672-678.

Determination of optimum tin aminosulphite content, electrolysis temperature and glue per beta-naphthol additive proportions for Sn refining. Calculated difference of potentials through the bath show the main consumption of energy is in the ohmic resistance of the solution and cathodic polarization. 12 ref. (C23p; Sn)

137-C. (Japanese.) Pyrometallurgical Processing of Nuclear Fuels. Masayoshi Kanno. Atomic Energy Society of Japan, Journal, v. 2, Dec. 1960, p. 767-778.

Comprehensive review of recycling of U-Th fuel, including evaporation, oxide slagging or drossing, solvent and molten salt extraction, fractional crystallization, pyrozinc, hermex, electrolytic, zone-melting, de Boer and cyclic oxidation-reduction methods. (C-general, 10-54; U, Th)

138-C. (German.) Precipitation of Titanium Metal by Fused Salt Electrolysis. Hubert Kuhnel, Paul Ehrlich and Rolf Dieter Uihlein. Zeitschrift fur Anorganische und Allgemeine Chemie, v. 306, Nov. 1960, p. 246-259.

Construction and operation of an electrolytic cell (capacity 2 kg.) for precipitation of solid metals under inert gas atmosphere at temperatures up to 1000° C. Precipitation of coarse Ti crystals from a NaCl melt containing 1.5-4% Ti chlorides. Influence of current conditions on obtained Ti dendrites. (C23; Ti)

139-C. (English.) Preparation of High-Purity Zinc Dusts. Hiromu Imai. Kansai University, Technology Reports, Mar. 1959, p. 57-64.

High-purity Zn is obtained by chemical treatment with potassium bichromate and aqueous ammonia solution containing ammonium chloride. The treated Zn dust has good resistance to oxidation even in moist air. 4 ref. (C19, R1h; Zn)

140-C. Oxygen Refined Ferroalloys. Journal of Metals, v. 13, Mar. 1961, p. 215.

Intermediate grade ferrochrome (68-71% Cr, 5-6% C, 2-3% Si, 0.07% S), which is tapped from a submerged arc furnace, is oxygen refined by a vertical water cooled Cu lance having a blowing rate of less than 1000 cu. ft. per min. and requiring from 30-40 min. The refined ferrochrome is 58-65% Cr, 4.25% C, 1% Si and 0.03% S. (C21d; Cr-b, Fe)

141-C. Oxygen Jetting Secondary Copper. W. S. Nelmes, J. A. Charles and A. G. Cowen. Journal of Metals, v. 13, Mar. 1961, p. 216-220.

Experimental work is being done on a top-jetting oxygen process in an air blown Peirce-Smith converter which is designed to replace the conventional method of converting black Cu to rough Cu. Research is done to determine whether the present converters could be replaced by a smaller vessel using oxygen. Advantages of an oxygen process over the conventional air blown converter process are given. (C21b; Cu)

142-C. Philippines' First Copper. F. Weston Starratt. Journal of Metals, v. 13, Mar. 1961, p. 221-222.

Cu powder is produced from a Cu-Zn concentrate in an integrated ammonia leach-hydrogen reduction process in which the concentrate is treated by continuous NH_3-air leaching at 180° F. and 100 psi., solid separated, purified by a combined oxidation and hydrolysis operation and reduced with H_2 in a series of seven autoclaves at 400° F. at a total pressure of 650 psi. The resulting Cu

powder is roll compacted, sintered and hot rolled into strip. (C19n, C26; Cu)

143-C. Production of Uranium, Thorium, Plutonium and Their Compounds. Reactor Fuel Processing, v. 3, Oct. 1960, p. 48-52.

Production processes for uranium trioxide, dioxide and tetrafluoride, uranium metal, thorium tetrachloride and thorium metal, including denitration, reduction, electrolysis, fluidized and moving-bed and distillation techniques. 17 ref. (C-general; Pu, Th, U)

144-C. (Russian.) Obtaining Very Pure Se and Te. A. V. Novoselova, A. S. Rashinkin and B. A. Ropovkin. Zhurnal Vsesoyuznogo Khimicheskaya Obshchestva, v. 5, May 1960, p. 557-561.

Literature review of methods for purifying Se and Te including distillation, precipitation and reduction processes. Application of special techniques such as zone refining. 83 ref. (C-general, C28k; Se, Te)

145-C. Zone Refining. E. F. G. Herington. Endeavour, v. 19, Oct. 1960, p. 191-196.

Review of the principles and techniques involved in zone refining with application to the purification of Ge, Si, Ga, In, organic compounds and H_2O, the results of zone refining being followed with radioactive isotopes, Na^{22}, Sr^{90}, S^{35} and P^{32}. 12 ref. (C28k, 1-59, 10-54)

146-C. Electron Beam Melting: What it Does for Metals. Donald Peckner. Materials in Design Engineering, v. 53, Mar. 1961, p. 101-106.

Principles of the electron beam melting process and effects of electron beam melting on the mechanical properties of Be, Hf, V, W, Cb, Ta and Co metals and alloys. Influence of melting rate and deoxidants. (C25, Q-general, 2-60; Be-b, Cb-b, Co-b, Hf-b, Ta-b, V-b, W-b, EG-d37)

147-C. Specialty Steel Producer Modernizes Melting Shops. Steel, v. 148, Apr. 3, 1961, p. 90, 93.

Vacuum arc remelting of alloy, stainless, bearing and high strength steel and super alloys at 8500° F. arc temperature using a consumable electrode to produce materials having improved hot and cold workability, mechanical properties and chemical homogeneity. Solidification control is used to improve ingot soundness, eliminating pipes and center porosity. (C5, E25q, 1-73, Q-general, 2-60; ST, SGA-h)

148-C. Production of Bimetal-Reduced Hafnium. Dale W. Richardson. U. S. Bureau of Mines, Report of Investigations 5734, May 1959, 21 p.

Reduction of $HfCl_4$ in a protective atmosphere using Mg-Na as a bimetal reducing agent. The resulting Hf sponge is cast into an ingot and rolled to form Hf strip. 7 ref. (C26; Hf)

149-C. (Japanese.) Behavior of Ti in Liquid-Liquid Extraction of Cb and Ta. Sanji Nishimura, Joichiro Moriyama and Isao Kushima. Japan Institute of Metals, Journal, v. 25, Jan. 1961, p. 27-30.

Distribution coefficients of Ti, Ta and Cb in the extraction systems, Hf-hexone, Hf-HCl-hexone, Hf-H_2SO_4-hexone and Hf-HNO_3 hexone are measured to determine the extent to which Ti can be separated from Ta_2O_5, Cb_2O_5 and tantalite concentrates containing TiO_2. Effect of Ti on the Co extraction of Ta and Cb and influence of the acidity of the liquid solvent solution is found to effect extraction efficiency. 3 ref. (C19n; Ta, Cb, Ti)

150-C. (Rumanian.) Electrolytic Production of Metallic Zirconium. Viorica Craiu, Paula Anghel and A. Calusharu. Revista de Chimie, v. 11, Sept. 1960, p. 509-514.

Electrolytic deposition of Zr from the molten salts of K_2ZrF_6-NaCl in an Ar atmosphere. Data for current and metal yield as a function of current density, temperature, the K_2ZrF_6/NaCl ratio and the form and nature of the cathode. Radiographic analysis of the product. 9 ref. (C23, S11q; Zr)

151-C. (Hungarian.) Electrolytic Refining of Commercial Antimony. Frantisek Kupka. Chemicky Prumysl, v. 10, Dec. 1960, p. 620-623.

Electrolytic precipitation of arsenic in commercial antimony using flowing sulphate-fluoride as an electrolyte. 12 ref. (C23; Sb)

152-C. Oil-Fired Furnaces. J. A Taylor. Metal Industry, v. 98, Mar. 10, 1961, p. 183-186.

Melting of Al, Al alloys, gunmetal, brass, phosphor bronze and Cu alloys

prior to casting by heating in a crucible or rotary furnace. Loss of metal and excess fuel consumption is prevented by using a heating system that does not overheat the charge and by recirculating the heated air. 8 ref. (C5k; Al-b, Cu-b)

153-C. (English-French.) Production of Cobalt Metal, Oxides and Salts. Paper from "Cobalt". Societe Generale Metallurgique de Hoboken, Belgium. 1961, p. 16-23.

Extraction of CoO from heterogenite and carrollite ores. Subsequent reduction of the oxide to form Co metal and powder. (C-general; Co)

154-C. Titanium Casting Technology. R. A. Beall, S. L. Ausmus and F. W. Wood. Metal Industry, v. 98, Mar. 24, 1961, p. 223-227.

Considerations of furnace design and mold materials for consumable electrode skull casting of Ti, Zr and other reactive metals. 5 ref. (C5, 1-73, C25; Ti, Zr)

155-C. (Czech.) Zirconium. Vaclov Spacek. Chemicke Listy, v. 55, Jan. 1961, p. 16-25.

Steps in the preparation from the ore: concentration by gravity, electromagnetic and electrostatic processes; thermal dissociation of ZrO_2 at 1800-2126° C.; leaching in acids after roasting; decomposition of ZrO_2 by melting with a sulphate, fluoride or hydroxide; preparation of $ZrCl_4$; chemical and electrolytic preparation of Zr and its manufacture by thermal dissociation of ZrI_4. 41 ref. (C-general; Zr)

156-C. Rare Metals Are a Challenge to Metallurgy. Pt. 11. Australasian Manufacturer, v. 45, Mar. 11, 1961, p. 54-55.

Various methods of converting rutile and ilmenite to Ti tetrachloride in the production of Ti. Production of Mo, Ta and Cb. (C-general; Cb, Mo, Ta, Ti)

157-C. Refractory Usage in Zinc Smelting. W. H. Dennis. Refractories Journal, v. 36, Sept. 1960, p. 263-268.

Properties of silica, silicon carbide and fireclay refractories; production methods and application in horizontal and vertical retort furnaces. Technology of Zn smelting by horizontal and vertical processes with attention to development of the vertical process with consequent improved technical index as a result of the availability of refractories with improved properties. (C21; Zn, RM-h, 17-57)

158-C. (French.) Highly Intensive Purification of Tellurium. N. Peterescu, M. Protopopescu and D. Drimer. Revue Roumaine de Metallurgie, v. 5, Feb. 1960, p. 227-237.

Vacuum distillation and zone refining; purity of the product. 5 ref. (C22h, C28k, 1-73; Te)

159-C. Mechanism of Electrodeposition of Cobalt From Liquid Ammonia Solutions of Spin-Paired Cobalt (III) Complexes. Evidence for a Trans Effect in Octahedral Complexes. George W. Watt and Joe W. Vaughn. Electrochemical Society, Journal, v. 108, Apr. 1961, p. 351-354.

Cathode current efficiency data for the electrolysis of liquid NH_3 solutions of certain cobaltammine nitrates are interpreted as supporting a bimolecular ligand substitution followed by a dissociative process which gives rise to the electrochemically active species. 17 ref. (C23; Co)

160-C. The Mechanism of Electrolytic Deposition of Titanium From Fused-Salt Media. Walter E. Reid, Jr. Electrochemical Society, Journal, v. 108, Apr. 1961, p. 393-394.

Static electrode-potentials of Na, Mg and Ti are measured in molten Li, K and Na chlorides against a porcelain electrode. It is concluded that Ti deposition probably occurs as a primary electrode reaction. 10 ref. (C23; Ti)

161-C. Research and Development on Fuel Processing. Reactor Fuel Processing, v. 4, Jan. 1961, p. 19-45.

Separation, purification and recovery of U, Th, Pu, La, Nd, Sm, Ru, Zr, Am, Cm, Pm and Y by solvent extraction, ion-exchange process, fused salt process, fluorination melt refining and liquid metal and salt processes. 68 ref. (C19, T11g)

162-C. (Russian.) Obtaining High Purity Magnesium by Electrolytic Refining. O. A. Lebedev and K. D. Muzhavlev. Tsvetnaya Metallurgiya, June 1960, p. 80-86.

Design of the device for electrolytic refining of raw Mg. Two and three-layer

method of electrolysis. Composition of electrolyte and necessary temperature and current density. Comparison of the purity of Mg obtained by electrolysis with that obtained by vacuum distillation. (C23p; Mg)

163-C. Some Aspects of the Production of Uranium Powder by Calcium Reduction of the Oxide. R. H. Myers and R. G. Robins. Paper from "Australian Atomic Energy Symposium". Melbourne University Press, Melbourne, Australia, 1958, p. 111-114.

Report on production of uranium powder by the Ca reduction of uranium dioxide. Results indicate that 30% excess Ca reductant is needed for effective reduction. Effects of time and temperature of heating of reaction products and size of reaction vessel on nature of the powder. 3 ref. (C26; U)

164-C. The Production of Uranium Metal Powder by Electrolysis in Molten Chlorides. R. G. Canning. Paper from "Australian Atomic Energy Symposium". Melbourne University Press, Melbourne, Australia, 1958, p. 115-121.

Process for converting uranium oxides to chlorides in molten chloride medium in which Cl absorption efficiency is dependent on temperature and uranium concentration in the melt. Recovery of uranium metal powder is achieved by controlled precipitation with Mg metal followed by electrorefining onto a Mo cathode. 4 ref. (C26; U)

165-C. Metallothermic Reduction of Vanadium Chlorides. F. E. Block, R. R. Brown and M. J. Ferrante. U. S. Bureau of Mines, Report of Investigations 5722, 17 p.

Processes for the metallic reduction of vanadium chlorides to facilitate large-scale plant production of high-quality vanadium metal. Metal is prepared by reducing the anhydrous chlorides with molten Mg or mixtures of Mg and Na under an argon atmosphere. 8 ref. (C26; V)

166-C. Thorium. T. H. H. Skeet. Mine & Quarry Engineering, v. 27, Apr. 1961, p. 179-184.

Review of occurrences and reverses of Th minerals, extraction processes and present and future application of Th and its compounds. (C-general; Th)

167-C. (Translation-ConBur.) Thermodynamics of Uranium Tetrafluoride Reduction by Magnesium. Soviet Journal of Atomic Energy, v. 7, Mar. 1961, p. 858-861.

Review of thermodynamic values and phase transitions of UF_4 reduction by Mg including calculation of equilibrium constants at different temperatures and changes in free energy. (C26; U)

168-C. Recovering Tin From Hardhead by Selective Oxidation of Iron. D. A. Wilson and P. M. Sullivan. U. S. Bureau of Mines, Report of Investigations 5756, 17 p.

Recovery of Sn from an Fe-Sn alloy (hardhead) by oxidation processes using air, steam, H and CO_2-CO mixtures. Tests indicate that temperature, use of siliceous flux and control of amount and rate of air delivery affect optimum recovery. 11 ref. (C28j; Fe-b, Sn)

169-C. (Japanese.) Refinement of Uranium With Benzyldodecylamine. Yoshinaga Oka, Taro Yamasaki, Shigeki Matsuo and Mihoko Abe. Atomic Energy Society of Japan, Journal, v. 3, Feb. 1961, p. 28-34.

Study of the effect of such variables as uranium loading and acid and sulphate ion concentration on U extraction from an acidic aqueous sulphate system by use of benzyldodecylamine. Efficient extraction is achieved in the concentration range of 0.1-1.0 M/1 sodium sulphate in the acidity range of 0.1-1.0 N. 5 ref. (C19; U)

170-C. (German.) Newer Information on Continuous Casting of Nonferrous Metals. Pt. 2. Aluminum and Aluminum Alloys. E. Herrmann. Metall, v. 15, Mar. 1961, p. 201-210.

Review of design and operation of modern continuous casting and related metalworking equipment such as single and multiple horizontal and vertical continuous casting machines for rods and tubes, cast-rolling machines for sheet and wire, horizontal strip casting machines and auxiliary devices. (C5q, 1-52; Al-b)

171-C. Separation Engineering on the Moon. A. M. Gaudin. Metallurgical Society of AIME, Transactions, v. 221, Apr. 1961, p. 210-220.

Theoretical survey of ore and mineral beneficiation and pyrometallurgical technique and chemical extraction,

distillation, reduction and refining methods with attention to limitations imposed by lunar gravitation, surface temperature and lack of water vapor, oxygen and nitrogen in the atmosphere. 3 ref. (C-general, B-general, 10-51, 10-54)

172-C. Molybdenum by Direct Thermal Dissociation of Molybdenum Disulphide. W. G. Scholz, D. V. Doane and G. A. Timmons. Metallurgical Society of AIME, Transactions, v. 221, Apr. 1961, p. 356-364.

Mo of high purity is produced by direct dissociation of commercial molybdenite in vacuum at 1600-1700° C. Analyses of ingots arc-cast from commercial Mo powder, hydrogen-reduced from ammonium molybdate and from thermally dissociated MoS_2 show the levels of chemical impurities to be similar. 8 ref. (C1; Mo)

173-C. (Russian.) Isolation of Weighable Quantitites of Pure Protactinium-231. I. Spitain and R. A. Dyachkova. Doklady Akademii Nauk SSSR, v. 134, May 1960, p. 1111-1114.

Concentration and isolation of Pa using sorption and ion-exchange. Precipitation of Pa and certain impurities from the original mixture with impurity removal by sorption with MnO_2. Final ion-exchange product is examined spectroscopically and by radiation measurements. 19 ref. (C19s, C27; Pa)

174-C. Olin Research Moves One Step Closer to Aluminum From Clay. Modern Metals, v. 17, Apr. 1961, p. 59.

Leaching of alumina containing clay with H_2SO_4 and separation of iron and aluminum sulphate by crystallization result in crystals 1/8 to 1/16 in. diameter. (C19n; Al)

175-C. (German.) Problems in Electrolytic Production and Raffination of Metals From Aqueous Solutions. Oskar Emert. Chemie-Ingenieur-Technik, v. 33, Feb. 1961, p. 93-95.

Review of process parameters for precipitation of metal powder and metal films and production of very pure metals and semiconductors including Cu and Zn production with insoluble electrodes; deposition of Ni and Co alloys by electrolysis and production of Zn, Cd and semiconductor metals by amalgam electrolysis using liquid Hg electrodes. (C23, C19)

176-C. High-Purity Nickel. Metal Industry, v. 98, Mar. 31, 1961, p. 246.

Equipment and techniques used to produce gas-free, high-purity Ni ingots by melting down sintered slugs in dry hydrogen in a controlled atmosphere furnace. (C5; Ni)

177-C. (German.) Investigation of Titanium Raffination Using Oxygen-18. Hans Jurgen Hein. Chemie-Ingenieur-Technik, v. 33, Feb. 1961, p. 103-105.

Fused salt electrolysis of 0-18 oxidized Ti at 850° C. using NaCl as carrier salt, Na_2TiCl_4 as electrolyte and pure Ti as cathode with oxygen analysis and hardness examination of the refined Ti to determine oxygen pick-up during raffination. (C23, R1h, 1-59; Ti)

178-C. (Italian.) Control of Zone-Purification Process by Radioactive Zinc Tracer. D. Gelli and M. Robba. Alluminio, v. 30, Jan. 1961, p. 3-8.

Redistribution of Zn in a zone-purified Al ingot is investigated using Zn^{65} radioisotpes. Effect of translation rate, number of passes and of anodic oxide layer on process. 4 ref. (C28k, 1-59; Zn)

179-C. Vacuum Techniques. T. Thorley. Metal Industry, v. 98, Apr. 7, 1961, p. 263-267.

Vacuum melting of reactive metals in induction furnaces or arc melting furnaces. Vacuum is maintained at low pressures by joint seals of Cu sheet or Au wire. Leaks are detected by a mass spectrometer. (C25)

180-C. (German.) Use of the Electro Furnace in Melting of Nonferrous Metals. C. Reschke and K. D. Fritzsche. Metall, v. 15, Apr. 1961, p. 328-330.

Design and operation of electric furnaces with emphasis on use of continuous electrodes for melting (of Cu and Ni matte), slag enrichment and selective reduction (production of Mn and Ti slag concentrates and simultaneous melting of pig iron) and reduction (production of Cu, Co, Sn and Zn). (C5h; Cu, Co, Mn, Ni, Sn, Zn)

181-C. (German.) Electrolytic Precipitation of Titanium Metal From Salt Melts

by a Soluble Anode. P. Ehrlich, R. D. Uihlein and H. Kuhnl. Chemie-Ingenieur-Technik, v. 33, Feb. 1961, p. 92.

Production of pure Ti from 99.7% Ti turnings by fused salt electrolysis in Ar atmosphere at 820° C. using $TiCl_2$ containing NaCl as electrolyte. Quality assessment of Ti by hardness measurements of current on crystal shape of the Ti deposits. (C23, C27; Ti)

182-C. Consolidation and Purification of Tungsten in High Vacuum. Industrial Heating, v. 28, Feb. 1961, p. 296.

Various methods of preparing massive shapes of tungsten for high temperature conditions include vacuum consumable and nonconsumable electrode process, powder metallurgy method and d-c. tungsten arc process. (C25, H10; W)

183-C. (German.) Problems in Electrolytic Production of Metals From Fused Salts, Discussed in Terms of Fused Salt Electrolysis of Aluminum. H. Ginsberg. Chemie-Ingenieur-Technik, v. 33, Feb. 1961, p. 80-84.

Review of theory and technology in terms of solubility and dissolution mechanisms in the molten systems $NaF-AlF_3$ and $Na_3AlF_6-Al_2O_3$; thermodynamics of reactions during electrolysis; the "anode effect" (unsteady change of current and voltage); carbon consumption; and heat and energy balance. (C23, C27; Al)

184-C. (Swedish.) Trends in Aluminum Manufacture. Odd Strandberg. Teknisk Tidskrift, v. 91, Mar. 17, 1961, p. 237-241.

Survey of processes for the extraction and refining of Al including nitride production from bauxite, the Quebec method and the Johnson process. Methods are given for current consumption and cost reduction during electrolytic extraction. (C23, C-general; Al)

185-C. (Italian.) Preparation of Magnetic Ferronickel Alloys of High Permeability by Vacuum Melting and Sintering. G. Brossa, A. Ferro and G. Venturello. Metallurgia Italiana, v. 53, Jan. 1961, p. 17-23.

Preparation of mumetal and Permalloy C using electrolytic Ni and electrolytic, Armco and ductile Fe with direct additions of Cu, Cr and Mo powder. Comparison of permeability characteristics. 12 ref. (C5, H15, P16q, 1-73, 2-60; Ni-b, Fe, SGA-n)

186-C. Silicon Yields to Horizontal Zone Refining. Chemical & Engineering News, v. 39, May 1, 1961, p. 46.

Purification of Si by horizontal zone refining using water-cooled quartz containers which do not react with molten Si. Resulting resistivity and product quality compare favorably with those obtained by floating zone method. (C28k; Si)

187-C. (Swedish.) Beryllium Preparation by the Sulphide Process. Teknisk Tidskriff, v. 91, Apr. 14, 1961, p. 387-389.

Precipitation of heavy metals such as Cu, Ni and Fe in Be-containing materials by ammonium sulphide with an ammonium-beryllium compound crystallizing at 50° C. The ammonium is driven off at 900° C. in an induction furnace to produce high-purity Be. 4 ref. (C27; Be)

188-C. Solid State Electrolysis in Yttrium Metal. J. M. Williams and C. L. Huffine. Nuclear Science and Engineering, v. 9, Apr. 1961, p. 500-506.

Purification of yttrium by heating to 1230-1370° C. for 200 hr. in static Ar using direct current. Chemical and metallographic analysis with cold rolling tests indicate improved ductility with increase of purity near the cathode as a consequence of oxygen and metallic impurity ingration to the anode. 8 ref. (C23p, Q23p, 2-60; Y-a)

189-C. (German.) Preparation and Testing of High-Purity Gallium. E. Papp and K. Solymar. Acta Chimica Academiae Scientiarum Hungaricae, v. 24, Apr. 1960, p. 451-474.

Electrowinning of Ga by two stage electrolysis of the concentrated extract obtained in the Bayer Al process after leaching, a stainless steel electrode and a Ni electrode being used. Purity tests by colorimetric spectrographic and polarographic methods and resistivity and activity measurements. 42 ref. (C23n, S11; Ga)

190-C. Ion Exchange for Gold Recovery. Mining Journal, v. 256, Apr. 14, 1961, p. 409, 411.

Twenty dimethylamine anion resins including a De Acidite H resin containing 24% strong base groups are tested for efficiency in recovery of Au by ion exchange. Data are included for competing Fe, Cu and Ni ions. (C19s; Au, NM-d37, 17-57)

191-C. Production of Uranium Metal. F. L. Cuthbert. Paper from "Australian Atomic Energy Symposium". Melbourne University Press, Melbourne, Australia, 1958, p. 102-110.

Uranium extraction, purification and residue recovery processes with emphasis on the use of pulse plate liquid-liquid extraction columns and tributyl phosphate-kerosene solvent. UF_4 is reduced to massive uranium metal ingots suitable for use as reactor fuel elements. 16 ref. (C19; U)

192-C. The Lower Halides of Niobium and Zirconium. I. E. Newnham. Paper from "Australian Atomic Energy Symposium." Melbourne University Press, Melbourne, Australia, 1958, p. 128-131.

New processes for separating Hf from Zr and Ta from Cb involving the differential reduction of the mixed tetrahalides of Zr and Hf and of the mixed pentahalides of Ta and Cb. Reduction occurs at 190-650° C. using atomic H_2. 17 ref. (C1p; Cb, Hf, Ta, Zr)

193-C. Bronze Alloys Electric Melting and Quality Control. R. V. Barone, T. F. Godfrey and R. A. Rosenberg. Modern Castings, v. 39, Mar. 1961, p. 103-110.

Low frequency induction melting of bronze alloys leading to close metallurgical control, decreased production costs and improved physical properties. Use of an X-ray fluorescence unit to monitor Zn content. (C5, Q-general, 2-60; Cu-s)

194-C. Apparatus for Zone Refining Highly Reactive Metals. G. E. Spangler. Franklin Institute (Air Force Office of Scientific Research). U. S. Office of Technical Services, PB 161929, July 1960, 12 p. $.50.

An improved apparatus for the purification of highly reactive metals by the floating zone technique. The apparatus consists of a hermetically sealed, all-glass system using a static inert atmosphere which is internally gettered. (C28k)

195-C. Discharge Behavior in Vacuum Arc Melting. F. W. Wood and R. R. Lowery. U. S. Bureau of Mines, Report of Investigations 5749, 1961, 32 p.

Investigation of anomalies in electrical-discharge behavior during consumable-electrode arc melting of Ti by measuring crucible temperature, arc potential and current, arc light intensity and furnace pressure. Formulation of theories for crucible rupture mechanism and explosive reactions in the furnace caused by displaced skittering arcs. (C5h, 1-73; Ti)

196-C. Gas-Fired Vacuum Retort for Distilling Metals. H. S. Caldwell, H. W. St. Clair, J. W. Bilbrey and M. J. Spendlove. U. S. Bureau of Mines, Report of Investigations 5764, 1961, 11 p.

Distillation of Zn alloys containing impurities of Al and Fe in a graphite retort with a liner of 304 stainless steel at 450-1000° C. under vacuum. Determination of relationship between evaporation rate and temperature. (C22h, 1-52, 1-73, 2-61; Zn-b, Al, Fe)

197-C. Aluminium Alloy Slab Casting and Sawing Installation. Engineer, v. 211, Apr. 21, 1961, p. 666.

Semicontinuous casting of Al alloy to form ingots for producing sheet, slip and coil. Grain size can be controlled by changing casting speed. (C5; Al-b)

198-C. A Survey of the Literature on the Use of Organometallic Compounds in the Preparation of Ultrapure Metals. W. A. G. Graham. Arthur D. Little, Inc. U. S. Office of Technical Services, PB 171097, July 1960, 38 p. $1.25.

Possible recovery methods studied include thermal decomposition, photolysis, electrolysis and hydrogenolysis. (C-general)

199-C. (Translation.) Adaptive Automatic Control System for Obtaining Aluminum by the Electrolytic Process Using a Computing Device. E. P. Sarkisyan, M. M. Agababyan and P. S. Saakyan. Automation and Remote Control, v. 21, June 1960, p. 563-567. (Translated from Avtomatika i Telemekhanika, Dec. 1960.)

Automatic control system constructed with digital computor elements for the electrolytic process of obtaining Al from fused alumina-cryolite bath. (C23; Al)

200-C. Electric Smelting of Montana Chromite Concentrates. W. L. Hunter and Lloyd H. Banning. U. S. Bureau of Mines, Report of Investigations 5775, 1961, 30 p.

Production of ferrochromium with varying carbon and Si content from

chromite ore. Electrical energy, flux and electrode requirements are given for high, medium or low-carbon ferrochromium. (C21d; Cr)

201-C. Refining Crude Aluminum by the Subhalide Reaction. Leland A. Yerkes and Oliver C. Fursman. U. S. Bureau of Mines, Report of Investigations 5773, 1961, 19 p.

Effect of pressure, temperature, vapor flow rate and charge composition on the efficiency of refining Al from crude alloys using $AlCl_3$ vapor. 17 ref. (C19r; Al)

202-C. (Japanese.) Lead Extraction Metallurgy by Electrolysis of Lead Sulphide in $PbCl_2$ Salt Bath. Kiyoshi Azuma, Takeo Furukawa, Hisashi Ishikawa and Yoshio Mizuniwa. University of Tokyo, Engineering Research Institute, Annual Report, v. 19, Mar. 1961, p. 90-97.

Technological parameters for extraction of Pb, with recovery of Au, Ag, Cu, Zn, S, Bi and Fe as byproducts, by electrolysis of chlorinated sulphide ores, with combined volatilization and vacuum evaporation of impurities. (C23; Pb)

203-C. (French.) Application of Electrolytic Processes in the Metallurgy of Titanium and Zirconium. M. Socci. Journal du Four Electrique, Jan. 1961, p. 21-22.

Thermal and electrolytic production of Ti and Zr. Principles of Kroll and Donegani processes for production of metal crystals. (C23; Ti, Zr)

204-C. (French.) New Physical and Chemical Properties of Metals of Very High Purity Obtained by Zone Refining. Georges Chaudron. Bulletin de la Societe Chimique de France, Jan. 1961, p. 18-25.

Purity, crystal structure, electric conductivity, mechanical strength and corrosion of zone refined Al and Fe. 21 ref. (C28k; Al, Fe)

205-C. (French.) Production of Beryllium and Its Alloys. Work of Paul Lebeau. Present Processes. Emile Pruvot. Bulletin de la Societe Chimique de France, Jan. 1961, p. 172-176.

Production of crude Be. Purification by fractionated sublimation and electrolysis to produce highly purified Be. (C-general; Be)

206-C. (Portuguese.) Calculation of the Correct Charge Composition for Lead Smelting Furnaces. Tharcisio D. de Souza Santos. Boletim da Associacao Brasileira de Metais, v. 17, no. 62, 1961, p. 119-130.

Calculation of the slag composition from the weight of charge components. Determination of the flux to be used from the SiO_2/CaO, FeO/SiO_2 and CaO/FeO ratios of the ore or sintered ore. 4 ref. (C21; Pb)

207-C. Using Molten Zinc to Extract Aluminum From Aluminum-Silicon Alloys: A Progress Report. H. S. Caldwell, Jr., and M. J. Spendlove. U. S. Bureau of Mines, Report of Investigations 5781, 1961, 15 p.

Effect of temperature, time, pressure, particle size and alloy composition on the efficiency of leaching Al from Al-Si alloys using volatile Zn. 7 ref. (C19n; Al-b, Si)

208-C. Treatment of Nickel-Copper Matte. Kelvin Sproule, G. A. Harcourt and L. S. Renzoni. Paper from "Extractive Metallurgy of Copper, Nickel and Cobalt". Interscience Publishers, Inc., New York 1, 1961, p. 33-54.

Processes for separating $CuSO_4$ and precious metals from $NiSO_4$ including conversion, casting and slow cooling, milling, flotation, metallic recovery, direct electrorefining of matte anodes and product treatment. Grain structure and phase diagrams of Bessemer Ni-Cu mattes. 17 ref. (C21b, C23p, B-general, M-general; RM-n, Cu, Ni, S)

209-C. Chibuluma Cobalt Plant. W. R. N. Snelgrove. Paper from "Extractive Metallurgy of Copper, Nickel and Cobalt". Interscience Publishers, Inc., New York 1, 1961, p. 55-66.

Plant equipment and production processes for a Cu-Co matte including flotation, roasting, smelting and gas disposal procedures. Laboratory test results for matte composition and grain structure. 4 ref. (C21, B-general, M-general; RM-n, Cu, Co)

210-C. Cobalt-Nickel Separation by Solvent Extraction. J. E. Magner. Paper from "Extractive Metallurgy of Copper, Nickel and Cobalt". Interscience Publishers, Inc., New York 1, 1961, p. 67-73.

Co, Ni and Cu separation by a solvent extraction process which includes feed

pretreatment and stripping and recovery of Co and Ni. Solvents utilized are H_2S, sulphonic acid, HCl and H_2SO_4. (C19n; Cu, Ni)

211-C. Separation of Cobalt and Nickel Through Volatilization of Their 2, 4-Pentanedionates. Patrick Grimes. Paper from "Extractive Metallurgy of Copper, Nickel and Cobalt". Interscience Publishers, Inc., New York 1, 1961, p. 75-83.

Recovery of Ni and Co from solution through precipitation of their 2, 4-pentanedione chelates. Separation of the two metals by sublimation or distillation, utilizing the difference in volatility of the chelates with subsequent decomposition by hydrolysis. 16 ref. (C19q, C27; Ni, Co)

212-C. Reverberatory Furnace and Converter Practice at the Noranda and Gaspe Smelters. J. N. Anderson. Paper from "Extractive Metallurgy of Copper, Nickel and Cobalt". Interscience Publishers, Inc., New York 1, 1961, p. 133-158.

Design and operation of a wet-charge Cu smelting reverberatory furnace. Comparative technical indexes for wet-charge and hot-charge practice and converter practice in smelting. 3 ref. (C21b, C21c, 1-52; Cu)

213-C. Smelting Practices of Phelps Dodge in Arizona. M. G. Fowler. Paper from "Extractive Metallurgy of Copper, Nickel and Cobalt". Interscience Publishers, Inc., New York 1, 1961, p. 159-203.

Review of development of Cu smelting practices and converter design and operation from 1880 to the present. Analysis of raw ore, slags, magnetic control, fluxing problems and Cu production. 6 ref. (C21b, 10-54; Cu)

214-C. Certain Limiting Factors in the Design and Operation of Pierce-Smith Copper Converters. W. J. de Villiers, R. C. Bohme, N. Gibson and W. A. Kealy. Paper from "Extractive Metallurgy of Copper, Nickel and Cobalt". Interscience Publishers, Inc., New York 1, 1961, p. 205-224.

Design and operating factors limiting capacity of a Cu converter including blast and automatic air control systems and pressure-volume characteristics. Technical index for conversion of a Cu-bearing silicious ore containing about 70% silica. (C21b, 1-52; Cu)

215-C. Copper Converting Practices at Chino Mines Division of Kennecott Copper Corp. M. K. Nicholson, P. L. Lockridge and G. C. Beals. Paper from "Extractive Metallurgy of Copper, Nickel and Cobalt". Interscience Publishers, Inc., New York 1, 1961, p. 225-238.

Increased efficiency and production of Cu smelting operations achieved by converter modification and installation of mechanical tuyere punchers. Comparative data for smelting operations with reverberatory furnaces. (C21b, C21c; Cu)

216-C. Electric Smelting of Sulfide Ores. Otto Barth. Paper from "Extractive Metallurgy of Copper, Nickel and Cobalt". Interscience Publishers, Inc., New York 1, 1961, p. 241-262.

Comparison of electric and reverberatory furnace smelting of sulphide ores. Design and fabrication of an electric furnace and its application to treatment of Cu, Ni and Co concentrates. (C21c, C21d, 1-52; Cu, Ni, Co)

217-C. Production of Ferronickel at Riddle, Oregon. E. E. Coleman and D. N. Vedensky. Paper from "Extractive Metallurgy of Copper, Nickel and Cobalt". Interscience Publishers, Inc., New York 1, 1961, p. 263-286.

Mining, ore beneficiation, calcining, electrofurnace smelting, refining and casting production of ferronickel derived from low-grade lateritic Ni ore. 3 ref. (C21d, B-general; RM-n, Fe-b, Ni)

218-C. Ferronickel Smelting in New Caledonia. C. G. Thurneyssen, J. Szczeniowski and F. Michel. Paper from "Extractive Metallurgy of Copper, Nickel and Cobalt". Interscience Publishers, Inc., New York 1, 1961, p. 287-300.

Electrometallurgical smelting process for producing ferronickel from unbeneficiated Ni ore. (C21d; RM-n, Fe-b, Ni)

219-C. Leaching and Electrowinning of Copper From Nchanga Oxide Concentrate. F. H. Chapman and E. W. Page. Paper from "Extractive Metallurgy of Copper, Nickel and Cobalt". Interscience Publishers, Inc., New York 1, 1961, p. 317-345.

Flotation, thickening, classification, filtering, washing and purification processes for sulphide leaching of Cu ores. Procedures and plant layout for electrowinning acid Cu sulphate solutions. (C19n, C23n; Cu)

220-C. Leaching of Chuquicamata Oxide Copper Ores. J. A. McArthur and C. Leaphart. Paper from "Extractive Metallurgy of Copper, Nickel and Cobalt". Interscience Publishers, Inc., New York 1, 1961, p. 347-361.

Extraction of Cu from oxide ores by sulphuric acid leaching in vats using batch percolation, dechloridizing and SO_2 processes. (C19n; Cu)

221-C. Pressure Leaching of Nickeliferous Laterites With Sulfuric Acid. E. T. Carlson and C. S. Simons. Paper from "Extractive Metallurgy of Copper, Nickel and Cobalt". Interscience Publishers, Inc., New York 1, 1961, p. 363-397.

Technological parameters for extraction of Ni and Co from nickeliferous lateritic ore pressure leaching with H_2SO_4 with auxiliary processes including high-pressure slurry pumping, agitation, heat exchange, flow control, concentrate preparation and refining. 14 ref. (C19n; Ni, Co)

222-C. Industry Report on Modern Copper Tank House Practice. J. H. Schloen and S. S. Forbes. Paper from "Extractive Metallurgy of Copper, Nickel and Cobalt". Interscience Publishers, Inc., New York 1, 1961, p. 401-431.

Summary of current operating practices and process factors in electrolytic Cu refining including cell construction material, solution lines, laundry, electrolytic heating, circulation, purification methods, section inspection, anode replacement, power requirements, addition agents and cathode quality. 4 ref. (C23n, 10-54; Cu)

223-C. Dialysis in Modern Tank House Practice. S. B. Tuwiner and John R. Smith. Paper from "Extractive Metallurgy of Copper, Nickel and Cobalt". Interscience Publishers, Inc., New York 1, 1961, p. 433-448.

Utilization of dialysis as a supplement to liquor purification systems in Cu refining tank houses for the separation of acids which dissolve impurities from commercial anodes. Advantages include acid recovery and reduction of acidity of the solution containing metal salts. 9 ref. (C23n, C19n; Cu)

224-C. The Electrolytic Tank House Operation and Cell Room Practice at Chuquicamata, Chile. J. A. McArthur and B. J. Ledeboer. Paper from "Extractive Metallurgy of Copper, Nickel and Cobalt". Interscience Publishers, Inc., New York 1, 1961, p. 449-468.

Cu extraction from oxide ore through electrowinning deposition and refining operations. (C23n; Cu)

225-C. Production of Refined Nickel Sulphides at Asarco's Perth Amboy Plant. D. A. Busch, John R. Stone and Geza Chiszar. Paper from "Extractive Metallurgy of Copper, Nickel and Cobalt". Interscience Publishers, Inc., New York 1, 1961, p. 469-474.

Extraction of $NiSO_4$ from electrolyte solutions used in electrowinning of Cu blister by leaching, precipitation and evaporation methods. (C19n, C27; Ni-b, S)

226-C. Electrolytic Cobalt Recovery in Katanga. M. A. Bouchat and J. J. Saquet. Paper from "Extractive Metallurgy of Copper, Nickel and Cobalt". Interscience Publishers, Inc., New York 1, 1961, p. 475-501.

Extraction of Co and Cu from oxidized ores through sulphide flotation and electrolytic H_2SO_4 leaching. Pyrometallurgical refining of Co cathodes. 8 ref. (C19n, C23; RM-n, Co, Cu)

227-C. Application of Pressure Hydrometallurgy to the Production of Metallic Cobalt. V. N. Mackiw and T. W. Benz. Paper from "Extractive Metallurgy of Copper, Nickel and Cobalt". Interscience Publishers, Inc., New York 1, 1961, p. 503-534.

Pressure hydrometallurgy processes for recovery of Co from Ni-Co-Cu sulphide ore including air and acid leaching and the soluble cobaltic ammine and Ni preferential reduction techniques. 12 ref. (C19; Co)

228-C. Production of Electrolytic Cobalt at Inco's Port Colborne Nickel Refinery. L. S. Renzoni and W. V. Barker. Paper from "Extractive Metallurgy of Copper, Nickel and Cobalt". Interscience Publishers, Inc., New York 1, 1961, p. 535-545.

Process for recovery and electrorefining of Co from Ni-Cu-Fe sulphide ores based on continuous selective oxidation and hydrolysis. 4 ref. (C19, C23; Co)

229-C. Bibliography on the Extractive Metallurgy of Copper, Nickel and Cobalt

Excluding Ore Dressing and Patents, 1946-1960. Ken G. Robb. Paper from "Extractive Metallurgy of Copper, Nickel and Cobalt". Interscience Publishers, Inc., New York 1, 1961, p. 547-633.

Compilation of 1190 literature sources including 109 references on general extractive metallurgy, smelting and related thermodynamic and thermochemical reactions; 256 references for hydrometallurgy including leaching and metal recovery from solution and 329 references on refining including electrochemical, chemical and thermal methods. (C-general, 11-65; Co, Cu, Ni)

230-C. Large-Scale Lead Smelting. C. C. Downie. Mining Journal, v. 256, Apr. 21, 1961, p. 447, 449.

Refining of galena, drosses and other Pb-bearing residues using an oil fired reverberatory hearth. (C21c; Pb)

231-C. (French.) Laboratory Tests on Cyanidation of Auriferous Minerals. A. Suttor. L'Ingenieur Chimiste, v. 43, Jan. 1961, p. 7-32.

Operations involved in dissolution of Au minerals and decantation, filtration and precipitation of purified metal. 4 ref. (C19p; Au)

232-C. Latest Developments in Aluminium Reduction. Paul H. Muller and Roland E. Oehler. NML (National Metallurgical Laboratory) Technical Journal, v. 3, Feb. 1961, p. 29-36.

Production of Al by reduction in electrolytic cells with prebaked and self-baking anodes of carbon and calcined carbon. Current consumption, current density and Faraday efficiency are given. Use of Al bus bars. 13 ref. (C23; Al)

233-C. Present Trends in Methods of Production of Aluminium Alloy Slabs and Billets for Working. M. R. Reeve. NML (National Metallurgical Laboratory) Technical Journal, v. 3, Feb. 1961, p. 46-55.

Melting in an induction furnace, gas removal with chlorine, deoxidizing with flux, grain refining with Ti and B, chill casting, continuous casting and semi-continuous casting to produce slabs and billets. Production of rod and strip with casting wheel. 6 ref. (C5; Al-b)

234-C. The Role of the National Metallurgical Laboratory in Research and Development of Light Metal Industry in India. B. R. Nijhawan. NML (National Metallurgical Laboratory) Technical Journal, v. 3, Feb. 1961, p. 56-72.

Developments in the production of Al, Ti, Mg, Be, Zr, Al-Si alloy and Al-Mg alloy from bauxite, ilmenite, magnesite, dolomite, beryl and zircon respectively by electrolytic extraction, chlorination, reduction and catalytic distillation. Tensile strengths and corrosion resistances given. 10 ref. (C-general; Al, Be, Mg, Ti, Zr)

235-C. Electrowinning of Copper From Cuprous Chloride. G. C. Mitter, B. K. Bose, S. G. Dighe, Y. W. Gokhale and B. P. Choudhury. Journal of Scientific & Industrial Research, v. 20D, Mar. 1961, p. 114-116.

Electrowinning of Cu from Cu_2Cl_2 electrolyte at room temperature with current density of 1.45 amp. per sq. diameter recovers 99.9% pure Cu. 10 ref. (C23n; Cu)

236-C. Application of Vacuum Casting Technique for the Production of Heavy Forgings. V. Scalise. Paper from "Conference on Internal Steel Quality and Methods of Its Assessment". West of Scotland Iron and Steel Institute, Journal, v. 68, 1960-1961, p. 127-152.

Vacuum casting technique for heavy forgings as related to avoidance of defects, elimination of hydrogen and hair cracks and annealing methods. Tabular data on casting processes and test results. (C5, 1-73; 4-51)

237-C. A Process for the Recovery of Pure Metals by a Solid State Reduction of Salt Crystals. Prem Behari Mathur. Indian Journal of Applied Chemistry, v. 23, Apr. 1960, p. 179-180.

Selective recovery of pure metals at room temperature by reduction of salt powders or crystals utilizing foreign electrolytes. Process applied to Cu, Ag, Mg, Zn and Ni. (C23; Ag, Cu, Mg, Ni, Zn)

238-C. (Japanese.) Effect of Melting Atmosphere on High-Temperature Properties of 60 Cr-25 Fe-15 Mo Type Alloys. Pt. 3. Studies of Cr-Base Heat-Resisting Alloys. Renpei Yoda, Heitaro Yoshida and Kiyoshi Mukaidani. Japan Institute of Metals, Journal, v. 25, Feb. 1961, p. 108-112.

Specimens prepared by air melting in a Tammann furnace and by air or low-pressure melting in a high-frequency induction furnace are tested for effects of melting conditions and of 10% Cr and 2% Ti additions on as-cast and aging (1100-1250° C.) hardness, creep strength, microstructure and hot workability. 8 ref. (C5, M27, Q-general, 2-60, 2-64; Cr-b, Fe, Mo, Ti)

239-C. (Japanese.) Behavior of Iron in Liquid-Liquid Extraction of Columbium and Tantalum. Sanji Nishimura, Jhoichiro Moriyama and Isao Kushima. Japan Institute of Metals, Journal, v. 25, Feb. 1961, p. 112-116.

Distribution coefficients and separation factors are determined for Fe, Ta and Cb in liquid-liquid solvent extraction using HF, HF-HCl, HF-HNO_3 and HF-H_2SO_4 hexone systems, Ta_2O_5, Cb_2O_5 and tantalite concentrates containing small quantities of FeO, TiO_2, SnO_2, SiO_2 and MnO. 4 ref. (C19a; Ta, Cb, Fe)

240-C. (Japanese.) Electron-Beam Melting of Refractory Metals. Kazuo Tsuya and Noriyoshi Aritomi. Japan Institute of Metals, Journal, v. 25, Feb. 1961, p. 124-128.

Investigation of electron-beam melting technique and resultant properties for Ta, Cb, Mo, W, Hf and Zr. Hardness, ductility, workability and impurity content are compared for electron-beam floating zone refined, arc-melted and sintered specimens. 7 ref. (C28, Q-general, 2-60; Ta, Cb, Mo, W, Hf, Zr, EG-d37)

241-C. (Japanese.) Appropriate Composition of Catalysts for Hydrometallurgical Processes at High Pressure. Hideo Sugawara and Saburo Shimodaira. Japan Institute of Metals, Journal, v. 25, Feb. 1961, p. 155-159.

Catalytic reduction efficiency and hydrogen consumption are investigated for catalysts used in extraction of powder metals from leaching solutions. Metal specimens include Ni-Al, Ni-Cu-Al, Ni-Fe-Al, Ni-Zn, Cu-Al and Fe-Al alloys and aluminized Ni. 6 ref. (C19; Ni-b, Cu-b, Al-b, Fe-b, Zn-b)

242-C. Vacuum Melting of Beryllium by Electron Bombardment. H. T. Sumison and C. O. Matthews. Lockheed Aircraft Corp. U. S. Office of Technical Services, PB 171521, Dec. 1959, 43 p. $1.25.

Smooth, homogeneous ingots 3 in. in diameter and essentially free of casting defects can be produced by this process. Vaporization loss during melting is not prohibitive for successful production. Ingots produced show improved cast structures and better machinability than induction-melted, vacuum-cast material. (C28, 1-73; Be)

243-C. Reduction of Niobium-Oxygen Solid Solutions by Alkaline Earth Metals. O. Kubaschewski. Institute of Metals, Journal, v. 89 Apr. 1961, p. 295-296.

Specimens of Cb-O (0.2-4% O) are equilibrated with Ca, Mg or Ba in bombs at 1000° C. for 4-7 hr., leached and degassed with composition analysis by chemical and vacuum-fusion methods as part of an investigation of thermodynamics and kinetic relations in the system. Experimental equilibrium concentration of oxygen as reduced by the method are compared to calculated values. 7 ref. (C26, S11f, P12; Cb-b, O)

244-C. The Rare Metals. Clifford A. Hampel. Chapter 1 from "Rare Metals Handbook". Reinhold Publishing Co., New York 22, 1961, p. 1-14.

Occurrence and sources of metals. Concentration, electrolytic and hydrogen reduction processes. Decomposition and melting using arc and electron-beam methods. 12 ref. (C-general; EG-c, EG-d, EG-g)

245-C. Vanadium by Metallic Reduction of Vanadium Trichloride. F. E. Block and M. J. Ferrante. Electrochemical Society, Journal, v. 108, May 1961, p. 464-468.

V_2O_5 is chlorinated with Cl_2 in the presence of C to yield VCl_4 which is decomposed to VCl_3 and separated from oxychlorides by refluxing. VCl_3 is reduced with Mg or Mg-Na to produce vanadium sponge which is purified from excess reductant and byproducts by vacuum distillation, then arc melted to produce vanadium containing 0.2% impurities which can be cold rolled to thin sheets. 7 ref. (C26; V)

246-C. Not-So-Rare Earths Take Aim on New Uses. Chemical Week, v. 88, May 13, 1961, p. 59-61.

Application of rare earth metals with improved purity in glass polishing, and as alloying agents in steelmaking and production of nonferrous alloys and thermoelectric materials. Survey of methods of separation and purification including fractional distillation, ion exchange, electrolysis and Ca reduction. (C-general; EG-g, 17-57)

247-C. Electrorefining Zirconium. D. H. Baker, Jr., J. R. Nettle and H. Knudsen. U. S. Bureau of Mines, Report of Investigations 5758, 1961, 12 p.

Refining of Zr scrap, off-grade sponge and alloys using a sodium chloride electrolyte at 830° C. Impurities are reduced as follows: Fe from 0.27 down to 0.02%; Sn, 1.36-0.001%; Cr, 0.12-0.003%; and Ni, 0.02-0.001%. (C23p; Zr-b)

248-C. (English.) Recovery of Tungsten and Molybdenum From Sodium Molybdate and Tungstate Solutions by Means of Hydrogen Pressure Reduction. A. N. Zelikman and Z. M. Lyapina. Planseeberichte fur Pulvermetallurgie, v. 8, Jan. 1961, p. 148-155.

Precipitation of tungsten from sodium tungstate solutions of various tungsten contents (5-40 g per l.), pH-values (2-7.68) and temperatures (100-200° C.) at a hydrogen pressure of 40 atm. Selective precipitation of tungsten and Mo from solutions containing sodium tungstate or molybdate at 200° C. and hydrogen pressures of 20 and 60 atm. (C26; Mo, W)

249-C. Automation for the Casting Shop. H. Henry Sinason. Iron and Steel Engineer, v. 38, May 1961, p. 92-96.

Mechanics, advantages and disadvantages of a fully continuous casting method. Comparison of semicontinuous and continuous machines. (C5q, D9q, 18-74)

250-C. Analog Simulation of Zone Melting. H. L. Mason. Journal of Research, National Bureau of Standards, Engineering and Instrumentation, v. 65C, Apr-June 1961, p. 97-99.

An analog computer is used to simulate zone melting of small-diameter tungsten rods of 0.2-1 cm. Heat balance equations take account of electron bombardment, heat capacity, radial and axial conduction and surface radiation. Diagrams are given for the chosen spatial subdivision and for the computer mechanism. (C28k; W)

251-C. Continuous Melting and Direct Roll Casting of Aluminum Alloy Sheet at New Plant of Consolidated General. Industrial Heating, v. 28, May 1961, p. 868-872.

New plant and equipment at Houston, Texas, features gas-fired reverberatory melting and holding furnace which contains 40,000 lb. of Al alloy at all times. Sheet is wound into 4000 lb. coils, "cold reduced", annealed and rolled to desired gage. Finished products are roll formed and stamped. (C5q, J23, F23; Al-b, 4-53)

252-C. New Philippine Plant Will Produce Copper From Ore to Shapes by Powder Metallurgy. Industrial Heating, v. 28, May 1961, p. 890, 892, 894, 896.

Equipment and operations for the proposed integrated Cu, Zn and ammonium sulphate plant which will convert ores into Cu powder by chemical leaching and gaseous reduction. Plant will produce strip, tubing and wire from the Cu powder. (C19n, C26, 1-52, F23; Cu)

253-C. (Translation-Chemical Society.) Extraction of Hafnium by Tributyl Phosphate. S. S. Korovin, E. N. Gribenik and L. N. Komissarova. Russian Journal of Inorganic Chemistry, v. 5, Aug. 1960, p. 910-913.

Extraction of Hf from a nitric acid solution by a solution of tributyl phosphate in dibutyl ether. Effect of nitric acid, metal and tributyl phosphate concentrations and time of mixing of the phases on efficiency. 11 ref. (C19; Hf)

254-C. (Rumanian.) Extraction of Indium From Metallurgical By-Products of Zinc in Romania. M. Petrescu, E. Ilinescu, I. Toth and I. Voiculescu. Studii si Cercetari de Matalurgie, v. 5, Apr. 1960, p. 527-546.

Laboratory and pilot-plant extraction by hydrometallurgy and wet purification of In from Pb resulting from Zn refining. 9 ref. (C19; In)

255-C. Production of Zirconium by the Semicontinuous Reactor Process. James E. Mauser. U. S. Bureau of Mines, Report of Investigations 5759, 1961, 17 p.

Pure Zr is produced by a process in which $ZrCl_4$ is reduced with Na and Mg beneath a molten byproduct salt in a semicontinuous reactor. Data are given for impurity content and hardness of the purified billets. 11 ref. (C26; Zr)

256-C. Proper Metal Preparation Cuts Costs in Non-Ferrous Foundries. Australasian Manufacturer, v. 46, May 13, 1961, p. 80-83.

Melting, alloying, pouring and materials selection techniques to improve casting structure and reduce scrap loss during production of Al and Cu-base alloy ingots. (C5; Al-b, Cu-b)

257-C. (Spanish.) Induction Melting of Light Metals. Walter Savonitti. Instituto del Hierro y del Acero, v. 14, Jan. 1961, p. 63-72.

Melting of alloys used in sand mold casting, permanent mold casting and die casting of automotive parts in furnaces of the characteristics: power-supply voltage 220-12000, frequency 50 cycles, transformer voltage 380-500, automatic current control, efficiency 25-330 Kw. power supply amperage 70-750, temperature 710-750° C., automatic metal dosage in casting. (C5j; EG-a39)

258-C. (French.) Tantalum and Columbium--Metals of the Future. B. Tougarinoff. Revue de la Societe Royale Belge des Ingenieurs et des Industriels, Feb. 1961, p. 45-53.

Extraction and refining method for ores composed of niobate and tantalate of Fe and Mn including mixing with NaOH and Na_2CO_3, roasting from 900-1000° C. with Sn and W salts extracted in water and Fe and Mn removal by leaching in H_2SO_4. Treatment with hydrofluoric acid and methyl isobutyl ketone; reduction of oxides by C, Na, or electrolytically, and subsequent sintering and resistance melting. (C-general; Cb, Ta)

259-C. (Translation-ConBur.) Electrolytic Production of Finely Divided Iron Powder. N. T. Kudryavtsev and N. I. Mikhailov. Journal of Applied Chemistry of the USSR, v. 33, June 1960, p. 1342-1346.

Effect of current density, $FeSO_4$ concentration and electrolyte pH on the current efficiency and dispersity of the powder produced by electrolysis of a FeO_4 solution saturated with K_2SO_4. 13 ref. (C23; Fe)

260-C. Electric Mobilities in Molten Alloys. Paper from "Physical Chemistry of Process Metallurgy". Pt. 1. v. 7. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1959, p. 447-460.

An empirical criterion for predicting the relative direction of motion of the components of molten metallic alloys under the influence of an electric field. The equation developed for electric mobility from this criterion yields quantitative predictions of better than order-of-magnitude accuracy. 16 ref. (C23; 14-60)

261-C. (French.) The Copper Refineries of Olen, Belgium. Pt. 1. Robert Sevin. Journal du Four Electrique et des Industries Electrochimiques, v. 66, Apr. 1961, p. 119-121.

Melting of blister copper in reverberatory furnaces using powdered coal as a fuel and refining by blowing compressed air through the melt. Excess oxygen is removed by puddling. Casting of anodes, electrolytic refining and casting of the 99.96% pure Cu into wire bars, cakes or ingots. (C-general; Cu)

262-C. A Theory on the Reduction of Titanium Chlorides by Metallic Sodium. T. A. Henrie and D. H. Baker, Jr. Paper from "Physical Chemistry of Process Metallurgy". Pt. 2. v. 8. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1959, p. 721-744.

Theoretical and experimental evidence that sodium reduction of titanium tetrachloride in fused sodium chloride occurs in two main stages, the first being the reduction of the tetrachloride to titanium dichloride and trichloride and the second being the reaction of the titanium subchlorides in the salt bath with Na which is dissolved in sodium chloride producing metallic Ti. The reaction is determined to be electrochemical in nature and of a galvanic type. 14 ref. (C26; Ti)

263-C. A New Development in the Production of Titanium by Reaction in the Gaseous Phase. S. Takeuchi, M. Tezuka, T. Kurosawa and S. Eda. Paper from "Physical Chemistry of Process Metallurgy". Pt. 2. v. 8. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1959, p. 745-769.

Production of high-purity Ti by gaseous phase reaction between $TiCl_4$ and Mg vapors. Large massive Ti in crystalline form is deposited with high efficiencies of 98% for $TiCl_4$ and 80% for Mg. Data are given for hardness and tensile and Charpy impact properties of the Ti crystals. 12 ref. (C26, Q-general; Ti, 14-61)

264-C. Reduction of Iron Halide Salts to Filamentary Metals. Paul D. Gorsuch. Paper from "Physical Chemistry of Process Metallurgy". Pt. 2. v. 8. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1959, p. 771-811.

Growth of Fe whiskers by hydrogen reduction of Fe halide salts through complex chemical process requiring presence of specific impurities in the halide salt and/or the hydrogen. Effect of amount of impurity on quantity of whiskers produced, their size, shape, orientation and surface perfection. Growth behavior at temperatures above and below the melting point of the halide salt. 33 ref. (C1p; Fe-b, 14-61)

265-C. A Process for Direct Leaching Zinc Sulfide Concentrates With Sulfuric Acid and Oxygen Under Pressure. F. A. Forward and H. Veltman. Paper from "Physical Chemistry of Process Metallurgy". Pt. 2. v. 8. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1959, p. 1255-1276.

Commercial zinc sulphide concentrate is oxidized in an autoclave from 110-115° C. for 2-4 hr. to produce a substantially quantitative amount of elemental sulphur and to extract 95-99% of the Zn in a single stage leach giving a leach solution high in zinc sulphate. The solution is subjected to conventional purification and electrolysis producing cathodic Zn and sulphuric acid for recycling. 18 ref. (C19n; Zn, S)

266-C. Observations on the Kinetics of the Reduction of $NiSO_4$ in Aqueous Solutions. W. G. Courtney and F. A. Schaufelberger. Paper from "Physical Chemistry of Process Metallurgy". Pt. 2. v. 8. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1959, p. 1277-1290.

Reaction kinetics in the hydrogen reduction of nickel sulphate from aqueous sulphuric acid and ammonia-ammonium sulphate solutions at 150-200° C. Variation of rate of nucleation and of growth and conglomeration with the partial pressure of hydrogen, agitation and solution concentrations. 10 ref. (C26; Ni, S)

267-C. Electrowinning Molybdenum: Preliminary Studies. H. J. Heinen and J. B. Zadra. U. S. Bureau of Mines, Report of Investigations 5798, 1961, 8 p.

Electrowinning of Mo directly from pure or impure MoO_3 by fused bath electrolysis in an open graphite cell at a current density of 20-26° amp. and from 750-1050° C. Fused electrolyte consists of sodium pyrophosphate, sodium tetraborate, sodium chloride and MoO_3. Effect of temperature and current density on current efficiency, yield and purity of metal. (C23n, 2-61; Mo)

268-C. The Vacuum Casting of Uranium. Industrial Heating, v. 28, June 1961, p. 1107, 1110, 1112, 1114, 1116.

Procedures and equipment for casting billets and bars. Details as to the vacuum heating unit, mold container and vacuum system. (C5, 1-73; U)

269-C. The Melting of Malleable Nickel and Nickel Alloys. C. G. Bieher and R. F. Decker. Metallurgical Society of AIME, Transactions, v. 221, June 1961, p. 629-636.

Systematic additions are made of 0.5% or less of most of the elements of the periodic table to Ni to determine the effects of minor constituents on the malleability and other mechanical and physical properties Ni alloys, the effects being related to the atomic diameter, valence and position on the periodic table. The basic methods for removal or neutralization of deleterious elements are reviewed with practical methods for melting and refining Ni alloys related to minor constituent control. 29 ref. (C-general, A-general, P-general, Q-general, 2-60; Ni-b)

270-C. Optimum Conditions for Zone Refining. J. D. Harrison and W. A. Tiller. Metallurgical Society of AIME, Transactions, v. 221, June 1961, p. 649.

Equations are derived for determining the rate of zone passage and number of passes required to produce a given degree of refining in minimum time. Calculations are made in terms of normalized growth velocity, taking in account the thickness of the diffusion boundary layer at the freezing interface and the

diffusion coefficient of the solute in the melt. (C28k)

271-C. (German.) Electron Beam Melting of Metals. Pt. 1. Processes. Helmut Gruber. Zeitschrift fur Metallkunde, v. 52, May 1961, p. 291-309.

Methods and apparatus for electron beam melting with particular reference to electron guns with accelerator anodes separated from the melt. Use of a combination of inclined electron guns for large scale production. 77 ref. (C28)

272-C. (French.) Copper, Cobalt and Germanium Plants in Olen, Belgium. Yvonne Prax. Chimie & Industrie, v. 85, Feb. 1961, p. 168-176.

Methods and equipment for melting and refining of Cu, Co and Co oxide and Ge. (C-general; Cu, Co, Ge)

273-C. (French.) Beryllium. Journal du Four Electrique, v. 66, Mar. 1961, p. 98-99.

Preparation of metallic Be from its ore by leaching, fusion at 1625° C., quenching, reaction with H_2SO_4, roasting at 1700° C., reaction with a fluorine compound from 700-1000° C., dissolution of the fluoberyllates in water and precipitation of Be hydroxide with NaOH or reaction with Cl in the presence of C. The Be chloride formed is electrolyzed in the presence of NaCl at 320° C. (C-general; Be)

274-C. Development of a 10,000-Ampere Cell for Electrorefining Titanium. F. P. Haver and D. H. Baker, Jr. U. S. Bureau of Mines, Report of Investigations 5805, 1961, 42 p.

High-purity metal is produced from impure Kroll sponge and mill scrap. Refined metal is deposited at the cathode in the form of coarse (85% plus 34-mesh), hexagonal crystals of alpha Ti when the cell is operated at 850° C. A cathode current density of 1000 amp. per ft. and a molten NaCl electrolyte containing approximately 5% by weight of soluble Ti is used. (C23p, W18e)

275-C. (Translation-Brutcher no. 5169.) Continuous Casting of Nonferrous Metals and Alloys Under Vibration. G. F. Balandin and Yu. P. Yakovlev. Tsvetnye Metally, v. 14, Jan. 1961, p. 75-78.

Factors influencing crystal structure and grain size of continuous castings. Static casting experiments with a vibrated pouring device; pouring over a vibrated runner into a continuous casting mold; special devices, in part cooled, for vibrating the melt in the crater of continuously cast billets. (C5q; Al, Zn)

276-C. (Translation-ConBur.) Mechanism of the Reaction Between Titanium Tetrachloride and Magnesium and the Optimum Temperature Conditions for the Reduction Process. R. A. Sandler. Journal of Applied Chemistry of the USSR, v. 33, May 1960, p. 1009-1014.

Reduction of $TiCl_4$ by Mg in an airtight stainless steel reactor from 760-950° C. under purified argon atmosphere. Effects of $TiCl_4$ feed rate and argon partial pressure on the chemical composition of condensate on H_2O cooled tubes. Optimum temperature for the reduction is 930-940° C. Intermediate products include $TiCl_3$ and $TiCl_2$. 6 ref. (C26, 2-61; Ti, Mg)

277-C. (Japanese.) Preparation of High Purity Silicon. Kyoshu Hata, Sadao Yasudra, Sizuo Yamada, Sizuki Nakamura and Motoari Akiyama. Tokai Technical Journal, v. 36, Feb. 1961, p. 14-23.

Preparation of pure Si by hydrogen reduction of trichlorosilane at 1100° C. Relationship between rectification of trichlorosilane and resistivity of prepared Si. Effect of reactant gas flow rate and mole ratio and of reaction temperature on yield of the reaction. (C26, P15g, 2-60, 2-61, 3-67; Si)

278-C. Technical Factors in the Production of Iron by Methods Other Than the Blast Furnace. J. Taylor. Paper from "West of Scotland Iron and Steel Institute, Journal", v. 67, 1959-1960, p. 211-227.

Conditions necessary for efficient separation of Fe from gangue produced in the reduction of iron oxide. Description of alternative methods to the blast furnace which involve production of solid Fe by gaseous reduction with H_2 and CO or by reduction with solid C or the production of liquid Fe. (C26, C28; Fe, 14-60)

279-C. (Translation-ConBur.) Rate of the Reaction Between Titanium Tetrachloride and Magnesium. R. A. Sandler. Journal of Applied Chemistry of the USSR, v. 33, July 1960, p. 1456-1460.

Gaseous $TiCl_4$ is mixed with Mg in a reactor vessel to determine rate of reaction as a function of vessel temperature and $TiCl_4$ concentration. The activation energy is calculated and used to explain the kinetics of the process. (C26, P13b; Ti, Mg)

280-C. Continuous Cast Rod and Tube. Metal Industry, v. 98, June 30, 1961, p. 515-516.

Production of phosphor bronze and gunmetal rods, tubes and shapes by continuous casting. Plant layout and sequence of operations. Mechanical properties of the castings. (C5q, Q-general; Cu-b, Cu-s, 4-55, 4-57, 4-60)

281-C. (Russian.) Criteria of Overblowing in the Blast Furnace Reduction of Oxidized Nickel Ores and Sintered Lead Ores. I. D. Reznik. Tsvetnye Metally, Feb. 1961, p. 30-38.

Reduction with air blast or oxygen enriched blast. Criteria of overblowing are a high oxygen content (up to 7%) and temperature of waste gases, hanging of the furnace charge and rising of the combustion center. Overblowing is avoided by correct distribution of charge and coke, providing for a sufficient coke quantity in the combustion center, charge preparation and furnace design. 21 ref. (C21n; Pb, Ni)

282-C. (Russian.) New Continuous Process for the Removal of Copper From Crude Lead. Ya. Z. Malkin, M. P. Smirnov, V. Ya. Sergienko, G. I. Kozhevnikova, E. I. Kalnin and N. G. Tarkhov. Tsvetnye Metally, Mar. 1961, p. 15-22.

Treatment in a water cooled reverberatory furnace with temperature control. The upper layers of the melt are held at 900° C. and the temperature is allowed to drop gradually to the bottom layers held from 370-450° C. Cu removal is accomplished by addition of sulphide concentrate, together with Na_2S or Na_2CO_3. (C21e, 2-61; Pb, Cu)

283-C. (Russian.) Starting a 32,000 Kvolt-Amp. Smelting Furnace. M. D. Sudarev, N. A. Komnatnyi, E. V. Berdennikov and N. V. Sobolev. Tsvetnye Metally, Mar. 1961, p. 23-31.

Smelting of a Cu-Ni ore concentrate in an arc furnace with atomized charging and electrode feed, a system of vents providing for gas removal. Construction and operation characteristics. (C21d, 1-52; Cu, Ni)

284-C. (Russian.) Copper Smelting With Oxygen Enriched Blast. K. I. Arfamonov, N. I. Lebedev, E. E. Ergaliev, A. K. Lesechko, M. N. Yakushin, V. N. Kazakov, N. G. Bryukhanov, L. I. Nikitina and F. I. Khvesyuk. Tsvetnye Metally, Mar. 1961, p. 32-39.

Effect of oxygen enrichment on the melting efficiency, coke consumption and waste gas temperature of a Cu smelting blast furnace. 11 ref. (C21a, 1-52; Cu)

285-C. The Preparation and Properties of Some II-V Semiconducting Compounds. G. A. Silvey, V. J. Lyons and V. J. Silvestri. Electrochemical Society, Journal, v. 108, July 1961, p. 653-658.

Purification and single crystal growth of Cd_3As_2, $CdAs_2$, CdSb, Zn_3As_2, $ZnAs_2$ and ZnSb prepared from the elements by directional freezing, vacuum distillation and zone refining. Crystallographic and solid-vapor equilibria data are obtained. 52 ref. (C22, C28k; Cd-b, Zn-b, As, Sb, EG-j31)

286-C. (German.) Detection of Losses in Production of the Valuable Element Rhenium--An Example for the Application of Radioisotopes in Metallurgy. Gunter Graf. Freiberger Forschungshefte, no. B 60, 1961, p. 31-46.

The production of Re from Pb-Zn flue dust is investigated during individual processing steps using the radioactive isotopes Re^{186} and Re^{188} such as leaching of filter oxides, thickening by evaporation, removal of Cd by cementation, precipitation of Re as sulphide and roasting of sulphide to determine metal losses during production. (C-general, 1-59; Re)

287-C. Some Practical Examples of the Use of Vacuum in Nonferrous Metallurgy. B. Tougarinoff. Vacuum, v. 10, Dec. 1960, p. 466-473.

Vacuum techniques employed in the dezincification of Pb; remelting of U; degassing, sintering and fusion of Cb and Ta; and purification of Si and Ge. (C-general, 1-73; Pb, U, Cb, Ta, Si, Ge)

288-C. Factorial Design in the Study of Acid Leaching of Pegmatitic Uranium Ores. D. G. Fisher, A. B. Van Cleave, R. G. McIntosh and R. L. Eager. Canadian Journal of Chemical Engineering, v. 39, June 1961, p. 139-144.

Effect of leaching time and temperature, particle size and oxidizing agents on uranium recovery using acid-cure and percolation leaching processes. (C19n; U)

289-C. Review of Carbon Cyanidation. Frank A. Seeton. Mines Magazine, v. 51, July 1961, p. 13-15.

Comparison of carbon cyanidation to conventional cyanide treatment. Application of carbon cyanidation in the extraction of Au and Ag not recoverable by flotation in a method that permits reuse of the carbon. 4 ref. (C19p; Au, Ag)

290-C. A Study of the Effect of Electron Beam Melting on Compounds and Metals. R. M. Martin. Reactive Metals Inc. (Wright Air Development Division). U. S. Office of Technical Services, AD 258588, Jan. 1961, 89 p. $2.25.

Ductile Co sheet can be obtained from electron beam melted Co ingots and the reduction is demonstrated of the interstitial and sulphur contents of Co by electron beam melting. Materials studied include B, B-C alloys, B-Si alloys, tantalum carbide, titanium carbide, zirconium dioxide, Hg, W, Co, V and Be. The electron beam melting process reduces the interstitial content of all the metals studied. (C25; SGA-h, EG-d37, 14-68)

291-C. Gas Reduction--New Route to Copper Refining. Chemical Engineering, v. 68, June 12, 1961, p. 100-102.

Use of reformed natural gas, or methane, to reduce O containing Cu in rotating anode furnaces. The gas is first converted to H and CO by reformer apparatus and then introduced into the molten Cu bath. (C26; Cu)

292-C. (Translation-ConBur.) Thermal Reduction of Magnesium Oxide by a Mixture of Ferrosilicon and Calcium Carbide and by Aluminum-Silicon Alloy. A. Yu. Taits. Journal of Applied Chemistry of the USSR, v. 33, Aug. 1960, p. 1696-1700.

Production of Mg from its oxide by the vacuum thermic process using ferrosilicon and CaC_2 and an Si-Al alloy as reducing agents. Comparison of the two techniques with particular reference to materials index. 5 ref. (C26, 1-73; Mg)

293-C. (Translation-ConBur.) Method for Production of Potassium From Lead--Potassium Alloy Made by an Electrolytic Process. S. A. Zaretskii and V. B. Busse-Machukas. Journal of Applied Chemistry of the USSR, v. 33, Aug. 1960, p. 1808-1812.

Investigations of various electrolytes for production of Pb-K alloys indicating that an alloy can be obtained with a current efficiency of about 80% using a liquid Pb cathode and fused KCl at an electrolysis temperature of 850° C. Vacuum distillation method for production of potassium from these alloys. 13 ref. (C23, C22, 1-73; K-b, Pb)

294-C. (Translation-ConBur.) Electrolytic Refining of Lead in Molten Silica Electrolytes. Yu. K. Delimarskii, I. G. Pavlenko and Yu. E. Kosmatyi. Journal of Applied Chemistry of the USSR, v. 33, Aug. 1960, p. 1819-1822.

Concentrates of Pb, containing small amounts of Bi, are electrolytically refined in electrolytes with compositions which varied by additions of Na_2O, PbO and $PbCl_2$ which vary the relationship between the electrochemical properties of Pb and the metallic impurities and, consequently, vary the refining power. 5 ref. (C23p; Pb)

295-C. (Russian.) Amalgam Method of Obtaining Thinly Dispersed Metals. A. T. Nijnik. Doklady Akademii Nauk SSSR, v. 137, Feb. 1961, p. 366-368.

In and Ga are extracted from mixtures by amalgamation with metals more electronegative i.e., In with Zn-Hg, Ga with Na-Hg. In and Ga amalgams are collected in sulphuric electrolytic solution. Hg is evaporated at 50° C. over 5 hr. 19 ref. (C29; In, Ga)

296-C. (French.) Results of Industrial Application of Refining by Certain Dissociable Salts in the Aluminum Foundry for Rolling Stock. M. Scheidecker, F. Santini and J. Herenguel. Revue de Metallurgie, v. 58, Apr. 1961, p. 339-343.

Refining of wrought Al-Mg alloys and Cu-bearing metals using fluozirconate,

KF, KCl, NaCl and ZrF_4 at 700-760° C. in an induction furnace. (C19a; Al-b, Mg, Cu)

297-C. Reduction of Barium Oxide With Aluminum. Hachie Sawamoto, Takeo Oki and Teruyoshi Umemura. Nagoya University, Faculty of Engineering, Memoirs (Japan), v. 12, May 1960, p. 123-129.

Influence of temperature on the reduction mechanism and the reaction conditions for maximum Ba yield. 4 ref. (C26; Ba, Al, 17-57)

298-C. A Study on Metallurgy of Metallic Beryllium Reducing Beryllium Oxide With Calcium. Hachie Sawamoto, Takeo Oki and Akira Nishina. Nagoya University, Faculty of Engineering, Memoirs (Japan), v. 12, May 1960, p. 130-135.

Reduction with excess Ca yielding a Ca-Be alloy from which the Be is extracted by removal of Ca and CaO with NH_4Cl, the product being Be powder of high purity. 4 ref. (C26; Be, Ca, 17-57)

299-C. Vacuum Techniques and Metal Properties. L. Habraken. Vacuum, v. 10, Dec. 1960, p. 412-434.

A survey of vacuum melting and refining techniques and equipment and the effect of their use on gas content, composition control, metal cleanliness, porosity, segregation, workability, mechanical and magnetic properties of alloys and metals. Application to the production of superalloys, steels, refractory metals and alloys difficult to produce by standard techniques. 24 ref. (C25, D8m, 10-54; SGA-h, ST, EG-d37)

300-C. Experimental Extraction of Gold and Silver From California and Nevada Ores. A. L. Engel and H. J. Heinen. U. S. Bureau of Mines, Report of Investigations 5790, 1961, 30 p.

Laboratory-scale treatment of ores including products of previous plant processing to determine the efficiency of various beneficiation and extraction methods such as gravity concentration, corduroy tabling, amalgamation, flotation, leaching reduction and cyanidation. (C19, B-general; Ag, Au)

301-C. Reclamation of Zinc From Galvanizers' Dross. P. K. Chakravarty, S. Visvanathan and J. S. Vatchagandhy. Tisco (Tata Iron & Steel Co., India), v. 8, July 1961, p. 129-136.

Separation of Zn by liquation and distillation in molten Pb and Al at 700° C. Tests determine effect of Pb content and immersion time on reaction between steel in the dross and molten Zn. 12 ref. (C22, C26; Zn-b)

302-C. (Russian.) Reduction of Grain Size in Beryllium and Chromium by Exposure to Ultrasound During Arc Melting. B. E. Popov, S. F. Kovtun and V. M. Amonenko. Fizika Metallov i Metallovedenie, v. 10, Dec. 1960, p. 853-856.

Arc melting of a Be or Cr electrode in an Ar atm. of 400 mm. pressure with and without simultaneous exposure to ultrasonic vibrations of 10-30 kcps. frequency. Comparison of microstructures obtained. 9 ref. (C5h, 1-74, M27c; Cr, Be)

303-C. The New Reduction Processes. Light Metals, v. 24, July 1961, p. 192-193.

Review of chemical, smelting and electrolytic methods for producing alumina and Al from bauxite, clay and Russian nepheline ore including the Bayer process, the Hall-Heroult process, Pechiney carbothermic reduction and an electrothermic process developed in Russia. (C-general; Al)

304-C. (German.) The Electron Beam Melting Process. W. Scheibe. Elektrowarme, v. 19, June 1961, p. 236-241.

Principles of the process and design and operation of commercial electron beam furnaces with up to 60 kw. power consumption for vacuum melting and casting of high-melting point metals such as Cb, W and Mo. (C5k, 1-52, 1-73; Cb, W, Mo)

305-C. Electrolytic Production of Sintered Titanium From Titanium Tetrachloride at a Contract Cathode. R. B. Head. Electrochemical Society, Journal, v. 108, Aug. 1961, p. 806-809.

Ti is deposited electrolytically from fused alkali chlorides by use of a contact cathode in an atmosphere of $TiCl_4$ and H_2. Temperature of the cathode hot spot rises to about 1300° C. while the graphite cell remains at low temperature. Reduction of

$TiCl_3$ and deposition of Ti take place simultaneously at the single cathode. 10 ref. (C23, 1-53; Ti)

306-C. Britain Declassifies Protactinium Extraction. Chemical & Engineering News, v. 39, Aug. 7, 1961, p. 48-49.

A 12-stage process is used to produce a 125-gram supply from ether sludge accumulated during pitchblende processing at Britain's Atomic Energy Authority. (C19; Pa)

307-C. (Spanish.) The Van Arkel Purification of Metals by Use of Incandescent Filaments. Pt. 1. Jose Terraza Martorell and Manuel Lopez Rodriguez. Instituto del Hierro y del Acero, v. 14, Jan.-Mar. 1961, p. 232-252.

A Zr or Ti specimen is vaporized over a filament causing decomposition of iodides and other compounds and deposition of purified metal around the filament. Effects of temperature, time, iodine quantity, type of iodides and pressure on metal deposition. (C1q; Zr, Ti, I)

308-C. Even Alloys Are Oxygen Blown. Union Carbide Metals Review, v. 4, Summer 1961, p. 9.

Refining of ferrochrome by blowing with oxygen to reduce carbon and Si content after tapping from a submerged arc furnace into ladles. Refined chrome contains 58-65% Cr, maximum 4.25% C and maximum 1% Si and is used in the melting of stainless and other alloy steels and the production of toolsteels, steel castings and cast iron. (C26; Cr-b, Fe)

309-C. Production of Copper Powder by Hydrogen Reduction Techniques. D. J. I. Evans, S. Romanchuk and V. N. Mackiw. Canadian Mining and Metallurgical Bulletin, v. 54, July 1961, p. 530-539.

Recovery of Cu in the form of specification Cu powders from sulphidic Cu concentrates and byproduct Cu sulphides. Process includes ammonia pressure leaching and hydrogen reduction from solution. Control of physical properties of Cu powder. 18 ref. (C19n, C26; Cu, 6)

310-C. (German.) Investigation of Chemically Prepared Iron and Iron-Nickel Powders. F. Eisenkolb and G. Ehrlich. Monatsberichte der Deutsche Akademie der Wissenschaften zu Berlin, v. 1, Jan. 1959, p. 12-20.

Preparation of metal and oxide powders by decomposition of Fe and FeNi salts (oxalate, formate, carbonate, nitrate and sulphate) in air and nitrogen at 350-800° C. and subsequent reduction in hydrogen at 300-400° C. X-ray investigation of lattice structure, particle size, compound formation and solubility. (C1, H11h, M22g, M26, P12e; Fe, Ni)

311-C. Recovery of Lead From Zinc Plant Residues by Brine Leaching and Electrodeposition. D. D. Marsden. South African Institute of Mining and Metallurgy, Journal, v. 61, June 1961, p. 522-534.

Method of extracting Pb by leaching with sodium chloride solutions, washing with acidified brine and recovering the dissolved Pb by electrodeposition or by chemical precipitation. Determination of optimum leaching conditions and solution composition. Effects of solute to Pb atomic ratio and acid additions to the solution on percentage of Pb recovered. 5 ref. (C19n; Pb)

312-C. Investigation of Refractory Metals Processing (Rhenium). I. R. Lane Jr. Report of NRL (Naval Research Laboratory) Progress, July 1961, p. 25-26, (Available as PB 171315 from U. S. Office of Technical Services, Washington 25, D. C.)

Method for consolidating Re powder and fabricating it into sheet form. Procedures include arc melting, cold working and pressing, followed by a stress relief anneal at very high temperatures (1650-2200° C.) in a very pure environment. (C5h, F23, 1-66, 1-67, 1-73; Re, EG-d37)

313-C. (Russian.) Kinetics of Electrical Reduction of Iron on a Mercury Drop Electrode. V. F. Ivanov and Z. A. Iofa. Doklady Akademii Nauk SSSR, v. 137, May 1961, p. 1149-1152.

Investigation of the degree of irreversibility of the reaction during the reduction of bivalent Fe ions on a Hg drop electrode using a calomel reference electrode. Influence of the Fe and hydrogen ion concentration. 8 ref. (C23, P13; Fe)

314-C. (German.) Use of Radioactive Isotopes in Nonferrous Metallurgy. Chr.

Fischer-Bartelk. Monatsberichte der Deutschen Akademie der Wissenschaften zu Berlin, v. 1, Dec. 1959, p. 780-782.

Applications include investigation of the interference of Fe and As in the electrolysis of Zn and of the role of other interfering elements in other metallurgical processes; detection of Re loss in Re extraction; and chemical analysis. (C23, 1-59, S11g)

315-C. Pilot Quantities of Columbium-Base Alloys by Vacuum Arc Melting. S. J. Noesen. Paper from "Columbium Metallurgy". v. 10. Metallurgical Society of AIME. Interscience Publishers Inc., New York 1, 1961, p. 147-172.

Description of raw materials used and of the method by which the consumable electrodes are fabricated. The macrostructure of the arc cast ingots is typically columnar, although the grain size is much finer than that usually produced in pure refractory metals. The microstructure is strongly dendritic. Results of solution treatments of the cast structure performed in an effort to reduce the degree of coring in the dendritic structure. Methods by which the ingots are prepared for subsequent fabrication. (C5h, 1-73, M-general; Cb)

316-C. The Fabrication and Mechanical Properties of Some Columbium Alloys for Use in Pressurized Water Reactors. D. J. Maykuth and R. I. Jafee. Paper from "Columbium Metallurgy". v. 10. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 223-256.

A number of binary and ternary alloys of interest in an alloy development program for pressurized-water reactor applications are prepared using an electron beam refined Cb base, by arc melting and fabricated to sheet. Comparative fabricabilities of these alloys and their hardnesses, tensile, creep and stress-rupture properties at temperatures up through 1500° F. (C5, F-general, Q-general, 2-61, T11; Cb-b, 17-57)

317-C. Improved Facilities for Continuous Casting of Encon Copper-Base Bearing Alloys. Machinery (London), v. 99, Aug. 1961, p. 315-316.

Use of 500-lb. capacity rocking arc melting furnaces in the production of rods, tubes and bars from phosphor bronze, leaded phosphor bronze, gunmetal. (C5q, W18s; Cu-b, 4-55, 4-60)

318-C. Gaseous Reduction of Oxygen-Containing Copper. Leonard Klein. Journal of Metals, v. 13, Aug. 1961, p. 545-547.

Techniques and equipment used to reduce Cu by passing into a bath of the molten oxidized Cu a stream of hydrogen and carbon monoxide reformed from natural gas. Process is compared to reduction by wood poles and by electric power in terms of safety, simplicity and economy. (C26; Cu)

319-C. Scandium Recovery From Uranium Solutions. L. D. Lash and J. R. Ross. Journal of Metals, v. 13, Aug. 1961, p. 555-558.

Processes and reagents used to recover high purity Sc_2O_3 from dodecyl phosphoric acid employed in solvent extraction of uranium. A fluoride strip system is used to recover Sc from the solvent in concentrated form and high purity Sc_2O_3 is prepared in multipound lots by chemical separation techniques. 12 ref. (C19a, C28; Sc)

320-C. Extractive Metallurgy of Vanadium. Blair Burwell. Journal of Metals, v. 13, Aug. 1961, p. 562-566.

Techniques of vanadium recovery from uranium, phosphate, Fe, Pb and Zn ores including roasting, acid leaching, solvent extraction and precipitation with H_2SO_4 or NH_4Cl. (C-general; V)

321-C. Preparation of Copper Powder by the Fluidized Technique. A. V. Ramana Rao and A. A. Krishnan. Journal of Scientific & Industrial Research, v. 20D, June 1961, p. 242-243.

Hydrogen reduction of CuO powder by a fluidized bed technique, complete reduction of the oxide being achieved in 10 min. under a hydrogen flow rate of 5 liters per min. at 200° C. The size, shape and distribution of particles depend on corresponding properties of the oxide. Compacted and sintered specimens of the produced powder are tested for deformation resistance. (C26, B16q; Cu)

322-C. New Process for Purifying Aluminum Sulphate Key to Economy in Aluminum Production. Industrial Heating, v. 28, Aug. 1961, p. 1484, 1486.

An economical acid extraction, controlled crystallizatization and thermal decomposition process for the production of alumina from clay and shales. (C19n, 1-52; Al, 14-68)

323-C. (German.) Production of Pure Europium and Samarium. E. Meckelburg. Metall, v. 15, Aug. 1961, p. 778-780.

Method and apparatus for production of pure Sm and Eu by reduction of the oxides Sm_2O_3 and Eu_2O_3 by Zr at 900° C. under vacuum or by reduction by Ce and Al. (C26, 1-73; Eu, Sm)

324-C. Refractories Usage in Copper Smelting. W. H. Dennis. Refractories Journal, v. 37, July 1961, p. 205-210.

Processing of copper sulphide minerals requires resistance to destruction of refractory linings. Clay brick, silica brick and magnesite brick refractories are evaluated in terms of applications in roasting, reverbratory smelting, conversion and refining for casting anodes. (C21, 17-57; Cu, RM-h)

325-C. Electrowinning of Copper From Cuprous Chloride. Research & Industry, v. 6, June 1961, p. 196-197.

Semipilot scale experiments indicate that room temperature electrolysis will yield Cu deposits of 99.99% purity. Process may form part of a cyclic operation for recovery of Cu and sulphur from copper pyrite ore. (C23n; Cu)

326-C. (Translation-ConBur.) Preparation of High-Purity Selenium. D. M. Yuktanov and N. B. Pleteneva. Journal of Applied Chemistry of the USSR, v. 33, Sept. 1960, p. 1932-1937.

Preparation of Se with a purity suitable for use in rectifiers by the oxide, sublimation, reduction with SO_2 and distillation. 4 ref. (C-general; Se)

327-C. (Translation-ConBur.) Possibilities of Increasing the Degree of Utilization of the Reducing Agent in Production of Potassium by the Silicothermic Process. A. S. Mikulinskii and A. P. Selyanskii. Journal of Applied Chemistry of the USSR, v. 33, Sept. 1960, p. 1961-1964.

The effect of the Fe-Si-KCl molar ratio on the Fe-Si consumption during the reduction of KCl is studied at 900° C. A new method for investigating the kinetics of alkali metal production is used in which the weight increase of the metal per unit time is a measure of the rate. (C26, 2-60; EG-e38)

328-C. (Translation-ConBur.) Thermal Decompsotion of Antimony and Germanium Hydrides. D. S. Konovalov and E. N. Migotina. Journal of Applied Chemistry of the USSR, v. 33, Sept. 1960, p. 1974-1979.

The reaction is shown to be self-accelerating and heterogeneous and is accelerated by the active reaction products formed as the result of chemisorption. Variations of the monomolecular rate constants with temperature, pressure and degree of decomposition are given. 18 ref. (C1n; Sb, Ge)

329-C. (Translation-ConBur.) Cathodic Behavior of Manganese Dioxide and Lead Dioxide in Alkali Solutions and Melts. G. A. Martinyuk and P. D. Lukovtsev. Journal of Applied Chemistry of USSR, v. 33, Sept. 1960, p. 2036-2042.

Electroreduction of MnO_2 and PbO_2, deposited on graphite and Pt electrodes respectively, is studies in KOH-NaOh melts at 20-280° C. 24 ref. (C23; Mn, Pb, 14-68)

330-C. Refining Lead. Pt. 2. J. F. Holmes. Metal Industry, v. 99, Aug. 18, 1961, p. 124-126.

Survey of methods for removal of Bi from Pb including electrolytic processes. (To be continued.) 74 ref. (C-general, C23; Pb, Bi)

331-C. Continuous Casting of Aluminium Alloys. W. M. Doyle. Metal Industry, v. 99, Aug. 18, 1961, p. 132-133.

Advantages and limitations of processes and equipment for production of Al slabs and strip in various sizes and thicknesses. 9 ref. (C5q, 1-52; Al-b)

332-C. Copper Recovery From Segregation-Flotation Concentrates by Ammoniacal Ammonium Carbonate Leaching. M. H. Stanczyk and P. A. Bloom. U.S. Bureau of Mines, Report of Investigations, 5826, 1961, 6 p.

Determination of the influence of various concentrations of ammonia and CO_2 on Cu extraction from segregation-flotation concentrate containing up to 20.43% Cu. A metallic Cu powder assaying 98% Cu, 0.87% SiO_2, 0.10% MgO, 0.54% CaO and 0.41% R_2O_3 is obtained after leaching, filtering, washing, calcination and H_2 reduction. (C19; Cu)

333-C. Technology of Gallium Arsenide. F. Cunnell, J. Edmond and W. Harding. Solid-State Electronics, v. 1, May 1960, p. 97-106.

Preparation of semiconductor grade GaAs single crystal by zone purification. Evaluation of the efficiency of zone refining and of the influence of some impurities on the electrical properties of the material. (C28k; EG-j31, Ga-b, As)

334-C. Research and Development on Fuel Processing. Reactor Fuel Processing, v. 4, July 1961, p. 16-47.

Solvent extraction, ion exchange processes, volatility and fused salt processes and pyrometallurgical processes for the recovery of uranium from irradiated reactor fuel. Review of programs for the study of plant and equipment corrosion as a result of uranium recovery processes. 91 ref. (C19, C21, R-general, T11g, 10-54; U)

335-C. Production of Uranium, Thorium, Plutonium and Their Compounds. Reactor Fuel Processing, v. 4, July 1961, p. 58-64.

Refined UF_6 is obtained by fluorination in fluidized-bed reactors. UO_2 is obtained by fluid-bed reduction of UO_3 $(NO_3)_2$ or by electrodeposition of uranyl chloride. Methods of producing uranium carbides and uranium metal and of recovery of uranium scrap metal are reviewed. Th is prepared by reducing thorium tetrachloride. (C-general, T11g, 1-52, 10-54; U)

336-C. Recovery of Zinc From Dross and Tin From Hardhead by Amalgam Electrolysis. P. M. Sullivan and D. H. Chambers. U.S. Bureau of Mines, Report of Investigations, 5827, 1961, 17 p.

Extraction of Zn (99.99%) from galvanizer's dross with a recovery efficiency of 98% and extraction of Sn (99.90-99.99%) with an efficiency of 81%. 13 ref. (C23, C29; Zn, Sn)

337-C. Zone Purification of Beryllium. W. R. Mitchell, J. A. Mullendore and S. R. Maloof. Metallurgical Society of AIME, Transactions, v. 221, Aug. 1961, p. 824-826.

Metallic impurities of Al, Fe and Si and BeO as found in commercially pure hot pressed Be powder are experimentally reduced to lower concentrations by zone-purification techniques. Reduction in the concentration of Al to extremely low levels (10 ppm.) is noted, Al being considered a major factor contributing to the hot tearing of Be during fusion welding. A method is suggested for producing Be of improved weldability by zone melting. 4 ref. (C28k, K9s, 2-60, 3-69; Be-a, Al, 6-71)

338-C. Thermodynamic Considerations in the Chlorination of Different Oxides Constituting Columbite (Niobite) and Tantalite. G. V. Jere, C. C. Patel and V. Krishnan. Metallurgical Society of AIME, Transactions, v. 221, Aug. 1961, p. 866-872.

Standard free energy and standard enthalpy changes as a function of temperature are calculated for the chlorination reactions of Cb_2O_5, Ta_2O_5, FeO, Fe_2O_3, TiO_2, SnO_2 and MnO by Cl, CCl_4 and CoCl at 573-1773° K. in the presence of C. The data are used to predict the ease of separation of Cb and Ta from the ore constituents and from each other. 35 ref. (C26, P12, 2-60, 2-61; Cb, Ta, 14-68, NM-a34)

339-C. Dependence of Segregation of Impurities on the Crystallinity of Gallium. Leonard R. Weisberg and P. R. Celmer. Metallurgical Society of AIME, Transactions, v. 221, Aug. 1961, p. 889.

Purification of Ga by growth of single crystals through directional freezing with Sn, Pb, Cu, Ag, Si, Al and Mg impurities being segregated in the tail. The dependence of the segregation on crystalline perfection is attributed to the anisotropic thermal conductivity of Ga. Results are compared favorably above zone refining. 8 ref. (C28, M26c, N3r, 3-69, 3-72, 9-69; Ga-a)

340-C. Continuous Casting of Aluminum Alloys. W. M. Doyle. Metal Industry, v. 99, Aug. 11, 1961, p. 102-104.

Properzi, Rigamonti, Hunter-Douglas and Hazelett Processes are discussed in terms of the alloy type and product form and size. 4 ref. (C5q, 1-52; Al)

341-C. Refining Lead. J. F. Holmes. Metal Industry, v. 99, Aug. 11, 1961, p. 110-112.

Technological parameters of pyrometallurgical and electrolytic methods of removing with special emphasis on the Kroll-Betterton process. 30 ref. (C-general, C23, B15r; Pb, Bi)

342-C. Vacuum Processes Set for Boom. Steel, v. 149, Sept. 18, 1961, p. 100-103.

Application of vacuum techniques to melting, refining, degassing, heat treatment, brazing, soldering and diffusion bonding. Vacuum treatment imposes the least interference with basic properties of metals. (C-general, J-general, K-general, 1-73)

343-C. (French.) Applications of a New Cobalt Alloy in Metallurgical Furnace Components. Mines et Metallurgie, Mar. 1961, p. 139-141.

Co is alloyed with low-carbon ferrochromium in an induction furnace with magnesite lining. Two types of UMCo 50 alloy with different carbon contents are obtained. Deoxidation by silicocalcium additions in the ladle at approximately 1600° C. Density, thermal expansion and conductivity, electrical resistivity, tensile properties, hardness and impact strength in the cast and forged states. (C26, P-general, Q-general; Co-b)

344-C. (German.) Extraction Metallurgy of Uranium. N. P. Galkin. Kernenergie, v. 4, June 1961, p. 468-476.

Review of uranium production by reduction of oxides or halides, fused salt electrolysis and thermic decomposition of compounds with emphasis on reduction of oxides and UF_4 by Mg. Survey of vacuum casting and alloying techniques. (C-general, 10-54; U)

345-C. Continuous Casting of Aluminum Alloys. W. M. Doyle. Metal Industry, v. 99, Aug. 4, 1961, p. 82-85.

Production of ingot rod and strip is discussed in terms of casting speeds, pouring temperatures and cooling water rates, as they affect porosity and segregation. (C5q, E25, 1-52, 9-68, 9-69; Al-b)

346-C. (Translation-AIP.) Preparing Monocrystals of Molybdenum and Tungsten by Crucibleless Zone Melting. N. A. Brillaintov, L. S. Starostina and O. P. Fedorav. Soviet Physics--Crystallography, v. 6, Sept-Oct. 1961, p. 202-204.

Application of a high vacuum apparatus for preparing single crystals of metals by zone melting using a focused beam of electrons without a crucible. Monocrystals of W, Mo and Cu are prepared with structures substantiated by X-ray diffraction. 4 ref. (C28k, M26, N3r; W, Mo, Cu, 14-61)

347-C. Annual Summary Research Report in Metallurgy--July 1959-June 1960. Ames Laboratory. Iowa State University of Science and Technology. U.S. Office of Technical Services, IS-193, Dec. 1960, 119 p. $2.25.

Preparation and purification studies of V, Cb, Th, Y, U, Ta and their alloys. (C-general; V, Cb, Th, Y, U, Ta)

348-C. Production of Plutonium Metal. Elspeth W. Mainland, D. A. Orth, E. L. Field and J. H. Rodke. IEC (Industrial and Engineering Chemistry), v. 53, Sept. 1961, p. 685-694.

Flow diagrams of ion exchange for concentration and purification, precipitation of Pu as the peroxide and production of plutonium fluoride and subsequent reduction to the metal. Process chemistry and description of equipment and operations at Du Pont's Savannah River works. 9 ref. (C19s, C27, 1-52; Pu)

349-C. (Translation-ConBur.) Removal of Small Amounts of Copper, Lead and Zinc From Nickel and Cobalt Chloride Solutions by Ion Exchange. N. P. Kolonina. Journal of Applied Chemistry of the USSR, v. 33, Nov. 1960, p. 2442-2446.

Reduction of impurity content in the solutions is obtained by using anion exchange resins to adsorb anionic chloride complexes formed with Cu, Pb and Zn while leaving Ni and Co in solution in the cationic form. 17 ref. (C19s)

350-C. (Translation-ConBur.) Some Theoretical Aspects of the Contact Reduction of Metals From Nonaqueous Solutions. B. V. Drozdov and E. S. Postnikova. Journal of Applied Chemistry of the USSR, v. 33, Nov. 1960, p. 2495-2499.

Theoretical determination of the acidity, conductivity, oxidation, potential and dielectric constant of solutions as they affect deposition rate. Results are illustrated by contact reduction on Al using $CuCl_2$ solutions. 6 ref. (C23, 1-53; Al, Cu)

351-C. (French.) The Olen (Belgium) Plants of the Hoboken Metallurgic Society. Robert Sevin. Journal du Four Electrique, v. 66, 1961, p. 165-168.

Production of Co from a 30% Fe-15% Cu-45% Co alloy which is ground and

dissolved in hot H_2SO_4. The Fe in solution is precipitated by adding lime milk with the Mn being precipitated by NaClO addition. The solution is treated with Na_2CO_3 to precipitate CO carbonate which is oxidized by roasting at 720-800° C. and further reduced. A process is also reviewed for extraction of Ge from its ores. (C19; Co, Ge)

352-C. Refining Crude Aluminium by the Subhalide Reaction. Leland A. Yerkes and Oliver C. Fursman. Mining Journal, v. 257, Aug. 11, 1961, p. 135.

Thermodecomposition of Al in crude Al-Si alloy in which the Al is reacted with vaporized Al trichloride at 6-25 mm. Hg and 900-1200° C. forming Al monochloride which reverts to Al and Al chloride when cooled. Spectrographic analysis of the products indicates a maximum Al recovery of 64.3%. (C1p, 2-62, 3-74; Al, Si)

353-C. (Russian.) Zinc Purification Using Rectification. V. V. Krpukhin, L. H. Povedskaya and S. A. Ershova. Tsvetnye Metally, June 1961, p. 23-27.

Removal of Cd and Pb inclusions in a fractioning column consisting of a series of graphite plates. Purity of Zn is determined by spectrography and colorimetry. 8 ref. (C-general, S11; Zn, 9-69)

354-C. (Russian.) Melting High-Purity Cathode Zinc. D. P. Zosimovitch and N. A. Shvab. Tsvetnye Metally, June 1961, p. 27-32.

Fluxless melting, using nitrogen as protective medium. Design, operation cycle and controls of an induction furnace for melting and an automatic device for pouring into molds. 8 ref. (C5j, 1-52; Zn)

355-C. (Russian.) Study of Zirconium Decomposition by Sintering With Limestone. H. E. Kaplan, T. D. Uspenskaya and T. V. Prianishnikova. Tsvetnye Metally, June 1961, p. 59-61.

Zr (98-99%) is recovered at 800-900° C. by preliminary fine grinding and mixing in the ball mill and introducing CaF_2, Na_2SiF_6 salts and feldspar into the charge. Effect of various salt additions and of granularity of concentrate on recovery percentage. 6 ref. (C1, B16a, 2-59, 2-60; Zr)

356-C. Large-Scale Lead Smelting. C. C. Downie. Canadian Mining Manual, 1961, p. 103-104.

Use of a cylindrical rotary furnace with its hearth lined with Mg for smelting Ph and Pb ores, drosses and battery plates. Charging, slag removal and Pb tapping by a chain-belt system. (C5g, 1-52; Pb)

357-C. The Partition of Power in High-Current Low-Pressure Metal Vapor DC Arcs. A Theoretical Interpretation Based on Arc Melting Experiments on Tungsten. Heinz G. Sell. Paper from "Vacuum Metallurgy Conference, Transactions, 1960". Interscience Publishers, Inc., New York 1, 1961, p. 15-47.

Analysis of parameters affecting the process of power partitioning between the electrodes (i.e., the lower temperature of one of the electrodes and the substantially higher energy dissipation of the other) during vacuum melting including arc characteristics, electrode power balance, thermionic electron emission of the cathode, vapor pressure, thermal ionization and positive ion current. Correlation of theory with parameters for melting of tungsten, and comparison with data, as a function of physical constants, for melting Al, Cu, Mo, Fe, Ta, W, Zircaloy, Hg, Ti and Fe-Si. 16 ref. (C5h, 1-73; W)

358-C. The Oscilloscopic Analysis of Arc Behavior in Consumable Electrode Furnaces. T. E. Butler and R. P. Morgan. Paper from "Vacuum Metallurgy Conference, Transactions, 1960". Interscience Publishers, Inc., New York 1, 1961, p. 49-63.

Arc modes and voltage effects examined for a-c. and d-c. arc melting of Ti, Cb, Ta, W and other metals in a cold mold vacuum arc furnace. Effect of arc length and current change and pressure on voltage characteristics. 13 ref. (C5h, 1-73; Ti, Cb, Ta, W)

359-C. The Vacuum Arc Melting of Tungsten-Molybdenum Alloys and Pure Tungsten Using DC Straight Polarity as the Power Source. A. E. Marche. Paper from "Vacuum Metallurgy Conference, Transactions, 1960". Interscience Publishers, Inc., New York 1, 1961.

Sintered consumable electrodes of 1-70% Mo-W alloys and pure W are melted in cold mold arc furnaces yielding ingots of 2.5-8 in. diameter of high

density and fine grain size. Macro and microstructures are examined metallographically with a binary phase diagram being constructed. Data are given for Rockwell B hardness with evaluation of workability, weldability and shock resistance. Properties and compositions of the ingots are related to process variables. 7 ref. (C5h, 1-73, M-general, Q-general, 2-60; Mo-b, W-b)

360-C Shaped Titanium Castings. Russell G. Hardy. Paper from "Vacuum Metallurgy Conference,Transactions, 1960". Interscience Publishers, Inc., New York 1, 1961, p. 83-98.

Vacuum arc skull melting and vacuum centrifugal casting of commercial purity Ti and 6Al-4V, 5Al-2 1/2 Sn and 8Zr-4Al-4Sn-2V Ti alloys in various ranges of complexity and dimensional tolerances using molds of a special graphite ramming mix with gates and risers welded to the consumable electrode. Data are given for physical and mechanical properties and applications of the castings with comparison to austenitic stainless steels for corrosion resistance and strength. Application of the method is suggested for Zr and Zircaloy. 6 ref. (C5h, 1-73; Ti-b)

361-C. New Development in the Vacuum Melting and Casting of Uranium in Tonnage Quantities. H. M. Eikenberry, J. W. Mahaffey and R. B. Steck. Paper from "Vacuum Metallurgy Conference,Transactions, 1960". Interscience Publishers, Inc., New York, 1961, p. 101-108.

Vacuum induction melting and casting of uranium charges in the form of derbies, briquettes and scrap. Summary of modifications in furnace-vacuum system and mold design, including flame coating of molds with Mg Zirconate, use of a gun-barrel-type graphite mold, improvement of pour-plug knock-out slide assembly and providing for mold heating. Effect of technique modification on ingot quality, particularly of outgassing effects on surface defect occurrence. 4 ref. (C5j, 1-73; U)

362-C. The Effect of Furnace Pressure on Uranium Ingot Chemistry and Metal Quality. R. B. Steck, H. M. Eikenberry and D. Detrow. Paper from "Vacuum Metallurgy Conference, Transactions, 1960". Interscience Publishers Inc., New York 1, 1961, p. 109-117.

Statistical analysis of vacuum induction remelted and cast ingots. Effect of furnace pressure on H, O, N and C impurity levels and segregation. (C5j, 1-73, S12; U)

363-C. Production and Properties of the Superalloy Udimet-700. W. J. Boesch and J. F. Radavich. Paper from "Vacuum Metallurgy Conference, Transactions, 1960". Interscience Publishers Inc., New York 1, 1961, p. 119-130.

Vacuum induction melting of an Al-Ti hardened B-bearing Ni-base superalloy. Effect of chemistry control during melting,various heat treatments at 1400-2150° F. and conversion process on microstructure and mechanical properties. Data are given for tensile and creep properties at 1200-1900° F., workability and machinability with observation of precipitation and segregation and transformation microstructures. (C5j, Q-general, 2-60, 2-64; SGA-h, Ni-b)

364-C. Precision Control of Boron-10 Isotope in a Modified Type 304 Stainless Steel. Marlin S. Walmer. Paper from "Vacuum Metallurgy Conference, Transactions, 1960". Interscience Publishers, Inc., New York 1, 1961, p. 131-142.

Vacuum induction melting is used to produce 304 stainless steel containing 0.50-0.90% B-10 for reactor applications using previously vacuum melted 304 stainless containing 2% B as the raw material. Deboronization, particularly surface depletion of boron, is observed in forged billets and rolled strip after heating for various times in oxidizing atmospheres at 215 and 2150° F. Effect of heat treatment and composition on neutron absorption cross section. 5 ref. (C5j, 1-73, P18j, 2-60, 2-64; SS, B)

365-C. Precision Control of Boron-10 Isotope Analysis in a Modified 304 Stainless Steel. Pierre P. Turillon and Harold B. Canada. Paper from "Vacuum Metallurgy Conference, Transactions, 1960". Interscience Publishers, Inc., New York 1, 1961, p. 143-149.

Application of vacuum induction melting and vacuum deoxidation to chemistry control in alloying 304 stainless with 0.37% B-10. Wet

chemical and spectrographic analysis are used to determine boron content, impurity and minor element concentration, gaseous impurity removal, homogeneity and composition. 4 ref. (C5j, 1-73; SS, B)

366-C. Production of Superior Quality Ultra-High-Strength Steel Castings by Vacuum-Induction Melting. Philip S. Schaffer. Paper from "Vacuum Metallurgy Conference, Transactions, 1960". Interscience Publishers, Inc., New York 1, 1961, p. 151-190.

Physical chemistry reactions occurring in vacuum induction melting, refining and casting are reviewed with evaluation of process advantages over air melting and casting. Application to production of 4330 and 4340 high strength steel with metallographic observation of structure before and after 68-2200° F. heat treatment, chemical analysis and mechanical testing to determine ingot quality. 6 ref. (C5j, 1-73, M-general, Q-general, 2-60, 2-64; ST, SGB-a)

367-C. Segregation of Intermetallic Phases in Low-Nickel High-Iron Age-Hardenable Austenitic Alloys. C. R. Benson. Paper from "Vacuum Metallurgy Conference, Transactions, 1960". Interscience Publishers, Inc., New York 1, 1961, p. 191-208.

Effect of solidification rate and composition balance on microstructural defects and mechanical properties of vacuum induction melted high temperature alloys, M-308 and V-57. Comparison with A-286, Inco 901, Waspaloy, Rene 41, 15 Tl and 12 Tl alloys by chemical analysis, mechanical testing or micro-emission X-ray spectrographic and X-ray diffraction methods. Elimination of intermetallic phase segregation by consumable electrode vacuum arc remelting and by alloy Ti or Al additions. (C5, 1-73, M27, Q-general, 2-60, 9-69; SGA-h Fe-b, Ni)

368-C. Vacuum Casting Techniques. W. A. Matejka. Papers from "Vacuum Metallurgy Conference, Transactions, 1960". Interscience Publishers, Inc. New York 1, 1961, p. 209-222.

Survey of vacuum and inert atmosphere casting methods for vacuum induction melted high temperature alloys including static pouring in preheated ceramic molds, chilled casting, centrifugal casting, controlled solidification and ingot spinning, oscillation and vibration technique. Effect of solidification conditions and casting technique on grain structure and mechanical properties. 12 ref. (C5, 1-73, M27, Q-general, 2-60; SGA-h)

369-C. The Zone Purification of Yttrium. William C. Necker. Paper, from "Vacuum Metallurgy Conference, Transactions, 1960". Interscience Publishers, Inc., New York 1, 1961, p. 289-298.

Application of the floating zone technique to refining of rod specimens. Effect of zone length, ingot length and diameter, vacuum atmosphere conditions, number and rate of zone passes of surface tension of the metal and liquid-solid interface conditions on impurity concentration, microstructure and mechanical properties. Design and operation of vacuum induction heating equipment for the process. (C28k, 1-52, 1-73; Y)

370-C. The Role of Vacuum Metallurgy in the Consolidation of Some Zirconium-Rare Earth Alloys. L. Ianniello and D. Lam. Paper from "Vacuum Metallurgy Conference, Transactions, 1960". Interscience Publishers, Inc. New York 1, 1961, p. 299-312.

Vacuum consumable electrode arc melting and floating zone leveling are compared for producing binary alloys of Zr with 0.5-4.0% Y, 1.0-6% Nd, 4.0% Dy, 4.0% Ho or 5% Er. Composition, microstructures and physical and mechanical properties are examined for specimens after vacuum degassing, cold deformation and heat treatment. Effect of physical properties and atomic structures of materials on alloying characteristics and solute strengthening. 7 ref. (C5, C28k, M27, P-general, Q-general, 2-60, 2-64, 3-68; Zr-b, EG-g45)

371-C. (French.) Nuclear Purity and Manufacture of Metallic Uranium. P. Vertes. Energie Nucleaire, v. 3, May-June 1961, p. 199-209.

Leaching of ore concentrate in nitric acid, purification of the solution, refining of the uranium nitrate by making it pass from the aqueous solution into an organic solvent and re-extraction with pure water. Formation of UO_3 by heating the nitrate solution using ammonia

or H_2O_2. Reduction of UO_3 to UO_2 and fluorination to UF_4. Treatment of UF_4 with Ca or Mg. (C-general; U)

372-C. (Italian.) Information on the Behavior of Cupola Furnaces. Fonderia, v. 10, Aug. 1961, p. 317-323.

Parameters governing cupola furnace melting including specification of height of taphole, coke size and quality, air volume, charge distribution, height of coke bed, size of scrap material, slag control and analysis and repair of linings. (C5, W18d, 17-51, 17-52)

373-C. (Italian.) Refining of Hypereutectic Alloys Containing Silicon. Fonderia, v. 10, Aug. 1961, p. 336.

Casting, fusing and refining of eutectic and hypereutectic Al-alloy having 16-20% of Si. Refining is done by adding Na, Cu, KCl, $TiCl_2$ or phosphor which increases wear resistance and lowers the expansion coefficient. (C5, P11g, Q9n, 2-60; Al-b, Si)

374-C. Preparation of High-Purity Nickel. K. K. Kershner, F. W. Hoertel and J. C. Stahl. U. S. Bureau of Mines, Report of Investigations 5840, 1961, 15 p.

Procedure for purifying Ni solutions by precipitating and filtering off impurities and use of the purified solutions as electrolytes in depositing high-purity Ni (99.99%). Co, Cu and Fe are precipitated by $NaC_2H_5OCS_2$ and $(C_6H_5)_4$ AsCl. Pt anode and Ti cathode are employed in electrolyzing purified Ni solutions. (C23; Ni, Co, Cu, Fe)

375-C. Separation of Rare Earths by Fractional Crystallization. Robert M. Healy and Howard E. Kremers. Chapter 3 from "The Rare Earths". John Wiley & Sons, Inc., New York 16, 1961, p. 29-37.

Review of classical rare-earth separation methods including fractional crystallization, fractional precipitation and thermal reactions. Fractional crystallization enhances separation by changing the solubility of the salt, varying the temperature or the nature of the solvent, or by evaporation. 15 ref. (C-general, 10-54; EG-g45)

376-C. Separation of Rare Earths by Liquid-Liquid Extraction. D. F. Peppard. Chapter 4 from "The Rare Earths". John Wiley & Sons, Inc., New York 16, p. 38-54.

Fractionation of rare earths, fission products of rare earths and trivalent members of the actinide series. Acidic sulphate esters, organic sulphonic acids, neutral and acidic phosphonates and esters of pyrophosphoric acid are used as extractants. 36 ref. (C19a; EG-g45)

377-C. Separation of Rare Earths by Ion Exchange. Jack E. Powell. Chapter 5 from "The Rare Earths". John Wiley & Sons, Inc., New York 16, 1961, p. 55-73.

Displacement chromatography and elution chromatography are used for separating mixtures of rare-earth metal ions. The separation mechanism is based on sorption of the ions on a suitable ion-exchange medium followed by differential displacement of the individual rare-earth ions with an elutriant solution. Complexing agents consist of hydroxy acids, aminopolyacetic acid, nitrilotriacetate and EDTA. 56 ref. (C19s; EG-g45)

378-C. Preparation of the Rare Earth Fluorides. O. N. Carlson and F. A. Schmidt. Chapter 6 from "The Rare Earths". John Wiley & Sons, Inc., New York 16, 1961, p. 77-88.

Anhydrous fluorides are prepared by reacting the rare-earth oxides with anhydrous HF, NH_4F, precipitation of the fluoride from aqueous solution and the passage of anhydrous HF through a molten fluoride salt at 300-850° C. 18 ref. (C1q; EG-g45)

379-C. Rare-Earth and Yttrium Halides for Metal Production--Chlorides, Bromides, Iodides. F. E. Block and T. T. Campbell. Chapter 7 from "The Rare Earths". John Wiley & Sons, Inc., New York 16, 1961, p. 89-101.

High-purity metals are prepared by thermal reduction, metallic reduction and electrolysis of rare-earth chlorides, bromides and iodides. Review of practical methods for preparing anhydrous rare-earth halides. 40 ref. (C1p, 10-54; EG-g45)

380-C. Metallothermic Preparation of Rare-Earth Metals. A. H. Daane.

Chapter 8 from "The Rare Earths". John Wiley & Sons, Inc., New York 16, 1961, p. 102-112.

Preparation by reacting halides with Na, K, Ca, Mg or Al at 300-2200° C. Metallothermic reduction is conducted in a Ta crucible under a high vacuum. Purification by distillation is discussed. 13 ref. (C22, C26; EG-g45)

381-C. Metallothermic Preparation of Yttrium Metal. O. N. Carlson and F. A. Schmidt. Chapter 9 from "The Rare Earths". John Wiley & Sons, Inc., New York 16, 1961, p. 113-125.

Methods include the direct reduction of YF_3 with Ca in a Ta crucible, the reduction of YCl_3 with Li or Na and the reduction of YF_3 with Ca or Li to form a low-melting Y-Mg intermediate alloy. 14 ref. (C26; EG-g45)

382-C. Rare-Earth Electrolytic Metals. E. Morrice and R. G. Knickerbocker. Chapter 10 from "The Rare Earths". John Wiley & Sons, Inc., New York 16, 1961, p. 126-144.

Commerical production of misch metal, Ce, La and Dy metals by electrowinning of molten rare-earth salt baths at 535-1000° C. 51 ref. (C23n; EG-g45)

383-C. Refining and Purification of Rare Earth Metals. C. L. Huffine and J. M. Williams. Chapter 11 from "The Rare Earths". John Wiley & Sons, Inc., New York 16, 1961, p. 145-162.

Metallic impurities (Ca, Mg, Li, Zn, Fe, Ta, Ti, Zr) are removed from rare-earth metals by distillation, solid-state electrolysis, zone refining, vacuum processing and by the hot wire or iodide deposition process. 37 ref. (C-general; EG-g45)

384-C. Mechanical Fabrication of Rare-Earth Metals. K. M. Bohlander. Chapter 12 from "The Rare Earths". John Wiley & Sons, Inc., New York 16, 1961, p. 163-174.

Review of fabrication techniques for ingots and billets including melting (900-2400° F.), casting, extrusion, forging, hot and cold rolling, swaging, joining, turning, milling, drilling and sawing. 13 ref. (C5, F24, F25, G17, K-general; EG-g45)

385-C. (Translation-ConBur.) Investigation of the Products of Alumino and Silicothermic Reduction of Potassium and Mechanism of the Reactions. N. M. Zuev. Journal of Applied Chemistry of the USSR, v. 33, Dec. 1960, p. 2583-2587.

Determination of the reaction equations from data obtained by X-ray and chemical investigation of the metallic potassium, slag and sublimed salts formed during thermal reduction of potassium. 7 ref. (C26; K, Al, Si, 17-57)

386-C. (Translation-ConBur.) Precipitation of Red Mud From Aluminate Solutions by the Bayer Process. T. T. Buravlev and I. T. Slyusarev. Journal of Applied Chemistry of the USSR, v. 33, Dec. 1960, p. 2593-2597.

Investigation of the electrical and hydrophilic properties of the red mud formed during the Bayer process to determine the cause of the stability of the red mud suspension in aluminate and effects on yield efficiency for Al. 19 ref. (C19n; Al)

387-C. (Translation-ConBur.) Method and Experimental Verification of Electrochemical Purification of Electrolytes. A. L. Rotinyan and G. S. Semikozov. Journal of Applied Chemistry of the USSR, v. 33, Dec. 1960, p. 2677-2682.

Study of the variation of the electrolyte purification factor with time and number of cells during the refining of Cu and Ni. Comparison of continuous and batchwise purifications. Effect of stirring on the convective diffusion rate constant for the impurity ions. (C23p, 3-69; Cu, Ni)

388-C. (Translation-ConBur.) Synthesis of HgSe and HgTe. P. V. Usachev, A. V. Golubkov and N. S. Volosatova. Journal of Applied Chemistry of the USSR, v. 33, Dec. 1960, p. 2735-2736.

Fusion of Se and Te powders with Hg at 675-800° C. to produce HgTe and HgSe. Data are given for melting points. (C29; Se-b, Te-b, Hg)

389-C. (Translation-ConBur.) Conditions for Electrolytic Formation of Metal Powders. A. T. Vogramyan, V. N. Kudryavtsev and V. N. Kuznetsova. Journal of Applied Chemistry of the USSR, v. 33, Dec. 1960, p. 2683-2687.

Conditions for deposition of Fe and Ni powders including current density and concentration of the discharging

ions near the electrode. The transition boundary between compact and powdery deposits at various current densities is given as a function of electrolysis time. 9 ref. (C23; Fe, Ni, 6)

390-C. Low Pressure Metallurgy. A. S. Darling. Metallurgia, v. 64, Aug. 1961, p. 71-78.

Low-pressure carbon reduction processes are employed for refining pure Fe and its alloys and Ni, Cu, Mo, Cr and Cb with suggested application to Co, V, Tr, W and U. (C26,3-74)

391-C. (Swedish.) Slate as a Raw Material for the Preparation of Uranium. Olof Hormander, Paul Forsgren and Erik Strandell. Teknisk Tidskrift, v. 91, Apr. 21, 1961, p. 405-408.

Swedish slate containing 0.03% uranium is crushed, aged for some weeks to remove methane and to increase the oxidation potential, concentrated by a wet process and leached in H_2SO_4. After adjusting the acidity to 2pH, hexavalent uranium is extracted from the solution in absorption towers. (C19, 1-52; U)

392-C. (Russian.) Refining of Thallium by Crystallization. T. I. Darvoid, V. N. Vihdorovich and N. A. Jordanskaya. Izvestiya Akademii Nauk SSSR--Metallurgiya i Toplivo, Mar. 1961, p. 55-62.

Inclusions are classified according to the effectiveness with which they can be separated by partial recrystallization and analyzed by spectrographic, chemical and tracer methods. Effect of electromagnetic mixing during solidification. (C28k, S11; EG-b42)

393-C. Production of Low Carbon Ferro-Chrome From High Carbon Ferro-Chrome. Kalyani Banerjee. NML (National Metallurgical Laboratory) Technical Journal, v. 3, May 1961, p. 19-27.

Methods of carbon removal include mixing molten high carbon ferrochrome with ferrosilicon to produce low carbon chrome silicide and subsequent desiliconization by smelting with Cr-rich slag. Comparison of this method with the Swedish process. 26 ref. (C26, C21, 1-52; Cr, Fe)

394-C. Preparation of Single-Crystal Boron. Claude P. Talley. Journal of Applied Physics, v. 32, Sept. 1961, p. 1787-1788.

Preparation of single crystals of boron of millimeter size using zone melting by electron bombardment at low pressure and 2300° K. A chemical vapor plating method is also used to grow smaller crystals. 8 ref. (C28k, N15g, 1-54; B, 14-61)

395-C. (German.) New Column-Type Apparatus for Uranium Extraction. L. Ziehl and F. Ploger. Chemie-Ingenieur-Technik, v. 33, Aug. 1961, p. 533-535.

Development of a new extraction plant for production of enriched aqueous solutions of uranium salts by liquid-liquid extraction using nonstationary mixers which permit extraction, washing and re-extraction. Design of plant; mode of operation. (C19a, 1-52; U)

396-C. The Electrolytic Removal of Oxygen, Sulphur,Selenium, and Tellarium From Molten Copper. R. G. Ward and T. P. Hoar. Institute of Metals, Journal, v. 90, Sept. 1961, p. 6-12.

Impurity O, S, Se and Te contents are reduced to less than 0.001% by cathodic treatment of molten Cu under molten barium chloride at 1400° C. The current efficiency of the laboratory, process is between 60 and 80%. Analysis of the electrochemical reactions on the process and the purity of the resultant Cu crystals. Possible application in the treatment of blister Cu run to electrolyzing cells direct from the converter. 15 ref. (C23, 1-53; Cu, 14-60)

397-C. (Norwegian.) Electrolytic Preparation of High-Melting Metals. Jomar Brun. Tidsskrift for Kjemi, Bergvesen og Metallurgi, v. 21, June 30, 1961, p. 128-133.

Review of electrorefining techniques for pure Ti and Zr using fused alkali metal chlorides or alkaline earth metal chlorides as electrolytes, graphite anodes and perforated steel plates as cathodes. Summary of process kinetics and effect of electrochemical reactions on purity of materials. (C23p, 10-54; Ti, Zr)

398-C. (French.) Capillarity Leaching of Uranium Ores. P. Mouret and P. Poffier. Energie Nucleaire, v. 3, July-Aug. 1961, p. 251-260.

Ores containing Si, Al, Fe, Na, K or Mg are ground and leached by a new method making use of the capillarity phenomenon. Leaching solutions used

contain ferric sulphate, H_2SO_4, demineralized water or sodium carbonate. Concentration of uranium compounds as a function of leaching time. 5 ref. (C19n, 1-52; Al, Fe, K, Mg, Na, Si, U)

399-C. Oxygen Enriched Air in Lead and Zinc Smelting. L. Landucci and F. T. Fuller. Journal of Metals, v. 13, Oct. 1961, p. 759-763.

Utilization in suspension, Zn roasters and blast and slag-fuming furnaces. Process advantages including increased sulphur elimination, SO_2 content of exit gas and heat recovery, steadier control of operation, flexibility and reduced coke consumption. (C21, 1-52; Pb, Zn)

400-C. Bunker Hill Uses Stainless Steel Valves in Critical Process Control Points. S. H. Keller. Engineering and Mining Journal, v. 162, Oct. 1961, p. 96-97.

Aloyco 20 stainless steel double disk gate valves are used in three critical areas of an electrolytic zinc processing plant. A detailed flowsheet is given for the processing of metal and by-products. (C23, 1-52, T28; Zn)

401-C. Commercial Recovery of Vanadium by the Liquid Ion Exchange Process. R. R. Swanson, H. N. Dunning and J. E. House. Engineering and Mining Journal, v. 162, Oct. 1961, p. 110-112, 115.

A liquid ion-exchange process, using a reagent capable of extracting metallic anions from both acidic and alkaline media, is applied to a V-Cr recovery technique. Data include a flowsheet and graphs showing the influence of pH and chloride and nitrate ions on the extraction process. 6 ref. (C19s, 1-52; V, Cr)

402-C. (English.) Mold for Titanium Castings. Pt. 4. Titanium Castings Using the Expendable Carbon and Oxide Mold. Motoyuki Nakamura, Soichiro Tachibana and Katsutoshi Hobo. Government Industrial Research Institute (Nagoya), Report, v. 10, Aug. 1961, p. 467-473.

Analysis of mold reaction contamination on hardness and appearance as affected by high temperature and vacuum. Molds utilized include carbon powder or zirconea with pitch as a binder; and zirconia, alumina or zirconsand with water glass as a binder. 8 ref. (C5, W19c, 1-53, 17-57)

403-C. Mines et Fonderies de Zinc de la Vieille-Montagne. Metal Industry, v. 99, Oct. 6, 1961, p. 273-276.

Equipment and operations of an integrated Zn and Pb smelter and refinery designed to recover by-products in a closed curcuit system. Method of recovering Cd, Ag, Bi, Hg, Tl, Ge and copper sulphate. (C-general, A11c, 1-52; Pb, Zn, Ag, Bi, Cd, Ge, Hg, Tl)

404-C. Societe Generale Metallurgique de Hoboken. Metal Industry, v. 99, Oct. 6, 1961, p. 277-280.

Description of equipment, layout and operations of an electrolytic copper refinery which includes an anode foundry, an electrolysis unit and a foundry for the conversion of Cu cathodes into commercial products. Methods of melting blister Cu and scrap and casting Cu anodes, of electrolytic refining and recovery of by-products and of further remelting and casting the Cu cathodes into ingots, slabs or billets. (C5, C23, 1-52, 18-67; Cu)

405-C. (Russian.) Oxidation Kinetics of Rhenium, Molybdenum and Indium Sulphides in Fluosolid Roasting. V. I. Deev and V. I. Smirnov. Izvestiya VUZ--Tsvetnaya Metallurgiya, Mar. 1961, p. 44-49.

Optimum temperature ranges for intensified reduction of Re, Mo and In sulphides, injecting an oxygen and nitrogen mixture; effect of temperature, roasting time and gaseous oxygen on the efficiency of reduction. 13 ref. (C28j, 1-53, 2-61, 3-67; Re, Mo, In, 14-68)

406-C. (Russian.) Study of Zinc Ferrite Reduction. V. D. Karoleva and F. M. Loskutov. Izvestiya VUZ--Tsvetnaya Metallurgiya, Mar. 1961, p. 57-66.

Decomposition of zinc ferrite in a mixture of CO, CO_2, H and N at 600-900° C.; dependence of Zn solubility on gas composition, temperature and time of reduction. 14 ref. (C26, 1-53, 2-61, 2-66, 3-67; Zn, 14-68)

407-C. (Russian.) Electrolytic Extraction of Beryllium and Zinc at Temperatures Below 1000° C. I. F. Nichkov and M. V. Smirnov. Izvestiya VUZ--Tsvetnaya Metallurgiya, Mar. 1961, p. 105-107.

Interaction of Be and Zn at temperatures below 1000° C. in a closed electrolyzer with an electrolyte consisting of chlorides of Be, Ca and Na and a Zn electrode. 9 ref. (C23, 1-53; Be, Zn)

408-C. (Russian.) The Modern Conditions of Technological Reworking of Uranium Ores. A. P. Zefirov, B. N. Laskorin and B. V. Nevskii. Atomnaya Energiya, v. 11, Feb. 1961, p. 153-169.

Survey of modern processes for uranium ore reworking with consideration of plant operations in various countries. Topics include comminution, leaching, separation methods, extractive reagents and economic factors. Effects of type and concentration of ore on processing. 34 ref. (C-general; U)

409-C. The Application of Solvent Extraction to the Recovery of Uranium From El Sherana Ore. A. I. Bellingham. Australasian Institute of Mining and Metallurgy, Proceedings, no. 198, June 1961, p. 85-112.

Sulphuric acid leaching and solvent extraction of uranium ore using a solvent of triamine in kerosene modified with 4% alcohol and a stripping agent of NaCl solution. Equipment design and operating principles for the extraction and chloride and carbonate stripping stages. 7 ref. (C19n; U)

410-C. The Recovery and Separation of Scandium, Yttrium, Thorium and Lanthanides by Solvent Extraction. R. G. Canning. Australasian Institute of Mining and Metallurgy, Proceedings, no. 198, June 1961, p. 113-151.

Equipment design and operating principles of solvent extraction processes for recovering Sc, Y, Th and heavy lanthanides from waste sulphate liquor. Effect of ferric ions, time, 2-ethylhexyl phosphoric acid concentration, pH and phase variation ratio on extraction percentages. 21 ref. (C19n, 1-52, 2-60, 2-66, 3-67; EG-b44, EG-h43)

411-C. Ion Exchange Processes in the Atomic Industry. T. V. Arden. Australasian Institute of Mining and Metallurgy, Proceedings, no. 198, June 1961, p. 153-206.

Review of processes including water treatment and effluent disposal, metal recovery and purification, new ion exchange resins and equipment and use of membrane cells for demineralization. 105 ref. (C19s; EG-g45)

412-C. Thermodynamics and Kinetics of the Deoxidation of Thorium by Calcium. David T. Peterson. Metallurgical Society of AIME, Transactions, v. 221, Oct. 1961, p. 924-926.

Reduction of Th by Ca metal at 1000-1200° C. with the reaction kinetics being determined and related to the diffusion coefficients of O in Th. The solubility of O in Th, the minimum oxygen concentration and the diffusion coefficient are determined at reaction temperatures. The process results in the lowest oxygen concentrations reported for Th metal. (C26, C28j, 2-60, 2-61; Th, Ca)

413-C. Observations Concerning Zone Refining and Thermal Treatment of Molybdenum From Low Temperature Resistance Measurements. E. Buehler and J. E. Kungler. Metallurgical Society of AIME, Transactions, v. 221, Oct. 1961, p. 957-961.

High purity Mo is heat treated, melted and zone refined and the physical and chemical changes produced by these processes are studied by resistance ratio R4.2/R27 3° K. measurements. Grain growth, microstructure, lattice defects and impurity concentration effects are associated with recrystallization, melting and zoning reactions. 9 ref. (C28k, M-general, N-general, P15g, 2-60, 2-63, 3-69; Mo-a)

414-C. Horizontal Induction Zone Melting of Refractory Metals and Semiconductor Materials. A. Berghezan and E. Bull Simonsen. Metallurgical Society of AIME, Transactions, v. 221, Oct. 1961, p. 1029-1031.

A simple and general method is described for melting and zone refining metals by induction heating on a specially shaped, water-cooled horizontal Cu crucible, consisting of either a Cu plate or a flattened tube or of several parallel small diameter tubes with the charge being on it or is suspended about it. Various atmospheres can be used; no contamination

is detected from the Cu crucible. Purification is obtained both by selective evaporation of impurities and by zone refining. Successful applications include refining of Si, Fe, Ni, Co, Cr, Ti, Zr, Cb, Mo, Ta, W, Al and Sn. (C28k, 1-69; EG-d37, EG-j, Al, Sn, Fe, Ni, Co, Cr, Ti, Zr)

415-C. (Russian.) Acquisition and Several Properties of Metallic Scandium. I. Spitsyn, L. N. Komissarova and A. A. Menkov. Doklady Akademii Nauk SSSR, v. 139, Apr. 1961, p. 903-906.

Preparation of metallic Sc from $SnCl_3$ by reduction with Ca at 900° C., with subsequent solutioning and vacuum purification. Microhardness, crystal structure and lattice parameter are measured. Rate of oxidation in air and reaction with HCl vary with temperature of air, HCl concentration and time. 16 ref. (C26, M26, Q29q, R1h, 2-61, 2-66; Sc)

416-C. (German.) Experiments on Electrolytic Production of Metallic Chromium From Ammonious Chromic Alum Solutions. Y. Kodama. Elektrie, v. 14, Aug. 1961, p. 237-242.

Method and apparatus for electrolysis of Cr from ammonious Cr-alum solutions. Cathode-potential-current measurements for various pH values. Evaluation of reaction mechanism and Cr precipitation as influenced by pH and current density. (C23p, C27; Cr)

SECTION D

FERROUS REDUCTION and REFINING

1-D. (French.) Mathematical Analyses of Degassing of Samples Held at Constant Temperatures Under Vacuum. J. Calmettes, J. Bertin and P. Bastien. Memoires Scientifiques de la Revue de Metallurgie, v. 57, Sept. 1960, p. 659-675.

Computation of the removal of ionic hydrogen contained in the lattice, molecular hydrogen present in micropores and hydrogen taking the place of lattice imperfections from ferritic steel samples held at 20-600° C. for 0-360 min. 3 ref. (D9s, 1-73, 2-61)

2-D. (French.) Deoxidation of Iron by Vacuum Melting. Pierre Turillon. Memoires Scientifiques de la Revue de Metallurgie, v. 57, Sept. 1960, p. 649-658.

Vacuum melting of electrolytic Fe in induction furnaces of 50 and 150 kg. capacity at pressures of 10-20 micron. Effect of melting time and crucible material on carbon and oxygen contents. 14 ref. (D8m)

3-D. (Polish.) Quality of Lime Used in the Basic Steelmaking Process. K. Radzwicki, Z. Kulinski and B. Paczula. Hutnik, v. 27, July-Aug. 1960, p. 283-286.

Dependence of sulphide impurity content of steel on the sulphur content in limestone used for basic steelmaking. Limestone is burned using coke fines, lighting gas, slack coal and generator gas as fuels to determine effect of the fuel on S and SiO_2 content in the limes. 6 ref. (D-general, 1-65, 2-60; RM-q)

4-D. (German.) Metallurgy, Heat Balance and Economy of Converter Processes. Theo Kootz. Bergakademie, v. 12 Sept. 1960, p. 484-491.

Comparison of heat balances of basic converter with openhearth processes in relation to pig iron analysis; process metallurgy; scrap, ore and Mn additions; and furnace wear and efficiency. 19 ref. (D2, D3, D11k)

5-D. (French.) Hydraulic Control of Bessemer Converters. M. Sanson. Metallurgie et la Construction Mecanique, v. 92, Sept. 1960, p. 647-648, 651-653.

Design and operation of a hydraulic mechanism for control of the metal charge in Bessemer converters. (D3a, W18q, 1-52)

6-D. Continuous Casting Gains Abroad. Steel, v. 147, Nov. 21, 1960, p. 106-108.

Siegfried Junghans casting process for continuous casting of steel strands by pouring molten steel through a heated tundish into water-cooled bottomless molds. (D9q)

7-D. New Induction Furnaces Offer Composition Control. Steel, v. 147, Nov. 21, 1960, p. 112, 115.

Control of composition of cast iron during holding in an induction furnace having an electrically heated forehearth through which corrective compounds are added. The metal is stirred by electromagnetic action caused by induction. Data for furnace design and performance characteristics. (D6, W18a, 1-52)

8-D. Computer Tightens Control of L-D Steelmaking Process. Steel, v. 147, Nov. 21, 1960, p. 115.

Proportions of cold scrap, hot metal and lime for charging furnace are determined by analog computer for producing steels which may be finished within specific temperature ranges. (D10a, X14j, 1-52)

9-D. Kaldo Moves in a New 110-Ton Unit in France. F. Weston Starratt. Journal of Metals, v. 12, Nov. 1960, p. 853-856.

Oxygen steelmaking using a large scale industrial Kaldo furnace to produce a steel containing 0.05-0.07% C, 0.280-0.400% Mn, less than 0.017% P, less than 0.018% S and about 0.002% N. (D10c)

10-D. A Prepared Discussion on "Consumable Electrode Melting of Reactive Metals", a Paper by S. J. Noesen. E. W. Johnson. Journal of Metals, v. 12, Nov. 1960, p. 850-852.

Temperature and pressure factors are related to the vacuum melting of steel. Effect of vacuum pressure over the melt and electrode surface on purity. (D8m, 2-61, 3-74; ST)

11-D. (Japanese.) Home Made Bearing Steel--Its Production and Quality. Toshiichi U-e-Sugi. Metals, v. 30, Aug. 1, 1960, p. 53-59.

Melting, deoxidizing, killing and soaking processes in the production of bearing steel from pig and scrap iron. Forming and heat treatment processes. Microstructure and mechanical properties at high temperatures. (D-general, F-general, J-general, M27, Q-general, 2-62; ST, SGA-c)

12-D. (Italian.) The Rotary Ladle: a New Metallurgical Tool for the Desulphurization of Cast Iron. F. Gauzzi. Fonderia Italiana, v. 9, July-Aug. 1960, p. 321-324.

Description of ladle which permits desulphurization of molten Fe without addition of external heat. Desulphurization with powdered lime and calcium carbide compared on basis of variation of temperature produced in bath by each material. Possibility of combining desulphurization with lime (an endothermic reaction) with an exothermic reaction such as deoxidation with ferrosilicon, calcium silicide or Al. 5 ref. (D9m, D11n; CI)

13-D. A New Concept in Desulphurization. Engineer and Foundryman, v. 26, Sept. 1960, p. 32.

A continuous process of desulphurization which reduces total reaction time by using a horizontal rotating drum to produce rapid contact between slag and metal. (D11n)

14-D. Electrolytic Production of Sulphur-Free Iron. W. T. L. Neal, J. F. Duke and H. R. Sullivan. Iron and Steel Institute, Journal, v. 196, pt. 2, Oct. 1960, p. 131-134.

Iron with sulphur content of less than 0.0005% produced by electrolysis across an ion exchange membrane. Equipment for production of 500 grams of Fe in 7 hr. 3 ref. (D8p)

15-D. Defects in Steel. Metal Progress, v. 78, Dec. 1960, p. 190, 192, 194.

A direct correlation exists between the incidence of splits caused by upsetting and peculiarities noted on the surface of billets. This surface condition is termed "slag" because nonmetallics are sometimes visible on scarfed billets. The silicon's facing used on hot tops is the source of the "slag" found at or near the surface of killed steel billets. (D9; ST, 9-69)

16-D. (Czech.) Investigation of the Effect of Deoxidizing Elements on the Desulphurization of Iron, Using the Isotope S^{35}. Liu-Su-Cen, Jiri Skala and Miroslav Mandl. Hutnicke Listy, v. 15, Oct. 1960, p. 755-762.

Desulphurization of Fe-C-S systems containing Al, Si or Mn in the presence of $CaO-Al_2O_3-MgO$ and $CaO-SiO_2-Al_2O_3$ slags. Effect of Si, Al, Mn and slag composition on desulphurization velocity. 25 ref. (D11n, 1-59)

17-D. (Czech.) Use of Steam to Intensify the Openhearth Process. A. Bichler. Hutnicke Listy, v. 15, Oct. 1960, p. 778-781.

To intensify the working of a 200 ton furnace fired with an oil-enriched mixture of blast furnace gas and coke gas, steam of 250-300° C. temperature and 8-10 atm. pressure is supplied to the flame at the rate of 0.7-1.3 tons per hr. Effect of steam supply on fuel and ore consumption, service life of furnace and phosphorus and hydrogen content of steel. 6 ref. (D2h)

18-D. (Russian.) Melting of Low Sulphur Iron at the Magnitogorsk Iron Works. I. P. Bardin, I. S. Kulikov, V. M. Sudin, L. M. Zilev, H. A. Sokolov, A. L. Halatonov, N. N. Babarikin and I. I. Hultyay. Stal', Oct. 1960, p. 865-869.

Use of fluxed iron ore sinter, increased furnace temperature and pressure and

slag containing 10-12% MgO to desulphurize Fe to 0.022% in a blast furnace. (D11n)

19-D. (Russian.) Influence of Increased Gas Pressure on Chemical Composition of Iron. V. N. Andronov. Stal', Oct. 1960, p. 869-877.

Comparison of theoretical and practical data on the influence of CO pressure in the blast furnace on Si, Mn, C and S content in pig iron, taking into account the nonisothermic nature of the blast furnace process. 12 ref. (D1, 3-74)

20-D. (Russian.) Melting Chromium-Nickel Steels Using Nickel Monoxide Additions in Large Tonnage Open Hearth Furnace. B. H. Petushkov and P. K. Morokov. Stal', Oct. 1960, p. 892-896.

Effects of pelletized NiO additions to the melt on mechanical properties of the steel and tap-to-tap time during melting. Comparison with results obtained using metallic Ni additions. (D2a; AD-q)

21-D. (Russian.) Use of Furnaces With Highly Refractory Basic Roofs to Improve Quality of Chrome Steel. I. A. Andreev, L. Ya. Hluskin, V. D. Litvinov, V. A. Kovachich, I. A. Frumkin, Ya. I. Moshchuk, V. I. Kolbilkin, P. A. Romanov and A. B. Boyko. Stal', Oct. 1960, p. 896-898.

Chrome steel with low C, P and S content is obtained by melting the steel in a furnace lined with magnesite-chromite, removing slag during melting and using ferrochromium, ferrosilicon and manganese-silicon preheated to 800-1000° C as reducing agents. (D2g)

22-D. (Russian.) Treatment of Ball Bearing Steel With Synthetic Slag. S. H. Voinov and A. H. Shalimov. Stal', Oct. 1960, p. 902-904.

Use of a receiving ladle lined with synthetic calcareous-aluminum slag to reduce content of S, O and other nonmetallic inclusions in ball bearing steels. Effect of ferrochromium and ferrosilicon additions to the melt and several slag removals during melting on the composition of the steel. (D5, D9)

23-D. (Russian.) Stator for Induction Stirring of Metal in Arc Furnace. D. F. Hladkiy, A. Ya. Kovalenko and N. V. Okorokov. Stal', Oct. 1960, p. 905-910.

Electromagnetic stirring of the metallic bath in an arc furnace using an air cooled stator with an Al bar winding. (D5f, 1-52)

24-D. (German.) Extent of Carbon Monoxide Decomposition in the Blast Furnace. Hermann Schenck and Harald Barth. Stahl und Eisen, v. 80, Nov. 10, 1960, p. 1681-1689.

Measurement of the influence of sulphur content in coke on the decomposition of CO at 500-800° C. in the blast furnace. Shape of decomposed carbon particles is investigated by electron microscope. (D1, D11r)

25-D. (German.) Influence of Different Kinds of Lime on Refining in a Basic Bessemer Converter. Werner Kohler, Gerhard Tromel and Karl Heinz Obst. Stahl und Eisen, v. 80, Nov. 10, 1960, p. 1689-1695.

Refining cruves for C, P and Mn are measured under the same conditions for four different lime types in an oxygen enriched (35% O_2) basic bessemer converter. Influence of lime type on refining rate and dephosphorization after reaching maximum decarburization. (D3, D11n)

26-D. (French.) Influence of Oxidation of Iron in Agglomerates on Treatment in the Blast Furnace. F. Pesche. Revue de Metallurgie, v. 57, Sept. 1960, p. 771-773.

Effect of the degree of oxidation of the agglomerate on the weight of the load and amount of coke required during reduction of a charge composed of 60% crude ore and 40% agglomerate in a blast furnace. (D1, D11r)

27-D. (French.) Duplex Basic Bessemer Process. M. Brocard. Revue de Metallurgie, v. 57, Sept. 1960, p. 775-782.

Slag-metal reactions during the production of basic bessemer steel. Effect of process variables on steel composition. (D11n, 1-65)

28-D. (French.) Vacuum Techniques in Metallurgy. D. A. Degras. Revue de Metallurgie, v. 57, Sept. 1960, p. 805-814.

Vacuum degassing, melting, deoxidation and annealing of Fe, Al, steel and other metals to show the effect of vacuum treatment on purity of the ingot. 13 ref. (D-general, J23, 1-73)

29-D. (German.) Effect of Gas Vibrations on the Reduction of Iron Oxides. Hermann Schenck and Josef Cloth. Stahl und Eisen, v. 80, Oct. 27, 1960, p. 1453-1457.

Reduction tests in vertical and horizontal tube furnaces at temperatures from 650-1000° C. for pressed and unpressed iron oxide powders, ore mud (36.2% Fe, 17.9% Al_2O_3) and ore cubes, using oscillating CO and hydrogen reduction gas. Influence of oscillation on reduction rate and mechanism. (D-general)

30-D. (German.) Further Developments in Salzgitter Iron Ore Smelting. Heinz Schumacher. Stahl und Eisen, v. 80, Oct. 27, 1960, p. 1458-1468.

Procedures involved in smelting the Salzgitter ores, which are relatively low in Fe and high in SiO_2 (28% Fe, 27% SiO), such as separation of ore and gangue, melting of sinter, use of an electric probe in a pilot blast furnace to eliminate scab formation and utilization of blast furnace slag. 14 ref. (D1)

31-D. (German.) Use of Metallothermic Processes in Iron and Steel Fabrication. Anton Wimmer. Stahl und Eisen, v. 80, Oct. 27, 1960, p. 1469-1477.

Direct melting of steel in an almost slagless two-step process which involves preparation of ore-coal-flux briquets and subsequent electric melting in a converter or covered ladle. Composition of melting briquets; refining curves; mechanical properties and chemical analysis of produced steel. Description of a metallothermic plant in Spain. (D5g, B16d; Fe)

32-D. (German.) Refining of Basic Bessemer Pig Iron by Oxygen Top-Blowing. Erwing Plockinger, Manfred Wahlster, Kurt Borowski, Jurgen Maatsch, Arthur Schildkotter and Volker Schiel. Stahl und Eisen, v. 80, Oct. 27, 1960, p. 1477-1486.

Investigation of gas flow in an oxygen jet blown into cold air and hot gas. Development of new blowing practice in a 3 ton converter. Experiments with ore cooling and the use of secondary slag in a 60 ton furnace. 22 ref. (D3b)

33-D. (German.) Use of Oxygen in an 100-Ton Maerz-Boelens-Type Openhearth Furnace at Horde. Hans Joachim Krabiell and Egbert Knackstedt. Stahl und Eisen, v. 80, Oct. 27, 1960, p. 1492-1496.

Refining of steel in a coke oven gas and oil heated furnace with oxygen enrichment where oxygen is blown below the burners onto the bath by Laval nozzles and into the bath by lances. Influence of oxygen enrichment on furnace wear and efficiency and on sulphur content of steel. 4 ref. (D2g)

34-D. (German.) Melting of Pure Iron. Wilhelm Anton Fischer and Alfred Hoffmann. Stahl und Eisen, v. 80, Oct. 27, 1960, p. 1497-1501.

Dephosphorization, desulphurization and decarburization of technically pure Fe in air; further purification by melting and remelting under vacuum (10^{-3} Toor) in MgO crucibles, including deoxidation with carbon. Correlations between oxygen and Si contents of melts. 31 ref. (D11n, 1-73)

35-D. Fuel Injection Increases Blast Furnace Iron Output. Steel, v. 147, Dec. 5, 1960, p. 112, 114, 116.

Addition of coke oven or natural gas to the furnace air stream to permit use of hotter blast, reduce coke rate and increase rate of ore reduction. (D1b)

36-D. On England's Largest Electric Furnace Plant. R. S. Howes and A. Jackson. Journal of Metals, v. 12, Dec. 1960, p. 934-936.

Reconstruction plans of United Steel Companies, Ltd. for replacing openhearth and cold charged fixed furnaces with hot charged Ajax furnaces and cold charged arc furnaces. Comparison of steelmaking methods showing raw material, fuel, brick and lime consumption, slag volume, tapping capacity and production rate. (D5, W18s)

37-D. Technology of Dwight-Lloyd McWane Ironmaking. T. E. Ban and B. W. Worthington. Journal of Metals, v. 12, Dec. 1960, p. 937-939.

Hot, carbonized pellets, produced from coal, iron ore and limestone as a highly beneficiated feed, are smelted in a conventional submerged arc furnace. Effect of DLM process on electrical energy requirements and furnace productivity. 12 ref. (D5g)

38-D. Ferroalloys, Steelmaking and the Future. F. E. Van Voris. Journal of Metals, v. 12, Dec. 1960, p. 940-944.

Recent developments in ferroalloys and alloy addition techniques used in steelmaking applications, especially in electric furnaces, for production of nonaging, deep drawing rimming steel, semikilled steel, free-machining steel, Cb-treated carbon steels, killed carbon steels and killed low-alloy steel. Effect of N, P, C and Si on mechanical properties of sheet steels; effect of Cb on tensile properties of hot rolled carbon-manganese semikilled steels. 11 ref. (D-general, 10-54, D5; ST, AD-n)

39-D. Dephosphorizing and Desulphurizing Steels. J. Zotos and E. DeLuca. Modern Castings, v. 38, Dec. 1960, p. 107-116.

Kinetics of dephosphorization and desulphurization during the production of steel in a 6 1/2 ton basic-electric arc furnace. (D5c, D11n)

40-D. (German.) Investigation of the Distribution of Manganese Between Liquid Carbon-Saturated Iron and Lime-Silica Slags at 1550° C. Hermann Schenck, Martin G. Frohberg and Tarek El Gammal. Archiv fur das Eisenhuttenwesen, v. 31, Oct. 1960, p. 567-569.

Measurement of Mn distribution at 1550° C. between carbon-saturated liquid Fe (0.69-5.44% C; 0.06-18.81% Si; 4.58-21.43% Mn) and slags (35.8-53.6% CaO; 41.7-57.4% SiO_2; 0.48-19.35% MnO). Influence of Si on thermodynamic activity of Mn. (D11n, P12; Fe-b, Mn)

41-D. Significant Current Events in the Steel Industry. Pt. 1. Industrial Heating, v. 27, Nov. 1960, p. 2387-2388, 2394, 2396, 2398, 2400, 2402.

Review of new equipment and processes in the iron and steel industry, including open-coil gas annealing and alloying and oxygen blowing with natural gas additions in blast and openhearth furnaces. (D1h, D2g, J23)

42-D. (Polish.) Vacuum Casting of Transformer Steel. M. Markuszewicz, H. Zak and J. Groyecki. Prace Instytutow Hutniczych, v. 12, Apr. 1960, p. 167-179.

Modern methods of vacuum degassing and efficiency of vacuum in removing impurities in steel. Microstructure, chemical composition and gas content of ingots cast in vacuum and atmospheres and magnetic properties of cold rolled steel strip. 13 ref. (D9s, M27, P16, 2-60; ST)

43-D. Carbon Cooled by Air Slows Blast Furnace Hearth Wear. E. M. Summers. Steel, v. 147, Nov. 18, 1960, p. 123.

Use of air-cooled carbon hearths in blast furnaces to prevent penetration of the hearth bottom and furnace foundation by molten Fe. (D1h, 1-52)

44-D. (Russian.) Natural Gas in Metallurgy. M. I. Gromov. Priroda, v. 49 Sept. 1960, p. 59-60.

Theoretical discussion on addition of natural gas to the air or oxygen stream during blowing in the blast furnace as a method of supplying hydrogen to the air blast and maintain adequate temperature in the furnace throat. (D1h)

45-D. Control of Alloy Carryover in Melting. K. M. Shupe and P. Dufresne. Iron and Steel Engineer, v. 37, Oct. 1960, p. 114-116.

Controlling melting sequences during the production of high speed, tool, die and stainless steels to prevent carryover of Co, Cr, Ni and V to subsequent heats. (D-general)

46-D. Recent European Developments in Consumable Electrode Melting. Wylie J. Childs. Paper from "Electric Furnace Proceedings, 1959", v. 17. American Institute of Mining, Metallurgical and Petroleum Engineers, Inc., New York, 1960, p. 7-16.

Consumable electrode melting of austenitic and ferritic stainless steels, toolsteels, hardenable alloy steels, ball bearing steels, Ti and Zr. Design of furnaces; fabrication of electrodes. 4 ref. (D5a, C5h, W18a; AY, SS, Ti, TS, Zr, SGA-c)

47-D. Consumable Electrode Melting of Steel and High-Temperature Alloys. Russell C. Buehl and A. M. Aksoy. Paper from "Electric Furnace Proceedings, 1959", v. 17. American Institute of Mining, Metallurgical and Petroleum Engineers, Inc., New York, 1960, p. 51-59.

Gas content, cleanliness, segregation and center porosity of arc melted 52100, A-286 and M-252 steels and Ti. Design

of crucible, pump and electrode for electric arc furnaces. Methods for controlling arc length. 7 ref. (D5a, C5h; ST, Ti)

48-D. A Study of Hot Topping Practice. D. V. Roloff and K. V. Smith. Paper from "Electric Furnace Proceedings, 1959", v. 17. American Institute of Mining, Metallurgical and Petroleum Engineers, Inc., New York, 1960, p. 90-103.

Use of a hot top to confine the shrinkage cavity to a sinkhead at the top of the ingot and eliminate excessive chemical segregation during the production of killed steel. Methods for reducing hot top volume by improving sinkhead efficiency. (D9p; ST-c)

49-D. Effect of Various Deoxidizers on Cast Steel. Clarence E. Sims and Charles W. Briggs. Paper from "Electric Furnace Proceedings, 1959", v. 17. American Institute of Mining, Metallurgical and Petroleum Engineers, Inc., New York, 1960, p. 104-124.

Deoxidation of liquid steel by Mn, Al, Ti, Zr, misch metal and Se. Effect of oxidizing agent on the mechanical properties of the cast steel. (D11r, Q-general; ST, AD-s)

50-D. Melting Practice to Produce Extra Low-Sulphur Carbon Steel. A. J. Kiesler. Paper from "Electric Furnace Proceedings, 1959", v. 17. American Institute of Mining, Metallurgical and Petroleum Engineers, Inc., New York, 1960, p. 148-155.

Lowering of sulphur content in carbon steel to less than 0.005% by melting first with conventional slagging components to remove phosphorus and FeO, adding a slag containing lime, graphite and Si and finally blowing oxygen into the melt. (D5a; CN, S)

51-D. Reducing Agents for Submerged-Arc Manufacture of Ferroalloys. Alfred D. Gate and Herbert D. Wedge. Paper from "Electric Furnace Proceedings, 1959", v. 17. American Institute of Mining, Metallurgical and Petroleum Engineers, Inc., New York, 1960, p. 184-191.

Use of C, Si and Al for reduction of oxide ores during submerged arc smelting of steel in a refractory-lined, open-top electric furnace. (D5, W18s)

52-D. Ladle to Ladle Stream Degassing for Steel Castings. Edward Dyble and G. E. Danner. Paper from "Electric Furnace Proceedings, 1959", v. 17. American Institute of Mining, Metallurgical and Petroleum Engineers, Inc., New York, 1960, p. 212-223.

Vacuum degassing of steel melts using a four-stage steam ejector system. Mechanical properties of cast test bars poured from the degassed melt. (D9, 1-73, Q-general)

53-D. Degassing Treatment of Chromium-Nickel Alloys. E. M. Anger. Paper from "Electric Furnace Proceedings, 1959", v. 17. American Institute of Mining, Metallurgical and Petroleum Engineers, Inc., New York, 1960, p. 226-230.

Ladle stream degassing of heat resistant 28Cr-20Ni alloys in vacuum. Tensile properties of castings poured from the degassed metal. (D9, 1-73, Q27a; Cr-b, Ni, SGA-h)

54-D. Factors Affecting Temperature Drop Between Tapping and Teeming. N. L. Samways and T. E. Dancy. Paper from "Electric Furnace Proceedings, 1959", v. 17. American Institute of Mining, Metallurgical and Petroleum Engineers, Inc., New York, 1960, p. 268-283.

Statistical analysis of measured tapping and teeming temperatures in openhearth and basic oxygen shops to show the effect of bath temperature at the end of refining, bath composition, ladle and furnace additions, holding time, teeming time and temperature and ladle refractory temperature on temperature drop between teeming and tapping. (D9)

55-D. Correlation Between Tap Temperatures, Ladle Temperatures and Pouring Stream Temperatures. W. H. Burr and H. Green. Paper from "Electric Furnace Proceedings, 1959", v. 17. American Institute of Mining, Metallurgical and Petroleum Engineers, Inc., New York, 1960, p. 283-289.

Pouring stream temperatures obtained during casting of ingots are used to predict the microcleanliness and magnaflux quality of alloy forging steels. 5 ref. (D9, 2-61)

56-D. Effect of Melt-Shop Practice on Cleanliness for High-Speed Steels. Walter L. Havekotte. Paper from "Electric Furnace Proceedings, 1959", v. 17. American Institute of Mining, Metallurgical and Petroleum Engineers, Inc., New York, 1960, p. 316-341.

Effect of degree of slag reduction, $CaO-SiO_2$ ratio in tap slag, temperature, alloy additions and running time on the cleanliness of steels melted in Heroult electric furnaces. (D5a, 2-61, 9-69)

57-D. Rare Earth Alloys and Lithium as Additives to Steel. A. J. Nimeth. Paper from "Electric Furnace Proceedings, 1959", v. 17. American Institute of Mining, Metallurgical and Petroleum Engineers, Inc., New York, 1960, p. 353-354.

Effect of Li additions on the gas content of stainless steel slabs. Use of rare earth alloy additions to eliminate double conversion and conditioning. (D9r, D11h)

58-D. Special Additives in Stainless and Alloy Steels. S. J. Myford. Paper from "Electric Furnace Proceedings, 1959", v. 17. American Institute of Mining, Metallurgical and Petroleum Engineers, Inc., New York, 1960, p. 355-356.

Theory for the effect of Li additions on the gas content of 6260, 6263 and 430 stainless steel grades and of alloy steels. (D11h, 2-60)

59-D. Dry Air as a Substitute for Oxygen in the Blowing of Stainless Steel. John B. Bridges. Paper from "Electric Furnace Proceedings, 1959", v. 17. American Institute of Mining, Metallurgical and Petroleum Engineers, Inc., New York, 1960, p. 370-378.

Use of dry air to replace oxygen for blowing of 304 and 410 stainless steel melts. Data for tap to tap time, Cr recovery rate, steel cleanliness and furnace damage when using dry air. (D5g)

60-D. (Russian.) Deoxidation and Alloying of Chromium Steel in the Ladle by Silicochromium. B. G. Petukhov and P. K. Morokov. Metallurg, Oct. 1960, p. 12-14.

Melting of Cr-Ni, Cr-Si-Mn, Cr and other steels with deoxidation by ferrochromium in the openhearth furnace or by silicochromium in the ladle. Comparative data are given for process time, economy, reduction of Mn, Si and Cr fire losses, mechanical properties and structure and increase of furnace efficiency. (D2c, D9m; AD-r)

61-D. (Russian.) Combustion of Masut and Natural Gas in the Openhearth Furnace. A. G. Trifonov, Yu. B. Snegirev, E. V. Bal'piter. Metallurg, Oct. 1960, p. 14-19.

New rational method for supplying the fuel (masut or natural gas) through the end of a caisson instead of directly into the working area of the furnace. Time of the melting process and fuel consumption as a function of fuel supply method. (D2h)

62-D. (Russian.) Advantageous Method of Supplying Oxygen to the Openhearth Flame Jet. A. A. Dobrokmotov. Metallurg, Feb. 1960, p. 19-21.

Oxygen is supplied through a caisson at 12^{o} angle tuyere inclination and 150 mm. above the caisson bottom. Shortening of the melting process, better furnace efficiency and economy in fuel and oxygen consumption are attributed to the nozzle arrangement. (D2g)

63-D. Pneumatic Processes of Converting High-Phosphorus Iron. P. Coheur. Iron & Coal Trades Review, v. 181, Nov. 11, 1960, p. 1049-1054.

Comparative data and performance figures on bottom blowing, using atmospheric air, O_2-enriched air or an O_2H_2O mixture and top blowing as processes for converting high-phosphorus iron. (D3b)

64-D. The Practical Chemistry of Oxygen Steelmaking Processes. R. A. Hacking. Iron & Coal Trades Review, v. 181, Nov. 18, 1960, p. 1107-1114.

Use of tonnage oxygen in steelmaking techniques, including oxygen-enriched air blast, oxygen-steam blast, oxygen-carbon dioxide blast, top blowing and combined blowing with openhearth processes. (D-general; O, 17-57)

65-D. Combustion Control of Openhearth Furnaces. Iron & Coal Trades Review, v. 181, Nov. 18, 1960, p. 1119-1120.

Increase of furnace production rate and reduction of fuel consumption using a paramagnetic oxygen analyzer to control the air intake of an openhearth furnace. Determination of the optimum air requirement by means of a waste gas sampling system. (D2h)

66-D. (Italian.) Chemical and Physical Bases of the Steelmaking Process. Pt. 1. G. Violi. Metallurgia Italiana, v. 52, Sept. 1960, p. 231-243.

Thermodynamical computation of free energy, activity, coefficients and equilibrium constants during refining. Effect of Cr on the activities of oxygen and carbon. (D-general, P12, 2-60)

67-D. (French.) Metallurgical Study of Electric Furnaces. G. Grenier. Journal du Four Electrique et des Industries Electrochimiques, v. 65, Sept-Oct. 1960, p. 235-238.

Charge composition and slag control in melting and refining of carbon tool and cable steel, Cr-Ni structural and 18-8 austenitic stainless steel. (D5, W18s)

68-D. (Translation-Brutcher no. 4941.) Study of Metallothermic Process Applied to Iron and Steel Production. A. Wimmer. Stahl und Eisen, v. 80, 1960, p. 1469-1477.

Data on raw materials and their preparation for production of metal fuel; stage one required for reduction of iron oxides. Raw materials for second stage, the direct reduction of Fe ores to low and very low carbon steels, using the metal fuel from stage one. (D8j)

69-D. (Translation-Brutcher no. 5015.) New Technique of Deoxidizing Steel With Aluminum. A. R. Bazilevskii. Metallurg, Sept. 1960, p. 16-17.

Technique of introducing Al metal into steel held in ladle for most effective deoxidation. Comparative oxygen contents of steel treated with lump Al, 45% ferroaluminum and Al in the form of sleeves attached to ladle stopper rod in various amounts. (D9m; AD-r, Al)

70-D. (Translation-Brutcher no. 4945.) Furnace Deoxidizing Practice for Steel Casting. N. N. Dobrokhotov. Liteinoe Proizvodstvo, v. 9, Dec. 1958, p. 8.

Improvement of mechanical properties of cast steel by substitution of normalizing plus tempering; quenching plus tempering; or alloying, normalizing plus tempering for the customary anneal followed by furnace cooling. (D2c, Q-general; ST)

71-D. (Translation-Brutcher no. 4935.) An Economic Evaluation of the Use of Iron Ore Pellets in the Blast Furnace. I. S. Kagan, Kh. P. Zaitsev, N. S. Snagovskaya, E. N. Volkova and I. A. Volokh. Izvestiya VUZ-Chernaya Metallurgiya, June 1959, p. 145-154.

Economics of pellets from finely ground ore concentrates, compared with fluxed sinter, as blast furnace charge. Data on calculation of cost price of pellets and of sinter. Coke rates with pellets and sinters of different qualities. Basic cost factors of blast furnace smelting of pellets from beneficiated magnetite-quartzite concentrates. (D1a)

72-D. (Translation-Brutcher no. 5016.) Desulfurization of Pig Iron Outside the Blast Furnace. L. Ya. Shparber. Metallurg, Feb. 1960, p. 8-9.

Equipment developed at the Magnitogorsk Iron and Steel Works for routine desulphurization of the entire blast furnace production as well as individual batches. Operating results; design details; feeding of desulphurizing agent to metal. (D11n)

73-D. (Translation-Brutcher no. 4896.) Fundamentals on the Degassing of Steel by the Closed-Circuit Process. H. Maas. Berg- und Huttenmannische Monatshefte, v. 105, June 1960, p. 151-157.

Vacuum steel-degassing process developed by A. Lorenz for Ruhrstahl AG. Determination of degassing effect by two different methods for H-tin fusion and hot extrusion: cumulative frequency curves; variation of oxygen content during degassing contents of sulphides, silicates and alumina. (D9s, 1-73)

74-D. (Translation-Brutcher no. 4871.) Use of Top-Gas Composition for Analysis and Control of the Thermal Condition of Blast Furnace. A. N. Pokhvisnev and N. K. Zhilkin. Izvestiya VUZ-Chernaya Metallurgiya, Sept. 1960, p. 29-45.

Successful elimination of the usual delays in the control of the temperature distribution in blast furnaces when based on Fe composition, flushing slag temperature and working of the tuyeres, by adopting instead the composition of the top gas as a guide, the only prerequisites being dependable automatic gas analyzers and a computer. (D1b, S16)

75-D. (Translation-Brutcher no. 4895.) Practical Experience in the Vacuum Degassing of Openhearth Steel Heats. H. J. Darmann. Berg-und Huttenmannische Monatshefte, v. 105, June 1960, p. 144-149.

Vacuum lifter process. Degassing action as function of time; heat lost by steel in ladle during vacuum degassing and ways of

compensating for this loss. Reduction of residual oxide inclusions to one-third of the normal amount. Hydrogen content of finished steels. (D9s, 1-73)

76-D. (Translation-Brutcher no. 4889.) Coke Consumption in the Blast Furnace and Reactivity of Coke. Gerhard Hegnert, Werner Zischkale and Eberhart Schurman. Stahl und Eisen, v. 80, July 21, 1960, p. 981-990.
See item 450-D, 1960. (D1)

77-D. (Translation-Brutcher no. 4892.) Influence of Reduced Pressure on Steel Melting and Casting. E. Schwarz-Bergkampf. Berg-und Huttenmannische Monatshefte, v. 105, June 1960, p. 133-135.
See item 493-D, 1960. (D11r)

78-D. (Translation-Brutcher no. 4830.) Contamination of Steel Made in Top Blown Converter. V. I. Baptizmansky and Yu. A. Dubrovsky. Izvestiya VUZ-Chernaya Metallurgiya, Nov. 1959, p. 31-37.
See item 281-D, 1960. (D3d)

79-D. (German.) Dephosphorization in the Basic Bessemer Process With Special Reference to High P_2O_5 and CaO Contents in the Slag. Karl Georg Speith, Hans vom Ende and Gustav Mahn. Stahl und Eisen, v. 80, Nov. 24, 1960, p. 1759-1770.
A charge containing 27.6-44.4 tons of pig iron, up to 3000 kg. scrap, max. 1600 kg. ore and 3800-5800 kg. limestone is blown at up to 1640° C. After removing the first slag the melt is blown with powdered limestone and finished by blowing with air or a mixture of air and oxygen. Effects of Fe, P and Ca content in the slag on the dephosphorization. 29 ref. (D11n, 1-65, 2-60)

80-D. Iron Ore Reduction Studied With Grate-Kiln Systems. Steel, v. 147, Dec. 19, 1960, p. 114-117.
Laboratory reduction kiln also serves as a gas cracker or reformer, making external gas generation equipment unnecessary. Unused reducing gas and unreacted fuel are burned to provide reaction heat. Batch experiments produce pellets that are 91% reduced. (D8j)

81-D. Cyclic, Vacuum Degassing Unit is Evaluated at Crucible. Steel, v. 147, Dec. 15, 1960, p. 122-123.
Comparison of the Heraeus-Ruhrstahl, Siphon, Bochumer-Verein and cyclic degassing processes. The cyclic method is said to provide effective degassing because of complete mixing while it also permits addition of alloying elements. (D9s, 1-73)

82-D. Iron--How Is Direct Reduction Doing Commercially? Colin C. McAneny. Engineering and Mining Journal, v. 161, Dec. 1960, p. 84-99.
Comprehensive review of the basic principles, commercial possibilities and operating data for the principal direct reduction processes including H-iron, HYL, Krupp-Renn, Nu-Iron, Orcarb, Strategic-Udy, Wiberg-Soderfors, Hoganas and Dwight-Lloyd McWane processes. (D8j)

83-D. Steel Plant Will Tap Copper Wastes. Chemical & Engineering News, v. 38, Dec. 12, 1960, p. 32.
Report on the production of a pilot steel plant using the Strategic Udy process in which the blast furnace is replaced by a rotary kiln and electric furnaces and Cu slag is used as a raw material. Materials can be added at different process stages so that reactions are more closely controlled. (D8p, D11n)

84-D. The Influence of Rare Earth Elements and Compounds of Steel. D. S. Eppelseimer and Sukh Dev Sehgal. Indian Institute of Metals, Transactions, v. 13, Sept. 1960, p. 265-276.
Oxides and fluorides of rare earths tend to minimize the size of inclusions and distribute them more uniformly. Excessive rare earth additions cause inclusions to appear again. Effect of rare earth additions on desulphurization and grain refinement. 27 ref. (D11n; EG-g)

85-D. Pilot Plant Developments. Pt. 3. Low-Shaft Furnace Pilot Plant at the National Metallurgical Laboratory, Jamshedpur. Research & Industry (India), v. 4, Apr. 1959, p. 81-84.
Design and construction of a pilot low shaft furnace to establish the feasibility of utilizing low-grade noncoking coals and lignite for the smelting of low-grade Fe ore. (D8n)

86-D. Iron and Steel Industry in India--A Symposium. Research & Industry, v. 4, May 1959, p. 112-115.
Review of developments in the Fe and steel industry, including use of the L-D

process for steelmaking and development of pilot plants with low shaft furnace for smelting Fe ores with noncoking coals and research on sintering and pelletizing techniques for utilization of low grade Fe ores and fines. (D-general)

87-D. (Japanese.) The Melting Condition of Manganese Pearlitic Malleable Iron. Matsuo Suzuki, Azuchi Hiramatou and Nobuhisa Tsutsumi. Imono (Japan Foundrymen's Society, Journal), v. 32, Sept. 1960, p. 625-635.

Microstructure and fracture surface of pearlitic malleable iron produced by refining molten 0.85-1.10% Mn white iron in a Heroult electric arc furnace with acid lining. Effect of melting and pouring technique and various heat treatments on structure and pinhole defect formation. (D5, E25q, M27, 9-71; CI-s)

88-D. Application of the L-D Process to High-Phosphorus Iron. A. Bruno. Iron & Coal Trades Review, v. 181, Dec. 2, 1960, p. 1219-1223.

Treatment of high phosphorous Fe by the L-D process to give steel of open-hearth quality with low sulphur and nitrogen content. The process employs two-phase working with deslagging of a slag rich in phosphorous at the end of the first phase. Final working slag is retained in the hearth. (D10a)

89-D. The Kinetics of Sulphur Transfer From Iron to Slag. R. G. Ward and K. A. Salmon. Iron and Steel Institute, Journal, v. 196, Dec. 1960, p. 393-403.

Measurement of transfer rate of sulphur from carbon-saturated Fe to a range of 17 CaO-MgO-SiO_2-Al_2O_3-CaF_2 slags at 1400-1600° C. Determination of equation and rate limiting step for the reaction. Effects of temperature, slag pH and slag composition. Applications to iron and steel making processes. 24 ref. (D11n)

90-D. (German.) Development From Air-Refined Steel to Oxygen Top-Blown Steel in Modern Steel Industry. W. Boddeker. Technische Mitteilungen, v. 53, Oct. 1960, p. 419-421.

Review of trend in steelmaking from acid Bessemer refining to production of low-nitrogen steel by top-blowing with 99% oxygen (L-D process). Increase of L-D steel output from 1956 to 1960. (D-general)

91-D. Why Gas Beats Oil in Reverberatory Iron Melting. S. J. Michaels. Industrial Gas, v. 39, Dec. 1960, p. 5-7.

Melting pig and scrap Fe for production of ductile Fe using gas fuel rather than oil and a reducing atmosphere to control Si and C content in the Fe and prolong refractory life. (D-general)

92-D. Blast Furnace Stoves Relation of Operating Cycle, Blast Temperature and Efficiency. G. V. Ilyushchenko and M. G. Volkov. Iron & Coal Trades Review, v. 181, Dec. 9, 1960, p. 1259-1263.

Influence of heat exchange phenomena on efficiency of hot blast stoves. Stoves designed for a blast temperature of 550° C. are enlarged for 950° C. operation and changed from a 3 hr. to a 2 hr. cycle of operation to increase thermal efficiency of stoves and temperature of the blast. (D1b)

93-D. Tilting Furnace is Altered to Use Oxygen Efficiently. Steel, v. 148, Jan. 9, 1961, p. 68, 70.

Design and operation of modified tilting type openhearth furnaces equipped with steel consumable pipe oxygen lances. Gas outlets are made smaller to compensate for slag foaming. Oxygen is admitted through lances and burners and air intake is through the regenerators. (D10)

94-D. (German.) Production, Properties and Use of Semikilled Steel. Kurt Felichte and Hans-Joachim Eckstein. Neue Hutte, v. 5, Oct. 1960, p. 590-596.

Test melting of MSt1hb steel, MSt 2hb steel and MSt3hb steel in open-hearth furnaces with and without predeoxidation with FeSi in the furnace and with subsequent semikilling with FeMn, FeSi and Al in the ladle to obtain the following steel analysis: 0.1-0.2% C, 0.08% Si, 0.45% Mn, 0.035% P and 0.045% S. Data are given for rolling behavior, mechanical properties after various heat treatments and use in replacing Si-killed steel of the same carbon content. (D2, Q-general; ST-c)

95-D. (German.) Direct Use of Krupp-Renn Balls in Electro Steel Production. K. F. Ludemann. Neue Hutte, v. 5, Oct. 1960, p. 617-618.

Dephosphorization and desulphurization of high-phosphorus (0.25-0.49%)

and high-sulphur (up to 2.3% S) Krupp-Renn balls in a 100 kg. pilot arc furnace, by blowing lime powder into steel bath, to melt unalloyed steel directly (without blast furnace). (D5, D11n)

96-D. (Japanese.) Behavior of Some Impurities in the Electro-Refining of Iron. Takashi Mukaibo. University of Tokyo, Engineering Research Institute, Faculty of Engineering, v. 19, Sept. 1960, p. 38-41.

The behavior of ortho-phosphate, sulphate and Zn ions in the Mohr's salt bath and of Ag plated on anodes is studied by autoradiography using P-32, S-35, Zn-65 and Ag-110 radioactive tracers to determine the efficiency of impurity removal by electrolysis combined with washing. (D8p, 1-59)

97-D. Pilot Plant Developments. Pt. 5. Projects at the National Metallurgical Laboratory, Jamshedpur. Research & Industry, v. 4, Nov. 1960, p. 275-279.

Design and operation of pilot plants for electrolytic production of Mn dioxide and Mn, production of steel by the L-D process, production of pig iron in low shaft furnaces and beneficiation of low grade Mn ores in vertical and horizontal reduction furnaces. (D10a, C23, B14; Mn)

98-D. (German.) Plant Experiences With an IMSK 250-Type 250 kg. Medium-Frequency Furnace. Dieter Mollitor. Giesserei-Technik, v. 6, Oct. 1960, p. 297-299.

Acid furnace melting of acid resistant GS X 12 Cr-Ni 18-8 steel. Use of Bi to avoid oxidation of steel in ladle; improvement of melting efficiency by geometric changes of furnace lining. Data for Cr and Ni losses. (D6)

99-D. Quality Control of Refractories for Iron and Steel Industry. Sri D. N. Nandi. Indian Chemical Engineer, v. 2, July 1960, p. 61-66.

Refractoriness, load capacity at working temperatures, abrasion and thermal shock resistance, chemical reaction and consumption of refractories used in all phases of steelmaking in India. 14 ref. (D-general; RM-h, 17-57)

100-D. The Dynamics of the Blowing Process. T. Kootz. Iron and Steel Institute, Journal, v. 196, Nov. 1960, p. 253-259.

Equilibria and nonequilibria in the basic Bessemer converter and open-hearth furnace and the course of dephosphorization and carbon elimination. Characteristics of oxygen top-blowing process and possible effects of the oxygen jet on the bath and its reactions. Requirements and advantages of the rotor processes. 27 ref. (D3, D10)

101-D. Use of Models for Investigations of Oxygen Steelmaking Processes. B. S. Holmes and M. W. Thring. Iron and Steel Institute, Journal, v. 196, Nov. 1960, p. 259-261.

Use of models and necessity for similarity in determining optimum blowing parameters, such as top and bottom limits of oxygen flow rates and lance position and number. Theory of splashing and stirring mechanisms involving the oxygen jet criteria to account for excess splashing due to chemical action. 6 ref. (D10)

102-D. A Model Experiment to Study the Rate of Gas Evolution From the Bath of an LD Converter. J. M. van Langen. Iron and Steel Institute, Journal, v. 196, Nov. 1960, p. 262-264.

Flow pattern within the bath resulting from the interaction between gas and liquid in a scale model showing that stirring action of the gas jet is very small and that an acid top layer is formed gradually and grows until the whole solution is acid, the last basic liquid mixing suddenly with the acid, which gives an increased gas evolution. Recommended design parameters for bath diameter-depth relation and radial blowing angle for steel and disiliconizing vessels for achieving better stirring action. (D10, 1-54)

103-D. Aerodynamics of Open-Hearth Furnace Regenerators. C. Hulse. Iron and Steel Institute, Journal, v. 196, Nov. 1960, p. 264-274.

Technique for determining flow distribution in the regenerator by means of cold trials. Shows suitable placing of baffle walls which give improved flow distribution and increases efficiency of regenerator. Suggests location of bottom fantail flue on the same side of regenerator as the slag pocket. (D2)

104-D. A Model Study of Splashing. Kun Li. Iron and Steel Institute, Journal, v. 196, Nov. 1960, p. 275-280.

Investigation of means for reducing splash in an oxygen blown furnace by examining the splash patterns and the effects of lance angle, lance height and jet flow rate. Influencing factors include condition of the foam layer on the top of the liquid which affects the amount and size and distribution of droplets and the general production of far less splash by lancing than jetting. 5 ref. (D10)

105-D. Protection of Open-Hearth Furnace Roofs by an Auxiliary Jet. J. V. Edwards. Iron and Steel Institute, Journal, v. 196, Nov. 1960, p. 289-294.

Rate of erosion of roof reduced by using a jet near the junction of the furnace roof above the back wall, midway along the furnace length and firing toward the bath. This arrangement sometimes increases the rate of wear nearer the crown and around the jet, but by selection of the correct flow rate and the use of a compound jet, these difficulties are overcome. 6 ref. (D2)

106-D. Sulphide Capacities of Silicate Melts. Pt. 1. K. P. Abraham and F. D. Richardson. Iron and Steel Institute, Journal, v. 196, Nov. 1960, p. 309-312.

Measurement of the sulphur holding properties of slags made with mixtures of MnO + SiO_2 and MnO + SiO_2 + CaO at 1500 and 1650° C. to test an equation developed by Flood for the calculation of equilibrium constants for reactions involving complex metals, from the corresponding constants for the simple melts. 12 ref. (D11n)

107-D. Sulphide Capacities of Silicate Melts. Pt. 2. K. P. Abraham and F. D. Richardson. Iron and Steel Institute, Journal, v. 196, Nov. 1960, p. 313-317.

Measures capacity for a number of slags in the system CaO ± MgO + SiO_2 + Al_2O_3 at temperatures of 1500 and 1650° C. Results show that P_2O_5 is more effective for silica or Al in lowering the sulphide capacities. 19 ref. (D11n)

108-D. Physics of Oxygen Steelmaking. C. Holden and A. Hogg. Iron and Steel Institute, Journal, v. 196, Nov. 1960, p. 318-332.

Analysis of the factors controlling the process of mass transfer in a reaction between slag and metal in oxygen steelmaking. Theoretical and model study of various types of furnace and processes and the influences of carbon removal rate, specific oxygen consumption, loss of yield and refractory wear. Design parameters for optimum efficiencies achieved by either stirring the metal or injecting the oxygen uniformly through the melt. 28 ref. (D10)

109-D. Oil Injection in Blast Furnaces. Engineer, v. 210, Nov. 25, 1960, p. 909-910.

Blast furnace production from self-fluxing Fe ore is increased up to 18% by supplementing the coke fuel with oil supplied by injection nozzles. (D1)

110-D. (French.) Reduction of Iron Ores and Use of Sponge Iron or Reduced Ores in the Production of Steel. J. Astier. Revue de Metallurgie, v. 57, Oct. 1959, p. 867-880.

Principal processes for direct reduction of ores in solid state. Problems of charging and melting of reduced product in electric arc furnaces. Economics of steel production based on various types of intermediate products. 17 ref. (D8j, D5)

111-D. (French.) Application of L-D Process to Phosphorus-Rich Irons. Technique Used at Pompey Mills. G. Messin. Revue de Metallurgie, v. 57, Oct. 1960, p. 947-954.

Two-stage process with first deslagging at 20-25% P_2O_5 and recuperation of final slag, with lime being added in chunks. First-stage cooling is by additions of ore, the second is by scrap additions. Tapping time does not exceed 45 min. for one-ton charge. The steel product has low sulphur and N_2 content and is equivalent to corresponding open-hearth steel. 15 ref. (D10a)

112-D. Direct Reduction Process Provides Own Reaction Heat. Steel, v. 147, Dec. 26, 1960, p. 66.

A mixture of molten alumina, silica and Ti oxide in a high-carbon (20%) base is combined with Fe ore and ignited by a small charge of BaO_2, Al and Mg.

The heat of the ensuing reaction is sufficient to reduce the Fe oxides of the ore and produce mild steel. (D8j)

113-D. The VLN (Very Low Nitrogen) Steelmaking Process. Iron & Coal Trades Review, v. 181, Dec. 16, 1960, p. 1325-1326.

Production of steel and low nitrogen content by a steam-oxygen process in which nitrogen is excluded from the blast and temperature of the charge during blowing is controlled by the steam-oxygen ratio. (D10)

114-D. (French.) Study on the Cooling of Liquid Iron in Casting Ladles. Maurice Decrop and J. P. Aymard. Fonderie, Sept. 1960, p. 359-368.

Liquid Fe is cooled from 1430-1225° C. in hand-ladles of from 30-80 kg. to determine the effect of the thickness of wells, preheating, pocket capacity, quantity of metal and length of time in ladle on the cooling rate. Derivation of formulas expressing heat losses. (D9m)

115-D. How the Russians Are Using Ultrasonics in Metallurgy. Arthur B. Tesmen. Metal Progress, v. 79, Jan. 1961, p. 79-83.

In the Soviet Union, ultrasonic energy is being used to degas molten metals, speed diffusion processes (such as carburization), accelerate aging of Al alloys and improve weld quality. Other work with ultrasonics is also being done. (D9, E25n, J-general, 1-74)

116-D. Two Fundamentals of All Metallurgical Operations. Albert M. Portevin. Metal Progress, v. 79, Jan. 1961, p. 126, 128, 130.

Metallurgical operations which involve reactions between two phases, liquid, solid or gaseous, depend for extent and speed of reaction upon emulsion or dispersion. Emulsion reactions in Ugine-Perrin process, vacuum casting of steel. Dispersion processes in Allard process for desulphurizing pig iron, in manufacture of refractories and in making solid solutions of Si and Ge. (D-general, D11, B1g, N-general)

117-D. Reduction of Kalabagh Iron Ore (Containing Ferruginous Clay) With Sui Gas. S. I. Ali, M. Ismail, Latif Alimad, Sadrul H. Rizvi, M. M. Ourash and George Hadn. Pakistan Journal of Scientific and Industrial Research, v. 2, Oct. 1959, p. 197-209.

Fe ore from Kalabagh, Pakistan, is reduced by a fluidized bed process to sponge Fe at 600-1200° C. for 1-9 hr. by Sui gas (an earth gas of high caloric value found in Pakistan). X-ray diffraction patterns and analysis are given for the magnetic and nonmagnetic fractions. 6 ref. (D8p, B15q; Fe)

118-D. Burning Out of Converter Skulls. Iron & Coal Trades Review, v. 181, Dec. 23, 1960, p. 1365-1367.

Method for preventing the formation of skulls at the converter mouth or subsequently melting them away by oxygen enrichment of still partially unburnt gases in the converter hood. Method devised for automatic operation. (D3f)

119-D. Steelmaking: The Impact of Oxygen. Metallurgia, v. 62, Dec. 1960, p. 233-234.

Survey of growing use of oxygen in Britain in converters as the blow in openhearth and blast furnaces for enrichment of combustion air or as a jet to speed up production or assist in refining. Influence of availability and application of tonnage oxygen on productivity. (D1h, D2g, D3f, D10, 10-54)

120-D. Physical Properties and Constitution of Liquid Slags. B. T. Bradbury and D. J. Williams. Metallurgia, v. 62, Dec. 1960, p. 235-240.

Electrical conductivity, transport number, viscosity, thermal expansion, surface tension and density of binary silicate slag systems. 21 ref. (D11n)

121-D. Krupp-Renn Direct Reduction Process. M. J. Kennard. Mining Congress Journal, v. 47, Jan. 1961, p. 34-37.

Use of anthracite fines, coke breeze or carbonized char from high volatile fuels to reduce Fe ores having a wide range of physical characteristics without metallurgical coke. Fe is reduced to low carbon nodules containing 92% metallic Fe. (D8j)

122-D. The Changing Iron Ore Industry. Robert M. Lloyd. Blast Furnace and Steel Plant, v. 49, Jan. 1961, p. 51-57.

Review of developments in upgrading of low quality Fe ores, new metallurgical processes and direct reduction processes. Emphasis on economic aspects

of ore production and distribution. (D-general)

123-D. (German.) Observations on Melting in Vacuum Arc and Electron Beam Furnace. G. Ogiermann and W. Scheibe. Metall, v. 15, Jan. 1961, p. 3-8.

Melting techniques for Ti, Zr, Ni and Fe based alloys, ball-bearing steel, tool-steel and stainless steel in the vacuum arc furnace using flashing-off (melting-off) electrodes. Melting high-temperature metals such as Ta, Cb, W and their alloys and nonmetals in the electron beam furnace. Deoxidation by addition of deoxidizers and evaporation of mono-oxides. Surface quality, microstructure and purity of products. (D8m, D5, 1-73; Cb-b, Ni-b, Ta-b, Ti, Zr)

124-D. (Japanese.) Evolution of Longitudinal Cracks on the Billet Surface. Yoshio Aketa and Kiyoto Ushijima. Tetsu-to-Hagane (Journal of the Iron & Steel Institute of Japan), v. 46, Dec. 1960, p. 3-14.

Primary cooling conditions, corner radius, evenness of cooling, casting temperature and casting speed are related to ferrostatic pressure of the inner molten steel and thickness of the solid steel shell in a formula which explains the mechanism of crack evolution during continuous casting of steel. (D9q, Q26, E25q; 4-52)

125-D. (German.) Means of Improving Efficiency of a Blast Furnace Plant. Helmut Paul Weitzer. Berg- und Huttenmannische Monatshefte, v. 105, Nov. 1960, p. 256-261.

Effect of structural changes (enlargment of inner diameter and different arrangement of cooling boxes) of blast furnace, preparation of burden by sintering in Dwight-Lloyd plant and water vapor and oxygen additions to blast on melting efficiency. Thermodynamics of hydrogen and CO reduction. (D1, D11)

126-D. (German.) Novel Developments in the L-D Process (Basic Bessemer Oxygen Top Blowing). Rudolf Rinesch. Berg- und Huttenmannische Monatshefte, v. 105, Nov. 1960, p. 302-313.

Investigation of variations in refining conventional and special pig iron by oxygen top blowing in a 5 ton pilot L-D converter and in a 30 ton production L-D converter, including addition of coke, coal and lignite fines to increased scrap additions, neutral heating of refined steel for Cr alloying and pressing of auto and ship sheet steel by premelting in an electric arc furnace and L-D refining with additions of coke fines through nozzle. Hardenability (Jominy test), microstructure and heat treating data for test refined steels. (D10a)

127-D. Direct Reduction of Iron Ore and Its Future in Steelmaking. J. Mackenzie. British Steelmaker, v. 27, Jan. 1961, p. 18-24.

Basic chemistry of Fe oxide reduction. Description of several processes for direct reduction by hydrogen of Fe ore, concentrated ore and sinter. 8 ref. (D8j)

128-D. (Russian.) Charge Pressure in the Blast Furnace. V. K. Kropotov. Stal', Nov. 1960, p. 972-977.

Values for vertical pressure of charge materials on various sections of the shaft and equations for determination of the optimum weight of burden materials in the blast furnace are derived from laboratory experiments. 13 ref. (D1a)

129-D. (Russian.) Vacuum Treatment of Converter Steel. P. Ya. Sorokin. Stal', Nov. 1960, p. 988-991.

Vacuum and vacuum inert gas, degassing of melts in the ladle with agitation. Study of hydrogen content for various levels of the ladle. 7 ref. (D9s, 1-73; ST-g)

130-D. (Russian.) Reaction Between Heat Resistant Alloys and Oxide Refractory at High Temperature in Vacuum. V. M. Amonenko, K. G. Romanchenko and A. S. Tron'. Stal', Nov. 1960, p. 1002-1004.

Reaction between Ei617 alloy melt and crucible material (consisting of ZrO_2, BeO, MgO, Al_2O_3 and Al_2O_3 + TiO_2) during vacuum melting at 1450-1650° C. Mechanical properties, nonmetallic inclusions and hydrogen and oxygen content of the product alloy as affected by crucible composition, temperature and holding time. 8 ref. (D8m, Q-general, 2-60; AY)

131-D. (Russian.) Intensification of the Steelmaking Process in Arc Furnaces. F. P. Edneral. Stal', Nov. 1960, p. 1004-1007.

Recent developments in steelmaking technology and electric arc furnace productivity. Use of oxygen in production of structural, ball bearing and stainless steels with addition of alloy scrap, coke powder or Cr-Ni scrap to the charge. (D5)

132-D. (Russian.) Treatment of Molten Steel With Rare Earth Metals. E. D. Verbol'skaya, G. F. Zasetskii, I. V. Isakov and A. E. Khlebnikov. Stal', Nov. 1960, p. 1030-1033.

Induction melting of Cr-Ni-Mo steel (0.4% C) with addition of misch metal containing 40-50% Ce and 15-20% La. Favorable effect of misch metal additions on the rolling process, tensile and plastic properties, sulphur content and chemical uniformity of ingots. 3 ref. (D6, Q-general, 2-60; AY)

133-D. (English.) Investigation of Degassing Process in Treatment of Steel Drops Under Vacuum. L. Tiberg. Jernkontorets Annaler, v. 144, Oct. 1960, p. 757-770.

Oxygen decrease and removal rate during vacuum treatment of steel is investigated at 1570-1620° C. and at 30, 73 and 140 mm. Hg pressure for various times. Study of degassing during and after the boil in relation to temperature decrease and thermodynamic reactions during solidification and cooling. (D9s, 1-73, N12, P12; ST)

134-D. Advantages of Ladle Additions of Exothermic Ferrochromium. Robert L. Mickelson. Foundry, v. 89, Feb. 1961, p. 160, 162.

Cr content in steel and gray iron is adjusted by ladle additions of exothermic ferrochromium. Exothermic mixture disperses alloying agent throughout the melt and gives good Cr recoveries. (D9m, D9r)

135-D. Energy Requirements of the Ajax Steelmaking Process. A. Jackson. Institute of Fuel, Journal, v. 33, Dec. 1960, p. 580-584.

Description of the Ajax process in which steel is made in a modified openhearth furnace by oxygen lancing. Material consumption, furnace output, heat balance and thermal efficiency. (D10)

136-D. Flat Rolled Products Made From Oxygen Converter Steel. Tadashi Ikeda. Australian Institute of Metals, Journal, v. 5, Nov. 1960, p. 209-220.

Report on the rapid growth of oxygen converter steel in Japan. Reasons for the superiority, in many respects, of strip products manufactured from oxygen converter steel over those produced from openhearth steel. (D3)

137-D. Gas Injection for Blast Furnace. C. L. Kobrin. Iron Age, v. 187, Feb. 9, 1961, p. 107-109.

Use of gas injection to lower coke consumption, increase Fe production and smooth furnace operation. (D1h)

138-D. Protection of Openhearth Furnace Roofs by an Auxilary Jet. J. V. Edwards. Iron & Steel, v. 33, Dec. 19, 1960, p. 628-629.

Reduction of roof wear of openhearth furnaces caused by flow of furnace gases by installation of water cooled jet clusters which oppose upward gas flow. (D2g)

139-D. Effect of Flow Distribution on Air Preheat in the OH Furnace. J. Chapman and W. Montgomery. Iron & Steel, v. 33, Dec. 19, 1960, p. 640-645.

Measurement of general level of air preheat as affected by air infiltration, flow distribution in the flues, checkers, baffle systems, slag pockets and increased surface area of the checker filling. Application of effective preheat improvements and resultant reduction in fuel consumption. (D2h)

140-D. The Dynamics of the Blowing Process. T. Kootz. Iron & Steel, v. 33, Dec. 19, 1960, p. 671-673.

Oxidation and deoxidation equilibria, dephosphorization, decarburization and gas and slag metal reactions occurring in converter, oxygen openhearth and rotary furnace processes. Effect of jet speed impingement area, lance distance and blowing pressure on reaction rates. (D11, D2g, D3b, D10)

141-D. The Physics of Oxygen Steelmaking. C. Holden and A. Hogg. Iron & Steel, v. 33, Dec. 19, 1960, p. 673-677.

Thermochemical parameters of oxygen steelmaking by bottom blown converter and Linz-Donawitz, Oberhaussen, Kaldo, Ajax and Russian Rotor processes. Operational and experimental model data for influence of the oxygen on gas and particle entrainment, refining reactions

and splashing. Determination of optimum top blowing conditions and flow patterns. (D10, D11)

142-D. The Use of Models for Investigations of Oxygen Steelmaking Processes. B. S. Holmes and M. W. Thring. Iron & Steel, v. 33, Dec. 19, 1960, p. 678-679.

Theoretical analysis of refining mechanisms occurring in oxygen blown furnaces, with attention to splashing and development of Froude number. Applicability of models to determination of optimum blowing condition, such as top and bottom limits of oxygen flow rates and number of lances for most economic usage. (D2g, D3, 17-56)

143-D. Oxygen-Steam Converters Improve Steel's Ductility. Steel, v. 148, Feb. 13, 1961, p. 116.

Steelmaking by the very low nitrogen process, in which limited use of scrap in the charge and blowing with a steam-oxygen mixture result in a steel of low nitrogen content. Improved ductility of the steel is attributed to the process. (D3)

144-D. (German.) Formation and Precipitation of Deoxidation Products. M. Wahlster and E. Plockinger. Technische Mitteilungen Krupp, v. 18, Nov. 1960, p. 64-80.

Mechanism of the formation of oxide phases in molten steel based on the reaction between the oxygen in the Fe and Si, Al, Ti, Zr, MnSi, CaSi, FeAl and CaAl as observed in laboratory melts and melts in 3-ton electric arc furnaces. Quantitative investigation of precipitation processes in the casting ladle and in the ingot as dependent upon the chemical composition and the grain size and surface properties of the primary oxides as influenced by laminar and turbulent flow. 25 ref. (D5c, D9, D11r, N7; ST, 14-68)

145-D. The Use of a Combined Blast in Blast-Furnace Smelting. A. N. Ramm. Paper from "Contemporary Problems of Metallurgy". Consultants Bureau, Inc., New York, 1960, p. 51-79.

Method for calculating the influence of the composition of a combined blast on parameters of the process such as external heat loss, smelting intensity, development of reduction, blasts and combustion temperatures, furnace throat temperature, coke consumption, thermal balance and production economics. Application to blasts containing air, reducing gas, natural gas, coking gas and blast furnace waste gas with and without oxygen enrichment. 19 ref. (D1)

146-D. Prospects of Iron Smelting With an Oxygen Blast (90-95% O_2). M. A. Shapovalov and B. B. Gess. Paper from "Contemporary Problems of Metallurgy". Consultants Bureau, Inc., New York, 1960, p. 80-87.

Technology of smelting in low shaft furnaces. Effect of oxygen on heat exchange smelting index and combustion intensity. Calculation of process parameters for increasing tonnage and overcoming limitations of furnace design and height and excess fuel consumption using an oxygen enriched blow. 5 ref. (D8n)

147-D. Metallurgical Evaluation of Blast-Furnace Raw Materials. A. N. Pakhvisnev. Paper from "Contemporary Problems of Metallurgy". Consultants Bureau, Inc., New York, 1960, p. 88-97.

Development of a formula for determining thermal equivalents of blast furnace materials as an index of metallurgical value in smelting. Thermochemical calculations are made in terms of heat removal by the smelting products, blast and throat temperature, blast humidity, raw material composition and O, S and P contents. 5 ref. (D1a, D11k)

148-D. A New Representation of the Blast-Furnace Process. Yu Shu-P'ei. Paper from "Contemporary Problems of Metallurgy". Consultants Bureau, Inc., New York, 1960, p. 98-115.

Theoretical and experimental determination of parameters for increasing the adiabatic combustion temperature and smelting efficiency and consequent Fe output of blast furnaces using increased pressure and by wetting the blast. Thermochemical and thermodynamic calculations of thermal balance, phase changes during gaseous reduction and movement of heated gas through the charge. 23 ref. (D1, D11j, D11k)

149-D. The Equilibrium Distribution of Sulphur Between Iron and Blast-Furnace Slags. I. S. Kulikov, I. Yu. Kozhevnikov

and L. M. Tsylev. Paper from "Contemporary Problems of Metallurgy". Consultants Bureau, Inc., New York, 1960, p. 127-138.

The sulphur-distribution equilibrium and slag basicity index are determined and correlated for the system Fe-slag-carbon at 1330-1500° C. and 1 atm. pressure as a function of Ca-O activity temperature, desulphurization and endothermocity of the process. 27 ref. (D11n, 1-59, 2-60, 2-61)

150-D. Some Problems of Ferrous Metallurgy in Eastern Germany. M. K. Kramer. Paper from "Contemporary Problems of Metallurgy". Consultants Bureau, Inc., New York, 1960, p. 139-143.

Review of technology and production developments in blast furnace and low shaft furnace smelting openhearth practice, ore concentration and beneficiation, foundry practice and rolling of steel since World War II. (D-general, 10-54)

151-D. Metallurgical Processes in Low-Shaft Furnaces. K. F. Ludemann and G. Von Struve. Paper from "Contemporary Problems of Metallurgy". Consultants Bureau, Inc., New York, 1960, p. 145-157.

Investigation of low shaft furnace production of pig iron and spiegeleisen from lean, Si-containing ores. Thermochemical analysis of process parameters in terms of design features and operation of the furnaces; pig iron, slag and blast furnace gas composition; desulphurization and Si reduction reactions; and influence of charge preparation and oxygen content in the blast on the indirect reduction process. (D8n, W17h)

152-D. A Study of the Smelting Process for Pao-T'Ou Ores in an Experimental Blast Furnace. Chou-Jen, Tsou Yuan-si, Yen Tung-seng, Wu Tzu-liang, Wang Hou-tsi and Sun Chung-li. Paper from "Contemporary Problems of Metallurgy". Consultants Bureau, Inc., New York, 1960, p. 158-178.

Pilot plant studies of smelting with fluorine containing ores. Effect of fluorine on corrosion erosion of refractory bearings and steel equipment, slag analysis and properties, pig iron composition and the physical chemistry of the process. Design and operation of the experimental blast furnace with data for F and S distribution during smelting. 25 ref. (D1, D11)

153-D. The Wiberg Sponge-Iron Process. M. Wiberg. Paper from "Contemporary Problems of Metallurgy". Consultants Bureau, Inc., New York, 1960, p. 179-189.

Process for gaseous reduction of lump, sintered or pelletized Fe ore in a low-shaft furnace, or any furnace operating on the counter flow principle, using CO or a mixture of CO and H. Application of the sponge Fe produced in the process to steelmaking by CO-melting with pig iron in an electric furnace. (D8j, D5)

154-D. Blast-Furnace Operation at Increased Gas Pressures. V. G. Voskoboinikov and L. I. Slepushova. Paper from "Contemporary Problems of Metallurgy". Consultants Bureau, Inc., New York, 1960, p. 190-202.

Effect of increased throat pressure on smelting intensity, coke and fuel consumption, thermal balance, reduction rate, productivity and pig iron composition in the smelting process. Review of thermodynamic and thermochemical studies, evaluation of operating characteristics of experimental furnace and survey of applications in different countries. 29 ref. (D1h, D11, 3-74)

155-D. Blast-Furnace Smelting Under Pressure and the Problem of a Rational Shape. V. M. Shchednin. Paper from "Contemporary Problems of Metallurgy". Consultants Bureau, Inc., New York, 1960, p. 203-210.

Correlation between blast furnace shape and smelting conditions. Measurement of static gas pressure distribution in furnaces during smelting to determine the necessary degree of throat reduction and/or bosh and hearth widening for achieving maximum smelting intensity under increased pressure. 12 ref. (D1h, 3-74, W17g, 17-51)

156-D. Rational Method of Blast-Furnace Blast Humidification. N. N. Baborykin. Paper from "Contemporary Problems of Metallurgy". Consultants Bureau, Inc., New York, 1960, p. 211-223.

Influence of moisture content of the blast on thermochemical parameters of the smelting process including tuyere reducing gas enrichment by H and Co, coke consumption by O_2 and heat lost by water dissociation. Control of thermal balance in the furnace by adding steam or by drying the blast to values near the limits of normal atmospheric humidity variation. 20 ref. (D1h)

157-D. The Thermal State of the Hearth in Connection With an Investigation Into the Heating Process During the Smelting of Ferrosilicon and Foundry Iron. M. Ya. Ostroukhov and L. Z. Khodok. Paper from "Contemporary Problems of Metallurgy". Consultants Bureau, Inc., New York, 1960, p. 224-235.

Study of thermochemical parameters including gas composition and temperature in the heating zone, critical temperature and temperature changes in the hearth, slag composition and temperature and extent of the heating zone. Effect of Si content in the charge and additional heat and pressure of the blast on productivity and pig iron composition. 14 ref. (D1, D11)

158-D. The Economic Advantages of Large Types of Blast Furnaces. P. A. Shiryaev. Paper from "Contemporary Problems of Metallurgy". Consultants Bureau, Inc., New York, 1960, p. 236-239.

Technical indexes for smelting in Russian blast furnaces of 1033-2286 cubic meters size are correlated with construction, equipment and operating costs to determine comparative costs per ton for conversion of Fe. (D1, 17-53)

159-D. The Economics of Developing Iron Smelting in Electrical Furnaces in Eastern Siberia and in the Far East. A. E. Probst. Paper from "Contemporary Problems of Metallurgy". Consultants Bureau, Inc., New York, 1960, p. 240-246.

Technical indexes for low-shaft electrical furnaces using brown coal and coke breeze are compared to blast furnace smelting using metallurgical coke. Economic indexes favorable to electric furnace processes are derived on the basis of lower fuel and power costs. (D8n, D1, 17-53)

160-D. The Use of High-Sulphur Bauxites of the Urals in Blast Furnaces. V. I. Koratich, V. V. Mikhoilov and O. A. Arkhipor. Paper from "Contemporary Problems of Metallurgy". Consultants Bureau, Inc., New York, 1960, p. 247-255.

Agglomeration of bauxite ores (containing 4-11% sulphur) at 1400-1500° C. to remove 98-99% of the sulphur. Blast furnace smelting (and experimental ore-thermal electric furnace smelting) of self-fluxing agglomerates with coke breeze and metal additions, to produce pig iron of low sulphur content and high alumina slags for the Al industry. Data are given for thermochemical parameters of the processes. 4 ref. (D1, B14)

161-D. Continuous Steelmaking--Why Not? John F. Elliott. Paper from "Contemporary Problems of Metallurgy". Consultants Bureau, Inc., New York, 1960, p. 256-270.

Theoretical development of a possible continuous steelmaking process based on current technology consisting of iron ore smelting, scrap melting, desulphurization, deoxidation, alloying, oxidation of solute metals (Si, Mn and P) decarburization and casting. Conventional furnaces are used with hot metal flowing to each process stage by gravity. 11 ref. (D-general, 1-61)

162-D. The Continuous Casting of Steel. G. V. Gurskii. Paper from "Contemporary Problems of Metallurgy". Consultants Bureau, Inc., New York, 1960, p. 271-293.

Solidification and recrystallization phenomena in continuous cast steels as a function of meniscus mobility, cooling rate, temperature, mold lubrication and casting rate. Micro and macrostructures of rolled specimens taken from ingots and billets of low alloy, rimming, killed and transformer steels. Design and operational characteristics of continuous casting equipment. (D9q, W19)

163-D. A Radical Improvement in the Melting of Stainless Steel. A. M. Samarin. Paper from "Contemporary Problems of Metallurgy". Consultants Bureau, Inc., New York, 1960, p. 294-300.

Process for elimination of intercrystalline corrosion, increasing resistance to general corrosion and improving structure of Ni-Cr stainless steels by melting with ferrochromium produce in vacuum and containing less than 0.03% carbon. The steel is vacuum arc and vacuum induction melted without stabilizing agents and is produced to ingots by continuous casting. 8 ref. (D5, D6)

164-D. The Mechanism of Reaction Between Vanadium Iron and a Gaseous Oxidizing Agent. A. Yu. Polyakov. Paper from "Contemporary Problems of Metallurgy".

Consultants Bureau, New York, 1960, p. 301-307.

Oxidation reactions, with vanadium, metallic impurities and slag forming agents and resultant composition change in Fe-V-C melts as a function of carbon content and oxygen solubility. Sample melts containing 0.02-0.5% V, 0.01-4.0% C and small quantities of Mn, P, Si, O and Cr are soaked in air and blown with oxygen in a converter at 1200-1470° C. for various times. 3 ref. (D11r, D3)

165-D. A Study of the Absorption of Sulphur From Gaseous Fuel During Openhearth Melting. A. I. Osipov, V. F. Surov and L. A. Sh'vartsman. Paper from "Contemporary Problems of Metallurgy". Consultants Bureau, Inc., New York, 1960, p. 308-315.

Radioactive tracer study of sulphur absorption and concentration in the metal and slag during openhearth melting of steel with blast furnace and coke oven gases containing 0.25-1.0% sulphur. The radioactivity of the Co-45, Co-60-S-35 tracers is measured periodically to follow the sulphur transfer and desulphurization mechanisms. 6 ref. (D2, D11n, 1-59)

166-D. Experience in the Use of Limestone--Ore Briquettes in the Processing of Openhearth Pig Iron in a Converter With the Use of Oxygen. S. T. Zaikov and P. Yu. Kravtsov. Paper from "Contemporary Problems of Metallurgy". Consultants Bureau, Inc., New York, 1960, p. 316-322.

Acceleration of slag formation and temperature control in converter processing of steel by adding 42-70% limestone-ore briquettes to the melt. Effect of briquettes composition on slag analysis and steel composition. 3 ref. (D3a; RM-q)

167-D. New Developments in the Planning of Steel Plants. S. M. Andronʹev, G. A. Garbuz and G. T. Litvinesko. Paper from "Contemporary Problems of Metallurgy". Consultants Bureau, Inc., New York, 1960, p. 328-346.

Survey of three technological developments and related equipment in steelmaking including evaporation cooling of steelmaking furnaces, oxygen and steam blasting of molten Fe in the ladle prior to openhearth refining and continuous casting of steel, with subsequent rolling. Thermochemical data and process parameters are given with attention to productivity and efficiency achieved through mechanization and automation. (D-general, D9q, W10f, W18)

168-D. (Translation-ConBur.) Mineral Formation in the Silica Crucible of a Steel Smelting Induction Furnace. L. I. Katyakin and L. A. Tseitlin. Academy of Sciences of the USSR., Proceedings, Chemical Technology Section, v. 130-131, Jan-Apr. 1960, p. 29-32.

Macroscopic and microscopic investigation of mineralogical zones formed in the silica crucible of a 250 kg. capacity high frequency induction furnace after production of 30 steel melts containing 0.19-0.58% C, 0.5-1% Mn, up to 0.6% Si, up to 0.2% Cr and up to 0.5% Ni at 1530-1550° C. (D6)

169-D. Technical Control in Steel Foundries in North America. C. B. Jenni. Foundry Trade Journal, v. 110, Jan. 19, 1961, p. 69-77.

Review of American steel foundry control methods in analysis of raw materials and charges, control of melting, deoxidation and pouring procedures and slag and temperature control. (D-general, S-general)

170-D. Blast Furnace Enrichment Investigations. E. J. Ostrowski, G. Kesler and N. B. Melcher. Journal of Metals, v. 13, Jan. 1961, p. 25-30.

Description of an experimental blast furnace for Fe ore, designed to operate at temperatures above 2600° F. Effects of moisture, natural gas injections and oxygen enrichment on the blast temperature, production rate, coke rate, hydrogen utilization and furnace control. (D1h)

171-D. Blast Furnace Injections. J. A. Cordier. Journal of Metals, v. 13, Jan. 1961, p. 31-36.

Methods for calculating the optimum conditions for running blast furnaces charged with Fe ore when a new material is injected into the blast. Effects of injection on Fe quality, production rate, coke rate and quality of the gas produced. Industrial trials of fuel oil and natural gas injections. (D1h)

172-D. Injection Technique Investigated on Low-Shaft Furnace. E. P. Bonnaure

and M. L. Halbrecq. Journal of Metals, v. 13, Jan. 1961, p. 37-40.

Use of an experimental low-shaft blast furnace to test the effects of various injection techniques on the heat transfer and gas reactions in the shaft, the production rate and the coke rate. Techniques tested include injection of light fuel oil with oxygen enrichment of the blast and injection of fuel oil or rest-gas (60% CH_4) with superheating of the blast. (D1h)

173-D. Thermal Aspects of Blast Furnace Fuel Injection. A. M. Decker. Journal of Metals, v. 13, Jan. 1961, p. 41-44.

Methods for applying the results of fuel injection experiments in pilot-plant blast furnaces to commercial furnaces. Calculations are based on rco and rh (the mean fractions of metallic oxide reduced by CO and H_2, respectively) for each furnace. 16 ref. (D1h)

174-D. Ferromanganese Production With Oxygen Enrichment. J. M. Stapleton, R. J. Flanagan, R. L. Stephenson and D. A. Fletcher. Journal of Metals, v. 13, Jan. 1961, p. 45-48.

Increase of the oxygen concentration to 26.5% in blast furnaces melting ferromanganese ores, with a resulting increase in production and decrease in coke rate. Calculation of increased benefits from oxygen enrichment up to 38-40%. 4 ref. (D1h; AD-n31)

175-D. Coke-Oven Gas Injection Into the Blast Furnace. E. R. Dean and R. A. Powell. Journal of Metals, v. 13, Jan. 1961, p. 49-50.

Injection of coke-oven gas containing small amounts of H_2S into the tuyeres of a merchant iron blast furnace, with a resulting increase in metal production and decrease in coke consumption. (D1)

176-D. (French.) New Prospects for Metallurgy From Reactions Obtained by Injection of Powdered Materials Into Molten Metals. Marc Allard. Revue de Metallurgie, v. 57, Nov. 1960, p. 985-989.

Refining reactions obtained by blowing powdered lime, slag, Mg, B, Si or Cr into molten Fe or steel as in the Perrin process and the mechanical characteristics of basic Bessemer hot rolled sheets produced by the injection of lime powder. (D3f, Q-general, 2-60; ST-d)

177-D. (German.) Renn Lumps and Sponge Iron as Cooling Agents in the Oxygen Steelmaking Process. E. Plockinger and K. Borowski. Technische Mitteilungen Krupp, v. 18, Aug. 1960, p. 1-8.

Effect of fine grain Renn lumps and sponge iron additions in the L-D process on the thermochemistry of the process, blowing conditions and composition of the iron produced. Advantages over slag cooling. 6 ref. (D10a)

178-D. Present Trends in Direct Arc Electric Furnace Applications. Pt. 1. W. E. Lewis. Industrial Heating, v. 28, Jan. 1961, p. 90-94, 96, 98, 100.

Use of direct arc electric furnaces in the production of carbon steel ingots and iron and steel castings. Review of direct reduction processes to supplement furnace operations using steel scrap charges. (D5)

179-D. Alternative Iron Making Processes. Mining Journal, v. 256, Jan. 20, 1961, p. 65, 67.

Description of various ironmaking processes in which reduction may be effected in a vertical shaft, a rotating horizontal kiln, a static or fluidized bed or an electrically heated bath. Survey of factors such as fuel and power requirement which govern process selection. (D8)

180-D. (Czech.) Use of Oxygen in the Electric Furnace Process. Rostislav Krejci. Slevarenstvi, v. 8, Dec. 1960, p. 439-440.

Partial carbon oxidation and dephosphorization are achieved by adding ore to an electric arc furnace charge containing a higher amount of limestone than usual. After removal of the primary slag a new slag is produced by lime addition. Scale distributed on the surface causes the slag to foam which eliminates temperatures during subsequent heating. Then oxygen is introduced by steel tubes of 3/4-1 in. diameter. (D5g)

181-D. (Japanese.) Equilibria Between Dissolved and Gaseous Sulphur and Sulphur Dioxide in Molten Iron. Zen-ichiro Morita and Akira Adachi. Tetsu-to-Hagane (Iron

and Steel Institute of Japan, Journal), v. 47, Jan. 1961, p. 16-21.

Pressures of sulphur gases and sulphur dioxide in equilibrium with molten Fe and heats of vaporization of sulphur from the bath are determined from equilibrium relations established by thermodynamic calculations. 10 ref. (D11)

182-D. Steel From Copper Slags. E. J. Fitzgerald. Journal of Metals, v. 13, Feb. 1961, p. 135.

Steel is produced from waste Cu slags by a modified Strategic-Udy process in which preheated lime is charged with Cu slag, pyrites and coal into an electric matting furnace and resulting Fe-silica slag is refined in a smelting furnace to produce a semi-steel containing 1.00-1.25% carbon. (D8p, D11n)

183-D. The Ajax Furnace and Process. A. Jackson. Journal of Metals, v. 13, Feb. 1961, p. 148-152.

Review of the Ajax process in which oxygen blowing and a 100% hot metal charge are used to produce steel from phosphoric pig iron. Design of the Ajax furnace which basically operates an oxygen process designed to have the maximum thermal efficiency but retains the characteristics of the open-hearth for fettling and final refining of the charge. (D10)

184-D. Smelting Special Ores. Mining Journal, v. 256, Jan. 27, 1961, p. 97.

Techniques for smelting low grade siliceous ores, titaniferous ores, low grade Mn ores, slags from nonferrous smelting operations and Zn, Ni and Cr ores. Methods described include Krupp-Renn, Strategic-Udy, Ugine and Sturzelberg processes. (D-general)

185-D. The Hydrogen Reduction of a Low-Grade Siliceous Iron Ore. Franklin J. Hill and Theodore D. Tieman. Metallurgical Society of AIME, Transactions, v. 221, Feb. 1961, p. 68-72.

Sized fractions of Wisconsin Gogebic taconite are reduced with hydrogen at 600-1000° C. In general, the degree and rate of reduction increase with temperature, gaseous diffusion appearing to be significant as a rate controlling factor at certain stages. 14 ref. (D8j)

186-D. End-Point Temperature Control of the Basic Oxygen Furnace. W. J. Slatosky. Metallurgical Society of AIME, Transactions, v. 221, Feb. 1961, p. 118-130.

Mathematical equations are developed as the product of a thermochemical analysis of the process and are designed to calculate the required scrap, lime and hot metal additions and determine thermal balance, heat loss and tapping temperature in terms of a number of independent variables. Technical indexes are given for test heats using this technique. 9 ref. (D10, 1-65, D11)

187-D. Reduction Kinetics of Magnetite in H_2-H_2O-N_2 Mixtures. W. M. McKewan. Metallurgical Society of AIME, Transactions, v. 221, Feb. 1961, p. 140-145.

Dense magnetite pellets are reduced in hydrogen-water vapor-nitrogen mixtures at 400-500° C. at a pressure of 0.97 atm. The rate of reduction per unit area is found to be constant with time and directly proportional to the partial pressure of hydrogen at a constant ratio of water vapor to hydrogen. Water vapor poisons the oxide surface by an oxidizing reaction and markedly slows the reduction. The enthalpy of activation is found to be +13,600 cal. per mole. 6 ref. (D8j)

188-D. Oxygen Steelmaking for Flat Rolled Products. R. W. Evans. Paper from "Production of Wide Steel Strip". Iron and Steel Institute, London, England, May 1960, p. 21-33.

Reduction of nitrogen and phosphorus content of basic Bessemer steels is obtained by top or bottom oxygen blowing. Acid and basic converter, L-D, Kaldo and basic openhearth methods are also compared as to suitability of products for strip rolling. (D2g, D3f, D10)

189-D. Openhearth Steelmaking Practice for Flat Rolled Products. S. J. Dougherty and R. Duffett. Paper from "Production of Wide Steel Strip". Iron and Steel Institute, London, England, May 1960, p. 33-41.

Production of deep drawing rimmed steel, mechanically capped steel and Al-killed steel in oil and natural gas fired openhearth furnaces using oxygen blowing to reduce phosphorus content. Suitability of product for rolling is a result of this reduced phosphorus content. (D2g)

190-D. Production of steel with Extensive Use of Oxygen in the Openhearth Melting Shop at Cornigliano. M. Foresi and G. Massobrio. Paper from "Production of Wide Steel Strip". Iron and Steel Institute, London, England, May 1960, p. 42-51.

Production of steel by oxygen blowing in a basic roof openhearth furnace. Influence of oxygen blowing on refractory consumption, refining time, heat consumption, production rate, carbon and phosphorous content and surface quality of slab. (D2g)

191-D. Combustion and Heat Transfer in the Openhearth Furnace. C. Holden. Glass Technology, v. 1, Dec. 1960, p. 251-259.

Comparison of various fuels; effect of preheat level and use of combustion oxygen; factors affecting heat transfer including bath coverage and flame emissivity and temperature; effect of furnace design on the flow of gases within the chamber and their consequent influence on over-all heat transfer. 18 ref. (D2h)

192-D. (German.) Control of Oxygen Content in Mild Openhearth Steel During Refining. Walter Hess. Stahl und Eisen, v. 81, Jan. 19, 1961, p. 103-110.

Use of Al additions to control carbon-oxygen ratio during refining, pouring and ladling of mild (under 0.2%) openhearth steel. (D2)

193-D. (German.) Operation Experiences With Thin Walled Seamless Molds for Continuous Casting. Bruno Tarmann and Othmar Kleinhagauer. Stahl und Eisen, v. 81, Jan. 19, 1961, p. 111-119.

Continuous casting of alloy steel using thin, seamless tubes of Cu, brass or steel as molds. Data are given for heat conductivity and lifetime of mold and for heat transfer rate from mold to cooling water. (D9q, W19c; Cu-b, ST, 17-57)

194-D. The Swing to All-Basic Furnaces. J. H. Chesters. Glass Technology, v. 1, Dec. 1960, p. 243-250.

Economy of replacing silica roofs with basic chrome-magnesite brick utilizing faster driving involving greater fuel input rates with or without oxygen for combustion and lancing. Increased outputs are achieved with roof lives two or three times that of silica in spite of substantially higher operating temperatures. 16 ref. (D-general, W18r; RM-h38, 17-57)

195-D. The Theoretical Bases on Oxygen Steelmaking. J. Pearson. Iron & Coal Trades Review, v. 181, Dec. 30, 1960, p. 1407-1413.

Theoretical chemistry of steelmaking by the Thomas, L-D, Kaldo and Rotor processes, taking into consideration the role of oxygen and the oxidizing power of the slag at various stages of the process. (D3, D10)

196-D. New Lance Mixes Fuel and Oxygen. Iron & Coal Trades Review, v. 181, Dec. 30, 1960, p. 1419-1420.

Increased production of steel from an openhearth furnace is achieved with an oxygen lance which intensifies the mixing and burning of natural gas with oxygen to reduce the melt-down time. After melting is complete, a high oxygen input rate is maintained to speed up refining. (D2g)

197-D. (German.) Improvement of Efficiency of a Pilot Blast Furnace by Oxygen and Carbon Dioxide Additions to Blast. Rudolf Spolders and Werner Wenzel. Stahl und Eisen, v. 81, Feb. 2, 1961, p. 149-154.

Test melting of conventional blast furnace burden in a 0.6 m. diameter pilot blast furnace with CO_2 and oxygen enrichment (up to 16.6% CO_2 and up to 45% O_2) in blast. Temperature measurement and sampling of burden and gas in furnace during melting by vertical probes. Improvement of efficiency; costs. (D1h)

198-D. (German.) Reactions in Oxygen Top Blowing in Rotating Vessels. Pt. 1. Ernst Hardt, Gunther Vocke and Hermann Schenck. Stahl und Eisen, v. 81, Feb. 2, 1961, p. 155-163.

Oxygen refining of basic Bessemer pig iron in horizontal rotating pilot vessels with round or oval cross section to obtain hard low-phosphorus steels without recarburizing after refining. Decarburizing, dephosphorizing and desulphurizing as influenced by shape of vessel and rotating speed. (D2g)

199-D. (German.) Metallurgy of the "Phoenix-Lance" Process. Eberhard Schurmann, Karl-Kurt Aschendorff, Heinz Hofges and Egon Kohler. Stahl und Eisen, v. 81, Feb. 2, 1961, p. 163-172.

Refining of basic Bessemer pig iron in a 16 ton converter in three steps:

vertical blowing with air; after partial liquefying of lime oxygen, top blowing upon slag in horizontal converter and short-time air blowing in vertical converter to finish run. Investigation and metallurgical interpretation of refining in terms of decarburizing, dephosphorizing and sulphur, oxygen and nitrogen control. (D3)

200-D. (German.) Investigation of Gas Absorption and Release of Gas by the Steel Stream in Top-Pouring of Heavy Forging Ingots. Eberhard Schurmann, Martin Hater and Alfred Fricke. Stahl und Eisen, v. 81, Feb. 2, 1961, p. 172-183.

Measurement of oxygen pick-up during open and covered mold casting of 78 ton bars. Measurement of change of hydrogen, CO and CO_2 content in mold atmosphere during casting in enclosed mold to evaluate gas release by steel stream. Thermodynamic interpretation of results. (D9s)

201-D. Kaiser Steel, Fontana Plant. T. J. Ess. Iron and Steel Engineer, v. 38, Feb. 1961, p. K3-K25.

Production of iron from ore by reduction in blast furnace. Steelmaking in openhearth and oxygen furnaces. Rolling of ingots in numerous mills to produce sheet, strip, beams, pipe and butt welded tube. Production of tin plate. (D-general, F23, 18)

202-D. Oxy-Fuel Processes Increase Steelmaking Rates. E. F. Kurzinski and R. D. Jones. Iron and Steel Engineer, v. 38, Feb. 1961, p. 67-72.

Steelmaking in openhearth furnaces using oxygen and fuel injector lances. Influence of oxygen flow rate on production rate, decarbonization rate, fuel and oxygen consumption and heating efficiency. (D2g)

203-D. (French.) Metallurgical Study of Electrical Furnaces. G. Grenier. Journal du Four Electrique, v. 65, Nov-Dec. 1960, p. 273-277.

Survey of steels produced in the electrical furnace such as ferritic stainless with 13% Cr, 18-4-1 high-speed, Mn, Al and Si steel and steel for valves and magnets and high temperature applications. Compositions and some practical production suggestions for these steels. (D5, D6)

204-D. (Translation-Brutcher no. 5024.) The Deoxidation of Steel With Aluminum. G. S. Ovsyuk. Liteinoe Proizvodstvo, June 1960, p. 47-48.

Report on trial heats in acid-lined electric arc furnaces producing 0.15-0.20% carbon steels for castings in which the ferromanganese and ferrosilicon were added in the furnace while 0.10 and 0.15% Al are added in the ladle. (D3; AD-r, Al)

205-D. (Translation-Brutcher no. 5026.) Recent Vacuum Installations for the Degassing of Liquid Steel. G. Kaspar. Berg- und Huttenmannische Monatshefte, v. 105, 1960, p. 149-150.

Description of layout of an industrial-scale steel degassing plant designed on the four-post principle and put into operation in Nov. 1959. Operation; space requirement; best location. Degassing installation on the ladle-lift principle. Steel degassing plant designed after the balance-beam principle and suited chiefly for the degassing of smaller capacity ladles. (D9s, 1-73)

206-D. (Translation-Brutcher no. 5048.) Control of Industrial Processes by Computing Machines. A. B. Chelyustkin. Metallurg, May 1959, p. 4-6.

Promise of use of computing devices by the iron and steel industry. Automatic electronic potentiometer, its operation and possibilities. Electromechanical device for converting continuous variables into discrete ones. Computers for digital scanning systems; coke by-products plants; calculation of heat balance in zone of direct reduction of blast furnaces to deliver a corresponding volume of air; automatic control of delivery of metal by rolls of reversing mills. (D-general, X14)

207-D. Iron Offers Low Residuals. Steel, v. 148, Mar. 13, 1961, p. 122-123.

Applications of Sorelmetal, a ferrous material of low residual element content produced by a direct reduction process. (D8j; Fe, 17-57)

208-D. Process Made Feasible by Sale of Both Iron and Slag. Steel, v. 148, Mar. 13, 1961, p. 123-124.

Electric furnace reduction process starting with a mixed hematite and ilminite ore in which most of the iron

is recovered as the metal while slag, containing all the Ti, is sold to producers of Ti metal. Iron is separated as metal because iron oxide is not present in excess. (D6)

209-D. Rotor Steelmaking Furnace Minimizes Charged Scrap. Steel, v. 148, Mar. 13, 1961, p. 130.

Use of a rotating furnace with oxygen blowing into the bath through one lance and over the bath through another line. Steel quality is equal to that produced in basic openhearths while scrap consumption is reduced. (D10c)

210-D. Yugoslavs Prove Out Copper Process. Steel, v. 148, Mar. 13, 1961, p. 132.

Production of oxygen-hydrogen free Cu by melting under a controlled atmosphere in an induction furnace and continuous casting in a vertical reciprocating mold. (D5j, D5q; Cu)

211-D. Vacuum Degassing of Steel. D. E. Parsons and W. A. Morgan. Canadian Mining and Metallurgical Bulletin, v. 54, Feb. 1961, p. 163-169.

Review of techniques such as ladle degassing, vacuum stream droplet degassing, pipette lifting method of ladle degassing and vacuum pipette degassing. Operating pressures, reduction in gas contents and improvements in hydrogen segregation, steel cleanliness and mechanical properties obtained with the various techniques. Description of an experimental vacuum stream droplet degassing unit and some results obtained on laboratory steel melts. 18 ref. (D9s, 1-73)

212-D. (German.) Preparation of Burden and Its Effect on Blast Furnace Operation. Gerhard Heynert, Paul Ischebeck and Wilderich von Spee. Stahl und Eisen, v. 81, Jan. 1961, p. 1-12.

Burden preparation by ore crushing, screening and sintering to obtain completely graded and sintered burden. Influence of burden preparation on coke rate, flue dust production, blast and waste gas temperature, power and fuel economy and furnace output. Heat balance and economic efficiency. (D1a)

213-D. (German.) Production and Use of High-Basicity Sinters in the Blast Furnace. Ludwig von Bogandy. Stahl und Eisen, v. 81, Jan. 1961, p. 12-22.

Review of recent research results on production and melting of high-basicity sinter in terms of sintering technology and thermodynamic and mechanical properties of sinter. Theoretical and practical data obtained in melting of sinter include: coke rate as influenced by limestone additions; amount and caloritic power of waste gas; flow pattern; slag formation and efficiency of pig iron production. (D1)

214-D. (German.) Experiences With Hot Tops Made of Combustible Plates and Exothermic Feeder Heads for Ingot Molds. Alvis Schoberl and Rudolf Plessing. Stahl und Eisen, v. 81, Jan. 1961, p. 22-30.

Increase of billet output by use of hot tops lined with combustible plates or exothermic material rather than with fire-clay in casting of unalloyed and alloyed steel ingots. Influence of steel shrinkage during solidification on steel quality. (D9p)

215-D. Experiments on Blast Furnace Operation in Yawata Iron and Steel Works. K. Wada and A. Honda. Paper from "Symposium on Pilot Plants in Metallurgical Research and Development". Council on Scientific & Industrial Research, Jamshedpur, India, 1960, p. 169-181.

Outline of experimental research on the efficiency of blast and low shaft furnaces as affected by crushing and screening of raw materials, use of coalite coke and use of heating and desulphurizing agents. A complete chemical analysis of ores is made and tabulated with operational data. (D1)

216-D. The Low Carbonization and Smelting Process in Low Shaft Furnace. I. Reinfeld. Paper from "Symposium on Pilot Plants in Metallurgical Research and Development". Council on Scientific & Industrial Research, Jamshedpur, India, 1960, p. 266-270.

Development of a process using agglomerations of ore fines and other fine grained Fe bearing materials which due to their identical size are suited for a physical burden. Process makes it possible to bind in fine grained fuels which are generally unsuited for production of good metallurgical coke. Tests are run and the pig iron, top gas, coal, coke and briquette mixtures analyzed. (D8n, A9j)

217-D. Intensification of Openhearth Process by Compressed Air. N. Shirokov. Paper from "Symposium on Pilot Plants in Metallurgical Research and Development". Council on Scientific & Industrial Research, Jamshedpur, India, 1960, p. 266-270.

An openhearth process is intensified by the application of gaseous oxygen for both enrichment of the blast supplied for fuel burning and for the direct oxidation of the bath carbon. Data are given for the effects of enrichment of the oxygen blast on furnace output, fuel and ore consumption, dust content and furnace temperatures. (D2g, A9j)

218-D. (French.) Reduction of Magnetite in the Gaseous Phase. R. Zoja, M. Ferrero and G. Timo. Revue de Metallurgie, v. 57, Dec. 1960, p. 1073-1080.

Laboratory and blast furnace observations of the reduction of magnetite specimens from Mines de la Cogne. Dependence of reduction on oxygen potential of the atmosphere, Fe sponge, Fe + wustite, wustite, wustite + magnetite and unreduced magnetite being obtained according to this potential. (D1)

219-D. (French.) Rate of Mass Transfer Between Metal and Slag During Steel Production, Studied on Models. P. Roquet and J. Adam-Gironne. Revue de Metallurgie, v. 57, Dec. 1960, p. 1081-1089.

Study of the kinetics of steel production in a rotary furnace by investigating analogous processes taking place at room temperature and between oleic acid in xylene and aqueous lime solution. A general formula for refining time is derived as a function of the dimensionless numbers involved in the diffusion process occurring at the metal-slag interface, which is assumed to be rate governing. 9 ref. (D10c, D11n, 17-56)

220-D. Infrared Film Helps Design a Better Oxygen Lance. Iron Age, v. 187, Mar. 23, 1961, p. 80-81.

Infrared film is used to record lance performance inside the furnace. Photographs show the stage in the heat cycle most erosive to the lance case. (D1h)

221-D. The Potential and Limitations of High Blast Temperatures. T. L. Joseph. Blast Furnace and Steel Plant, v. 49, Mar. 1961, p. 239-246.

Review of experimental results on the influence of blast temperature on the coke rate, size of combustion zone and temperature drop in insulated or screened blowpipes. Details of a special chromel-alumel thermocouple for measuring the temperature drop along insulated blowpipes. (D1b)

222-D. One of the Largest Continuous Casting Plants in the World. Aciers Fins & Speciaux Francais, Dec. 1960, p. 36-38.

Pouring, molding, continuous casting and cooling practices used in production of stainless, high temperature, valve and high speed steels at a French foundry. (D9q)

223-D. Control of Foundry Steelmaking. J. Blackburn. Foundry Trade Journal, v. 110, Feb. 23, 1961, p. 231-238.

Control of raw materials used in foundry steelmaking such as scrap, ferro-alloys and fluxes. Emphasis on items to control scrap quantity, composition, physical condition and segregation. Method of charging the furnace and working the melt. Composition of the bath and slag. Notes on the oxidizing and reducing periods. 5 ref. (D-general)

224-D. (German.) Manganese Distribution Between Iron Melts and Iron (11)-Oxide Slags in MnO Crucibles at 1520-1770° C. Wilhelm Anton Fischer and Hans Joachim Fleischer. Archiv fur das Eisenhuttenwesen, v. 32, Jan. 1961, p. 1-10.

Study of metal-slag equilibria and subsequent chemical, metallographic and X-ray investigation of reaction products to measure oxygen and Mn distribution. Thermodynamics of steel deoxidation by Mn. Measurement of melting point of MnO and liquidus line in the FeO-MnO system by thermal analysis. (D11)

225-D. Smelting Taconite in the Bureau of Mines Experimental Blast Furnace. Miles B. Royer, Norwood B. Melcher and W. O. Philbrook. U. S. Bureau of Mines, Report of Investigations 5724, 1961, 15 p.

Experimental refining of crude taconite to determine the extent to which blast furnaces can be used for smelting these siliceous iron ores. Tests indicate that coke consumption, slag rates, sulphur content and cost factors are significantly higher while metal quality is erratic as to Si content when compared to Mesabi iron ore. 7 ref. (D1b)

226-D. (German.) Use of a Lime-Iron-oxide-Sinter in the Basic Openhearth Process. Werner Fiedler. Freiberger Forschungshefte, no. B 43, 1960, 64 p.

Production of $CaO-Fe_2O_3$ sinter pellets (37.5% CaO, 62.5% Fe_2O_3) in a revolving kiln. Test melting in 40 ton basic openhearth furnaces with silica roof using $CaO-Fe_2O_3$ sinter as refining addition. Metallurgical effect of sinter on dephosphorization, desulphurization, carbon refining, Mn distribution and output. (D2, D11, 2-60)

227-D. (German.) Nonequilibria in Metal-Slag Reactions in the Basic Bessemer Converter. Theodor Kootz and Hans Joachim Ueberhorst. Stahl und Eisen, v. 81, Feb. 16, 1961, p. 239-248.

Influence of increasing amounts of SiO_2, Mn, Al_2O_3, TiO_2, MgO and CaF_2 on final composition of slag and metal in conventional basic Bessemer steel refining (40 ton converter). Influence of addition on decarburization, desulphurization and dephosphorization kinetics. (D11r, 2-60)

228-D. (French.) Back Pressure and Fuel Injection in Low Shaft Furnace Operation. E. Bonnaure. Revue de Metallurgie, v. 58, Jan. 1961, p. 13-24.

Increase of furnace efficiency by selection of optimum charge composition, size and CaO/SiO_2 ratio, providing for the phenomenon of back pressure injection of liquid and gaseous fuels and utilization of heated and oxygen enriched blast. 13 ref. (D8n)

229-D. (French.) Kaldo Process. R. Colmant, G. Decamps and P. Rocquet. Revue de Metallurgie, v. 58, Jan. 1961, p. 39-43.

Design and technical index for 110 metric ton Kaldo furnace producing extra-mild steel containing 0.045-0.077% C, 0.23-0.435% Mn, 0.009-0.016% P and 0.009-0.016% S. Data are given for hardness, elastic limit, tensile strength and elongation of deep drawing sheet manufactured from this steel. (D10b, Q-general; CN-g)

230-D. (Japanese.) Kinetic Studies of Steelmaking Reactions. Pt. 2. Rate of Carbon Oxidation in Liquid Iron by Oxygen Blowing. Kichizo Niwa, Mitsuo Shimoji, Tamiya Kishida and Yukiyoshi Itoh. Tetsu-to-Hagane (Iron & Steel Institute of Japan, Journal), v. 47, Feb. 1961, p. 111-115.

The velocity of the decarbonization reaction in liquid Fe as a function of oxygen pressure and velocity during oxygen blowing and time and temperature is considered theoretically in terms of the diffusion film theory and is observed in an experimental reactor at 1550° C. with oxygen pressure of 25-600 mm. Hg and flow velocity of 55 cc. per min. The rate determining factor for carbon oxidation is determined as the transfer of reactants (carbon) towards the surface where an equilibrium occurs. 5 ref. (D10, D11r)

231-D. (Japanese.) Continuous Casting of Steel. Pt. 4. Mechanism of Evaluation of Inner Cracks of Cast Billets. Kiyoto Ushijima. Tetsu-to-Hagane (Iron & Steel Institute of Japan, Journal), v. 47, Feb. 1961, p. 116-124.

Internal cracking as a function of internal stress caused by solidification phenomena in 0.62% carbon steel is investigated by macroscopy and microscopy methods and dye penetrant and magnetic inspection. Thermal stresses introduced by rapid spray cooling and mechanical stresses imposed by pinch rolling are shown to cause internal cracking with the extent of cracking being controlled by the solid-liquid metal interfaces and the temperature differences in the billet. 12 ref. (D9q, E25n, 2-61, 3-66, 9-72; ST)

232-D. Fuel and Energy Required for Steelmaking by the VLN Convertor Process. G. G. Fletcher and R. A. Pullen. Institute of Fuel, Journal, v. 34, Feb. 1961, p. 46-52.

Principles and application of the VLN oxygen-steam bottom blown basic convertor process used for producing deep drawing steels. Externally supplied fuel is not used in the process, the heats of oxidation of the hot metal impurities by the oxygen-steam blast and the heat of slag formation being sufficient. 9 ref. (D10c)

233-D. (Italian.) Application of Oxygen in Steel Production. Fonderia, v. 10, Jan. 1961, p. 23-26.

Use of oxygen blowing in the openhearth and in L-D, Kaldo and Rotor processes. (D10, D2g)

234-D. (Portuguese.) Modern Metallurgical Processes. Energy Requirements.

Ferrucio Fabriani. Engenharia, Mineracao e Metalurgia, v. 32, Dec. 1960, p. 339-345.

Calculations for the relation between enthalpy and mass to be reduced in metallurgical processes. Application to 21 modern furnace types. 8 ref. (D11, D-general, P12r, W17)

235-D. (Czech.) Manufacture of Stainless Steels in the Openhearth Furnace. Karel Protiva. Hutnicke Listy, v. 16, Jan. 1961, p. 7-12.

Openhearth production of Cr17Mn18 Ni4N2 and Cr18Ni9Ti alloy steel from charges containing scrap of these steels, carbon steel scrap, ferrochromium, silicochromium, metallic Ni and NiO with oxygen being blown through the melt. 5 ref. (D2g)

236-D. (Czech.) Remelting of Austenitic CrNiMnN Steel Scrap. Karel Lobl and Karel Hybek. Hutnicke Listy, v. 16, Jan. 1961, p. 13-19.

Processing of a charge containing 50-60% of the scrap and 0.25-0.30% carbon in an electric arc furnace with oxygen being blown through the melt. Formation of manganese silicate in the slag is avoided by adequate limestone addition. 14 ref. (D5a)

237-D. Agglomeration of Iron Ores Furthers Automation of the Blast Furnace. M. J. Greams. Iron and Steel Engineer, v. 38, Mar. 1961, p. 119-124.

Use of iron ore sinter and pellets as burden material with accompanying changes in blast furnace practice, such as beneficiation of raw materials, use of self-fluxing sinter, operation at higher top pressure maintaining higher blast temperatures while adding moisture, oxygen and natural gas. (D1a, B16; Fe)

238-D. Production of Stainless Slabs at the Continuous Casting Plant of Schoeller-Bleckmann Stahlwerke AG. B. Matuschka. Iron and Steel Institute, Journal, v. 197, Mar. 1961, p. 189-196.

Methods and equipment used in casting Ti stabilized stainless steel slabs. Effects of casting temperature, casting speed and degree of cooling on surface finish and quality of slab cross-section. (D9q, 1-52)

239-D. Notes on Gas-Flow Pattern Through the Regenerative Chambers of Open-Hearth Furnaces. Louis G. Septier. Iron and Steel Institute, Journal, v. 197, Mar. 1961, p. 215-222.

Theoretical consideration of gas-flow patterns through regenerative chambers of openhearth furnaces. Effects of pressure conditions above and under the checkers. Improvement of gas distribution in conventional regenerative chambers. Types of construction regularizing gas flows. 28 ref. (D2h)

240-D. Fluid Mold Aids Forging Finish. Iron Age, v. 187, Mar. 30, 1961, p. 111.

Molten slag is used to seal mold walls so that flaws can not occur on ingot surfaces during casting of high-temperature alloys and stainless and toolsteels. (D9k)

241-D. Fuel and Power Required for Making Steel in the LD Process. Kurt Rosner and Ferdinand Dobrowsky. Journal of the Institute of Fuel, v. 34, Jan. 1961, p. 3-7.

The amounts of heat available in L-D steelmaking, namely, the physical heat of the hot metal; the heat of oxidation of the accompanying elements including Fe going into the slag and into the dust; and the combustion of the process gases above the mouth of the crucible are compared with the utilized amounts of heat, these being composed of the heat contents of the liquid metal and slag; the heat required for the direct reduction of ore additions; and the heat content of the steam generated in the waste heat boiler. (D10a, D11k)

242-D. (Slovak.) Intensification of the Flame by the Addition of Oxygen in SM Furnaces. Alojz Presern. Nova Proizvodnja, v. 40, 1960, p. 368-380.

Direct addition of oxygen to the melt in the Siemens-Martin process shortens refining time, increases production and saves fuel, however, the reaction produces a thick brown smoke which contaminates the atmosphere. Intensification of the flame enables a much higher productivity, greater fuel economy and equally advantageous metallurgical conditions, while eliminating the contaminating fumes accompanying direct oxygen addition. (D2)

243-D. (Translation-Brutcher no. 5030.) Desulphurization of Pig Iron Outside the Blast Furnace Using Lime and Powdered Aluminum. S. K. Sobolev. Production

and Processing of Steel and Alloys. Metallurgizdat Press, 1960, p. 5-14.

Importance of having a simple and cheap method of external desulphurization of pig iron for subsequent refining operations. Laboratory experiments on desulphurization with lime injected into pig iron with the aid of an inert gas (nitrogen); factors determining the optimum conditions for sulphur removal. (D11n)

244-D. (Translation-Brutcher no. 4921.) Rate of Oxygen Removal in the Reduction of Iron Ores by a Mixture of Carbon Monoxide, Hydrogen and Nitrogen. E. Schurmann. Archiv Eisenhuttenwesen, v. 31, Sept. 1960, p. 509-519.

Study of rate of oxygen removal from a magnetite and a hematite ore during the reduction processes in the blast furnace stack. Theoretical analysis of the progress and rate of the reactions between a stream of carbon monoxide, hydrogen and nitrogen and solid iron ores. (D1)

245-D. (Translation-Brutcher no. 4940.) On the Refining of Basic Bessemer Irons by Oxygen Top Blowing L-D Process. Pt. 1. W. Plockinger. Stahl und Eisen, v. 80, no. 22, 1960, p. 1477-1481.

Development of a simple and dependable oxygen top-blowing process for basic pig irons with increased phosphorus contents. Theoretical and practical study of gas dynamics in free gas jets; general pattern; dynamic pressure distribution and oxygen content in a free jet in air. Optimum conditions for successful refining of basic Bessemer irons and how they can be realized. (D10a)

246-D. (Translation-Brutcher no. 5097.) Analysis of Some Factors in L-D Steelmaking (by Oxygen Top Blowing). M. Kishida. Tetsu-to-Hagane (Iron and Steel Institute of Japan, Journal), v. 46, Oct. 1960, p. 1182-1185.

Evaluation of three months' operating results (rimmed carbon steel for tubes) of an oxygen top-blown L-D furnace by multiple regression analysis. Factors in greatest need of control during operation: silicon content and temperature of hot metal; quantity of scrap and iron ore added. Effect of stage of furnace campaign on phosphorus in metal at end of blow; blowing time and metal yield. (D10a)

247-D. (Translation-Brutcher no. 5096.) Composition of the Hot Metal for the Oxygen Top-Blowing L-D Process. M. Oishi. Tetsu-to-Hagane (Iron and Steel Institute of Japan, Journal), v. 46, Oct. 1960, p. 1185-1187.

Plant-scale study of effect of hot metal composition on oxygen top-blown L-D furnace operations. Relations among slag weight, silicon and phosphorus contents of hot metal and slag basicity. (D10a)

248-D. (Translation-Brutcher no. 5095.) Sulphur Balance in a 50 Ton Oxygen Top-Blown L-D Furnace. S. Maehara. Tetsu-to-Hagane (Iron and Steel Institute of Japan, Journal), v. 46, Oct. 1960, p. 1187-1189.

Calculation of sulphur balance based on routine operating data from a 50 ton oxygen top-blowing L-D furnace producing low-carbon rimmed steel. Comparison of sulphur balance for L-D furnace with that for an openhearth furnace. Desulphurization by L-D furnace slag compared with openhearth slag. (D10a)

249-D. Russians Alter Blast Furnaces to Improve Oxygen Injection. Iron Age, v. 187, Apr. 13, 1961, p. 98-99.

Design of an oxygen feed system for use in blast furnaces producing no-silicon low-sulphur semifinished metal at 1450° C. Changes in ore beneficiation processes and pouring techniques are suggested as ways to increase production. (D1h)

250-D. Desulphurization of Cast Iron by Electrolyzing Slag. Foundry Trade Journal, v. 110, Mar. 23, 1961, p. 363-368.

Theory of desulphurization and technological parameters for electrolytic desulphurization of cast iron at 1500° C. Effect of slag basicity, current density, time of electrolysis, voltage and carbon and sulphur content on the percentage of desulphurization. 13 ref. (D11n)

251-D. Internal Defects in Steel Castings--Their Nature and How They Can Be Avoided. Foundry Trade Journal, v. 110, Mar. 23, 1961, p. 369-370.

Nature and incidence of internal defects occurring during steelmaking of large forging and casting ingots, including sand inclusions, gas porosity, contraction and shrinkage. (D9, 9-67, 9-68, 9-69)

252-D. (German.) Equilibrium of Sulphur Reaction Between Liquid Carbon Saturated Iron and Lime-Silica-Magnesium Oxide Slags. Hermann Schenck, Martin G. Frohberg and Tarek El Gammal. Archiv fur das Eisenhuttenwesen, v. 32, Feb. 1961, p. 63-65.

Measurement of sulphur distribution between carbon saturated iron and slags containing 21.15-55.61% CaO, 41.8-54.86% SiO_2 and 2.34-25.52% MgO at 1550° C. Influence of MgO on sulphur equilibrium. (D11n)

253-D. The Swing to All-Basic Furnaces. J. H. Chesters. Refractories Journal, Feb. 1961, p. 44-49.

Review of three main types of roof construction for the all-basic furnace; the continental, fully suspended and the rigid. Evaluation of the all-basic furnace for efficiency and economy in steelmaking as a result of faster driving--involving greater fuel input rates, with or without oxygen for combustion and lancing. Properties of silica and chrome-magnesite roof bricks. 16 ref. (D2, W18r, 1-65)

254-D. (Italian.) Ferrous Ingots. Raffaelo Zoja. Fonderia Italiana, v. 9, Dec. 1960, p. 484-489.

Furnace charging; reduction of oxides and influence of furnace operating conditions on casting composition. Standard composition of typical ingots. (D8)

255-D. Oxygen Converter Processes. H. F. Padbury. Refractories Journal, v. 36, May 1960, p. 118-120.

Technology of the bottom blown converter process using an oxygen-enriched air and oxygen-steam mixture and the top blown oxygen process as represented by LD and LD-AC (lime injection) processes. Consumption and wear pattern of refractories used in the process. (D10; RM-h, 17-57)

256-D. (French.) Processes for Reducing Iron From Minerals and Rumanian Research in This Field. P. Dumitrascu and M. Ispas. Revue Roumaine de Metallurgie, v. 5, Feb. 1960, p. 267-289.

Reduction of Fe in the liquid, viscous and solid state. Research on the application of mazut or methane in the blast furnace; review of direct reduction processes. 24 ref. (D8j)

257-D. Inductive Stirring in Arc Furnaces. Australian Mechanical Engineering, v. 48, Jan. 6, 1961, p. 34-36.

Installation of inductive stirring equipment in arc furnaces reduces operating time, improves quality and saves alloy elements. (D5f)

258-D. Fuel and Power Required for Making Steel in the Electric Arc Furnace. R. S. Howes and A. Jackson. Institute of Fuel, Journal, v. 34, Mar. 1961, p. 90-92.

The single slag process is used to manufacture rimming and solid carbon steels in an electric arc furnace consisting of a silica roof, dolomite bottom and magnesite lining. Electrical and thermal efficiency discussed. 5 ref. (D5)

259-D. Licensee Makes Nuclear Stock Gage. Steel, v. 148, Apr. 24, 1961, p. 142, 146.

Design of a nuclear device which permits more accurate determination of blast furnace burden level and closer control of the ironmaking process. Radiation sources send rays from one side of the furnace to detector units on the opposite side. When stock obstructs the beam, presence of burden at that level is sensed by the detecting unit. (D1a)

260-D. (English.) The Equilibria Between Sulphur in Molten Iron and Gaseous Sulphur and Sulphur Dioxide. Akira Adachi and Zen-ichiro Morita. Osaka University, Technology Reports, v. 10, Oct. 1960, p. 789-796.

The equilibrium relations between dissolved sulphur in molten Fe and gaseous sulphur and sulphur dioxide are established by thermodynamic calculations. The pressures of sulphur gases and sulphur dioxide in equilibrium with molten Fe and the heats of vaporization of sulphur from the bath are determined from these relations. 9 ref. (D11n, D11r, P12; Fe, S)

261-D. Fluid Mold Casting Cuts Ingot-to-Billet Costs. J. T. Evans. Western Metalworking, v. 19, Apr. 1961, p. 27-28.

Alloy and special steel forging ingots of improved forgeability, surface smoothness and low inclusion content are produced by teeming the melt into a mold containing molten slag, the slag

rising to coat the walls of the mold and fill in crevices. Longer mold life and less required preconditioning of the ingot for forging are attributed to the process. (D9k, D9p)

262-D. (German.) Production and Melting of Lime Sinter With Particular Reference to Desulphurization of Sinter and Pig Iron. Bernhard Weilandt and Fritz Kruse. Stahl und Eisen, v. 81, Mar. 2, 1961, p. 295-302.

Investigation of desulphurization in test sintering at a CaO/SiO_2 ratio of 0.8-1.4 and in test melting with a slag of 1.14-1.19 CaO/SiO_2 ratio. Production tests on a blast furnace using a 42% sinter (CaO-sinter and CaO-free sinter) containing burden. Influence of basicity on coke consumption and on desulphurization of pig iron. (D11n)

263-D. (German.) Reaction Mechanism in Oxygen Top-Blowing in Rotating Vessels. Pt. 2. Paul Ernst Hardt, Gunter Vocke and Hermann Schenck. Stahl und Eisen, v. 81, Mar. 2, 1961, p. 311-324.

Test refining of basic Bessemer steel by oxygen top-blowing in rotating vessels of round and oval cross section. Measurement of characteristic refining data such as decarburization rate, slag composition, steel analysis with particular reference to nitrogen content, oxygen consumption and waste gas composition as influenced by vessel geometry and rotating speed. (D10c)

264-D. (German.) Results Obtained in Automatic Openhearth Furnace Control. Friedhold Rabes. Neue Hutte, v. 6, Feb. 1961, p. 65-71.

Increase of output and efficiency and improvement of fuel consumption and gas chamber wear through semi-automatic and automatic hydraulic control of gas and air chambers, furnace pressure and gas-air ratio in openhearth refining. (D2h)

265-D. (German.) Economical Alloying in Steelmaking. Wolfgang Kuntscher. Neue Hutte, v. 6, Feb. 1961, p. 72-77.

Saving of alloying elements, with emphasis on Mn, in steelmaking by special melting and finishing operations such as predeoxidation by carbon powder, prevention of oxidation during tapping and casting and premelting of alloying elements under reducing slag and by special heat treatment such as hardening by quenching from rolling temperature and controlled cooling from rolling temperature. (D-general, J-general; ST)

266-D. (German.) Experiences in Deoxidation by Carbon Injection Into the Basic Bessemer Converter. Wolfgang Kuntscher and Gunther Richau. Neue Hutte, v. 6, Feb. 1961, p. 78-81.

Production tests on deoxidation by carbon powder injection into steel in a 7 ton basic Bessemer converter. Comparison of mechanical properties of carbon deoxidized steel with reference melts of conventional deoxidation and evaluation of Mn savings by carbon predeoxidation. (D3f, D11r, Q-general, 2-60; ST)

267-D. (Russian.) Developments in Computations of Zone Heat Balance and Thermal Parameter of Blast Furnaces. A. N. Chernyatin and B. I. Kitaev. Izvestiya Vuz Chernaya Metallurgiya, Oct. 1960, p. 20-30.

Method for derivation of zone heat balance and heat exchange efficiency for computation of thermal parameters in terms of the useful shaft height. Furnace productivity and degree of shaft height utilization are correlated as a function of gas and charge weight ratio, gas flow and charge size. 8 ref. (D1, D11k)

268-D. (Russian.) Method for Selection of Optimum Primary Slag Composition Based on Crystallization Data of $CaO-FeO-SiO_2$. A. A. Gimmel'farb. Izvestiya Vuz Chernaya Metallurgiya, Oct. 1960, p. 31-39.

Study of crystallization of $3CaO-2SiO_2$ slag component, which occurs first in melting, in various slags to determine the amount of the segregated crystals and the liquid phase in the system. Effect of slag basicity and FeO content on the blast furnace productivity. 9 ref. (D11r)

269-D. (Russian.) Optimum Conditions for Successful Dephosphorization in Processing Cast Iron. V. P. Grigor'ev and E. V. Abrosimov. Izvestiya Vuz Chernaya Metallurgiya, Oct. 1960, p. 46-57.

Dephosphorizing of high-phosphorous cast iron during the first stage of melting by oxygen blowing. Degree and rate of dephosphorization as dependent on the

content of Mn and Al_2O_3 in the starting material, the rate of heating and oxygen blowing. 7 ref. (D11n, 2-60)

270-D. An Improved Method of Desulphurizing Cast Iron With Sodium Carbonate. R. B. Coates and R. Williams. BCIRA (British Cast Iron Research Assoc.) Journal, v. 9, Mar. 1961, p. 263-278.

Molten metal is tapped onto a bed of sodium carbonate and agitated by compressed air introduced through a submerged lance. A 1% addition of $NaCO_3$ permits reduction of an initial sulphur content of 0.15-0.01%. 9 ref. (D11n)

271-D. The Effect of Nickel on the Chromium and Carbon Relationship in Stainless Steel Refining. A. Simkovich and C. W. McCoy. Metallurgical Society of AIME, Transactions, v. 221, Apr. 1961, p. 416-417.

The equilibrium concentration of Cr and C in the liquid metal at oxygen saturation and related bath temperatures are measured and calculated as a function of Ni content for stainless steel melts of 0.076-0.42% C, 7.58-9.50% Cr and 4.13-20% Ni composition held in an induction furnace at approximately 1580° C. with subsequent oxygen injection and temperature rise to approximately 1950° C. 4 ref. (D11r, P12d, 2-60, SS, Cr, C, Ni)

272-D. Analysis of Open Hearth Oxygen Injection. J. E. Hawkins, R. J. Fekete, G. A. Ferris and W. R. Kiessel. Journal of Metals, v. 13, Apr. 1961, p. 292-297.

Investigation of the effect of oxygen and its velocity and rate of flow, when used to enrich combustion air, on the composition and properties of steel produced by openhearth process. 6 ref. (D2g)

273-D. Oxy-Fuel Increases Open Hearth Potential. G. A. Ferris. Journal of Metals, v. 13, Apr. 1961, p. 298-299.

Experimentation to develop maximum production from openhearth steelmaking process. Results are reported on 400 ton heats with an output of 100 tons per hr. and a 200 ton furnace with a potential output of more than 65 tons per hr. (D2g)

274-D. Operating Experiences With Open Hearth Lances. D. F. Brion, R. F. Urban and T. B. Winkler. Journal of Metals, v. 13, Apr. 1961, p. 300-302.

Report on use of oxygen roof lances in openhearth steelmaking process. Guides are established for achievement of maximum production from individual furnaces. (D2g)

275-D. Future of the Open Hearth. A. K. Moore. Journal of Metals, v. 13, Apr. 1961, p. 303-304.

Evaluation of the future of the openhearth steelmaking process in terms of obsolescence and productivity as related to the new oxygen steelmaking technique. (D2)

276-D. Methods of Reducing Iron Ores. J. Astier. Journal of Metals, v. 13, Apr. 1961, p. 305-307.

Summary of techniques for iron ore reduction, including fluidized bed, kiln, gaseous reduction and electric furnace processes. 12 ref. (D-general)

277-D. Taconite Pellets in the Blast Furnace. W. E. Marshall. Journal of Metals, v. 13, Apr. 1961, p. 308-313.

Report on the use of taconite pellets in experimental and commercial blast furnace steelmaking. Data and results are presented from a 10 yr. testing program in selected mills. (D1b)

278-D. Pre-Reduced Iron-Ore Pellets. Their Experimental Preparation. J. P. Hansen, N. B. Melcher and M. M. Fine. Journal of Metals, v. 13, Apr. 1961, p. 314-315.

Research into the metallization of hard prereduced iron ore pellets, used as super blast furnace feed, to develop continuous pellet production methods. (D1a)

279-D. The Use of Natural Gas in the Blast Furnace. J. C. Moreland. Blast Furnace and Steel Plant, v. 49, Apr. 1961, p. 317-323.

Thermal equilibrium, degree of coke reduction and coke consumption as influenced by blast temperature and gas injection. Heat balance tests indicate changes in thermal requirements per ton hot metal and heat loss reduction. (D1)

280-D. The Potential and Limitations of High Blast Temperatures. Pt. 2. T. L. Joseph. Blast Furnace and Steel Plant, v. 49, Apr. 1961, p. 324-328.

Natural gas and moisture injections through insulated blowpipes make possible 2000° F. blast temperatures. Tonnages and coke rates as influenced by moisture and natural gas increases. Volume relationships between moisture grains per cubic foot of blast and natural gas as per cent of blast. (D1)

281-D. Ore Cooling in the Basic Oxygen Steelmaking Process. Jack Worsman. Blast Furnace and Steel Plant, v. 49, Apr. 1961, p. 338-340.

Effect of ore cooling process in which ore replaces scrap on yield, blowing time, oxygen consumption and slopping studied by data processing. (D10)

282-D. The Possibilities of the Basic Side-Blown Converter. G. Reginald Bashforth. British Steelmaker, v. 27, Apr. 1961, p. 115-119.

Design principles for the Tropenas side blown converter process and technical index for experimental basic-lined furnace production of carbon steel. The process is compared to the acid lined L-D and Kaldo converter processes with the best features of both plus added flexibility being attributed to the Tropenas process. (D10)

283-D. Continuous Casting in the Manufacture of Wire. F. Leitner and R. Rossegger. Wire World International, v. 3, Feb. 1961, p. 17-20.

General processing of carbon steel wire containing Si, Mn, P and S. Aspects covered include properties of cast strand, appearance of casting structure, density, condition of strand after rolling and structure, tensile strength and drawing properties of various grades of continuously cast materials. (D9q)

284-D. (Translation-Brutcher no. 5000.) On the Refining of Basic Bessemer Irons by Oxygen Top Blowing (LD Process). Pt. 2. W. Plockinger. Stahl und Eisen, v. 80, no. 22, 1960, p. 1481-1486.

Development of a new refining practice in a three ton pilot converter. Set-up for lance with guide and pneumatic feed of lime in lump or powder form at the 60 ton vessel. Data on hot metal composition, amount and nature of additions, metal composition in the first and second blowing stages, tapping temperature, total blowing time and oxygen consumption. (D10a)

285-D. (Translation-Brutcher no. 5035.) Influence of Blast Temperature, Intensifiers and Injection of Fuels Upon the Oxidizing Zone of a Blast Furnace. V. I. Loginov. Izvestiya Vuz-Chernaya Metallurgiya, Apr. 1960, p. 29-36.

Plant-scale study of changes in size of the oxidizing zone in blast furnaces producing basic iron, ferrosilicon and ferromanganese, as brought about by present-day smelting practices. Effect of blast temperature and blast humidity, also of oxygen enrichment of blast upon composition of hearth gases. (D1)

286-D. (Translation-Brutcher no. 5092.) Desulphurization of Liquid Steel by Slag Mixtures During Vacuum Treatment. Izvestiya Vuz-Chernaya Metallurgiya, Nov. 1960, p. 32-35.

Experimental study of effectiveness of desulphurization of steel by slag mixtures under vacuum. Treatment of liquid steel in a magnesite crucible of a vacuum induction furnace with slag mixture of 80% lime + 20% spar (dry, crushed) and mixture of 50% lime + 50% alumina (fused). (D11n)

287-D. (Translation-Brutcher no. 5082.) Effect of Way of Pouring the Metal Into Mold Upon Longitudinal Hot Cracking of Continuously Cast Slabs. E. A. Iodko. Izvestiya Vuz-Chernaya Metallurgiya, Dec. 1960, p. 31-38.

Laboratory and plant-scale studies of ways of minimizing longitudinal surface hot cracking on slab surfaces, particularly in the continuous casting of large tonnage killed carbon steel St. 3 with tensile strengths ranging from 55,000-67,000 psi. (D9q)

288-D. (Translation-Brutcher no. 5083.) Slag Control in Oxygen Top-Blowing Process of Steelmaking. Izvestiya Vuz-Chernaya Metallurgiya, Dec. 1960, p. 173-182.

Study of possibilities of cutting the consumption of slag-building materials and the losses of metal to the slag in the oxygen top-blowing process. (D10a)

289-D. (Translation-Brutcher no. 5102.) Relationship Between the Carbon Elimination Reaction and the Nitrogen Removal From Liquid Steel in Oxygen Steelmaking. Processes. S. Maekawa. Tetsu-to-Hagane (Iron and Steel Institute of Japan, Journal), v. 46, Oct. 1960, p. 1233-1234.

Relation between amount of carbon removed and the oxygen partial pressure rate-determining factor in carbon elimination; carbon drop rate as related to nitrogen elimination rate for various temperatures and oxygen pressures. (D10, D11)

290-D. (Translation-Brutcher no. 5072.) Properties of Cold Rolled Sheet From Oxygen Top-Blown (LD) Steel. B. Kawasaki. Tetsu-to-Hagane (Iron and Steel Institute of Japan, Journal), v. 46, Oct. 1960, p. 1275-1276.

Investigation of properties of cold rolled sheet made from 88 heats of low-carbon, rimmed LD process steel and from 66 heats of low-carbon, rimmed openhearth steel. (D10a)

291-D. (Italian.) Production of Stainless Steel Castings. Nickel, Dec. 1960, p. 1-7.

Melting of stainless steel in induction and electric arc furnaces. Composition of cast corrosion and heat resistant stainless steels. 4 ref. (D5, D6, D9, 2-60; SS)

292-D. Basic Oxygen Steelmaking. J. E. Tredennick. Industrial Heating, v. 28, Feb. 1961, p. 301-304, 306-308, 310.

Operating procedures and process for removing the elements C, Si, Mn and P. Method for determining the charge and control of these elements to meet a prescribed specification. (D10)

293-D. Oxygen Roof Lancing in Open Hearth Furnaces. Pt. 1. Industrial Heating, v. 28, Feb. 1961, p. 314, 315, 318.

Design and operation of oxygen roof lance which improves the production rate and the fuel consumption of the furnace. (D2g)

294-D. Oxygen Roof Lancing in Open Hearth Furnaces. Pt. 2. Industrial Heating, v. 28, Feb. 1961, p. 345-346, 348, 350, 352.

Effect of oxygen lanced practice on refractory requirements with respect to the roof and its height, back wall, bottom and bridge wall. Discusses improved furnace construction for this type of steelmaking. (D2g)

295-D. Use of Computers in Predicting Blast Furnace Operations and Heat Losses in Other Furnaces. A. L. Hodge, R. J. Leary, R. W. Smith and B. J. Mitchell. Industrial Heating, v. 28, Apr. 1961, p. 717-725.

Report on the application of large and small electronic computers to predict blast furnace operation with reference to temperature control, moisture content, oxygen enrichment, heat loss, coke rate, fuel consumption, metal and slag composition and curve fitting. (D1b)

296-D. Essentials of Steel Deoxidation. N. I. Shinokov. Indian Institute of Metals, Transactions, v. 13, Dec. 1960, p. 383-398.

Analysis of thermodynamic and thermochemical processes occurring during deoxidation of steel in the ladle and mold and in vacuum processes in relation to use of various deoxidants such as ferrosilicon, ferrochromium, silicocalcium and Al. Effect of deoxidation kinetics on slag metal reactions, nonmetallic inclusion content, steel composition, oxygen equilibrium concentration and gas metal reactions. 11 ref. (D11r; AD-r, 17-57)

297-D. Electronic Computer Facilitates End Point Temperature Control in Basic Oxygen Furnace Steelmaking. Industrial Heating, v. 28, Mar. 1961, p. 510, 512.

Computer calculates the proper proportions of hot metal, scrap and lime charge so that any desired steel may be tapped at the proper temperature. (D10)

298-D. (Italian.) Melting Tests in Electric and Openhearth Furnaces on Ferrous Materials Produced by Direct Reduction. O. Masi and P. Cannizzo. Metallurgia Italiana, v. 53, Jan. 1961, p. 1-16.

Effect of replacement of varying percentages of scrap by R-N briquettes on operating parameters, composition of melts and heat consumption. 14 ref. (D2a, D5a)

299-D. Silicomanganese Produces Cleaner Steel. Union Carbide Metals Review, v. 4, Winter-Spring, 1961, p. 6-9.

Silicomanganese deoxidation in the steelmaking furnace improves average cleanliness to better than that obtained with other furnace blocking practices. (D9r, D11r)

300-D. Ca-Mn-Si Boosts Casting Quality. Union Carbide Metals Review, v. 4, Winter-Spring, 1961, p. 23.

Use of Ca-Mn-Si in acid openhearth and acid electric furnaces to produce high-quality grade B steel castings. (D9r)

301-D. Mechanical and Induction Stirring in Arc Furnaces in Steel Mills. Journal du Four Electrique et des Industries Electrochimique, Feb. 1961, p. 63-66.

Comparison of the effect of mechanical and induction stirring on desulphurization and deoxidation reaction rates. (D11n, D11r, D5f)

302-D. Aluminum Capped Steel. W. P. Conner and D. J. Miller. Paper from "Open Hearth Proceedings". v. 43. American Institute of Mining, Metallurgical and Petroleum Engineers, 29 W. 39th St., New York 18, N. Y. 1961, p. 4-19.

Description of production processes for chemical capping of steels, a practice wherein the action of a poured rimming ingot is completely suppressed by the addition of a strong deoxidizer such as Al or Si. Results reported for the ingots include chemical inhomogeneity, ingot soundness, ingot-to-slab yield, sheet surface quality, sheet physical and chemical properties and sheet microstructure. (D9r, D11r)

303-D. A Practical Method for Statistical Evaluation of Open Hearth Problems. Raymond A. Hinnebusch and Jack A. McKinnon. Paper from "Open Hearth Proceedings". v. 43. American Institute of Mining, Metallurgical and Petroleum Engineers, 29 W. 39th St., New York 18, N. Y. 1961, p. 54-72.

A statistical method is used to evaluate the effect of rate of carbon elimination, amount of go-ahead carbon, length of finish slag, go-ahead temperature, time from addition of Mn to tap and size of heat on Mn recovery. (D2)

304-D. Use of Ultrasonics in Testing for Cleanliness. A. C. Mager. Paper from "Open Hearth Proceedings". v. 43. American Institute of Mining, Metallurgical and Petroleum Engineers, 29 W. 39th St., New York 18, N. Y. 1961, p. 72-85.

An ultrasonic reflectoscope is used to evaluate the effect of increased tapping temperature and ladle holding times, discontinuation of SiC ladle additions, adaptation of higher refractory ladle well tappings and discontinuation of pouring boxes on product cleanliness. (D9, 9, S13g)

305-D. Analysis of Plant, Operating Data Using Digital Computer. A. P. Woods. Paper from "Open Hearth Proceedings". v. 43. American Institute of Mining, Metallurgical and Petroleum Engineers, 29 W. 39th St., New York 18, N. Y. 1961, p. 86-137.

A data analysis procedure combining mathematical and graphical regression is used to determine optimized operating practice for an openhearth furnace with oxygen roof lance. (D2g)

306-D. Metallurgical Aspects of Oxygen Roof Lances. F. E. Gribble and N. F. Zepfel. Paper from "Open Hearth Proceedings". v. 43. American Institute of Mining, Metallurgical and Petroleum Engineers, 29 W. 39th St., New York 18, N. Y. 1961, p. 138-144.

Comparison of the mechanical properties of sheet products, killed carbon flange and firebox quality plates, killed forging blooms and Ni-Cr-Mo plates produced from oxygen lance and regular practice heats. (D2g)

307-D. Vacuum Treatment of Molten Steel. Fritz Harders, Helmut Knuppel and Karl Brotzmann. Paper from "Open Hearth Proceedings". v. 43. American Institute of Mining, Metallurgical and Petroleum Engineers, 29 W. 39th St., New York 18, N. Y. 1961, p. 145-161.

Description of the Dortmund-Horder Huttenunion process in which successive portions of heats of steel are degassed in a vacuum unit, then returned to the teeming ladle where they mix with the rest of the steel. Data are correlated to show the relation between oxygen content and recirculation factor, the latter being a measure of the number of times each particle of melt is exposed to the vacuum. (D9s)

308-D. Progress Report on the Carbon Subhearth. J. E. Smith. Paper from "Open Hearth Proceedings". v. 43. American Institute of Mining, Metallurgical and Petroleum Engineers, 29 W. 39th St., New York 18, N. Y. 1961, p. 186-195.

Comparison of bottom delay times on two openhearth furnaces, one having a conventional hearth and the other a carbon bottom. Evaluation of temperature changes above and below carbon blocks. (D2)

309-D. Experience With the Maerz-Boelens Open Hearth Furnace. Paper

from "Open Hearth Proceedings". v. 43. American Institute of Mining, Metallurgical and Petroleum Engineers, 29 W. 39th St., New York 18, N. Y. 1961, p. 195-214.

Design features of the Maerz-Boelens openhearth furnace which has front and back walls that slope inward over the hearth to the roof with the cross-sectional area of the furnace assuming a semi-elliptical time, tap-to-tap time, output and fuel consumption during several heats. (D2)

310-D. Production of Low-Carbon, Medium Carbon and High-Carbon Steels by the Basic Oxygen Process. C. C. Benton. Paper from "Open Hearth Proceedings". v. 43. American Institute of Mining, Metallurgical and Petroleum Engineers, 29 W. 39th St., New York 18, N. Y. 1961, p. 215-219.

Discussion of sources of metallics, charge and slag compositions, steelmaking methods and product composition in production of steels containing 0.03-1.05% carbon. (D10)

311-D. Basic Problems in Handling Materials and Products in the Basic Oxygen Furnace Process. J. N. Albaugh. Paper from "Open Hearth Proceedings". v. 43. American Institute of Mining, Metallurgical and Petroleum Engineers, 29 W. 39th St., New York 18, N. Y. 1961, p. 220-228.

Problems of scrap handling, mold requirements, ladle lining, skulling out and furnace relining in basic oxygen steelmaking. (D10)

312-D. Basic Oxygen Furnace With Cupola Iron. E. R. Richards. Paper from "Open Hearth Proceedings". v. 43. American Institute of Mining, Metallurgical and Petroleum Engineers, 29 W. 39th St., New York 18, N. Y. 1961, p. 229-232.

Discussion of equipment performance, flow of materials and Fe quality encountered during production of steel by the hot blast cupola basic oxygen furnace process. (D10c)

313-D. Changes Made After Start-Up to Increase Tonnage and Improve Quality. W. F. Bowers. Paper from "Open Hearth Proceedings". v. 43. American Institute of Mining, Metallurgical and Petroleum Engineers, 29 W. 39th St., New York 18, N. Y. 1961, p. 233-235.

Description of modifications to increase steel ladle capacity and improve brick relining technique during basic oxygen steelmaking. (D10)

314-D. Production Advantages From the Use of Oxygen Roof Lances. Orville O. Haniford. Paper from "Open Hearth Proceedings". v. 43. American Institute of Mining, Metallurgical and Petroleum Engineers, 29 W. 39th St., New York 18, N. Y. 1961, p. 236-240.

Typical charge compositions and data for furnace operation and performance are presented for 345 ton openhearth furnaces equipped with a single roof lance. (D2g)

315-D. Design Problems--Oxygen Roof Lances. E. J. Sobey. Paper from "Open Hearth Proceedings". v. 43. American Institute of Mining, Metallurgical and Petroleum Engineers, 29 W. 39th St., New York 18, N. Y. 1961, p. 251-257.

Illustration of various lance designs used by Jones and Laughlin Steel to increase openhearth furnace production. (D2g)

316-D. Fuels and Firing Practices With Oxygen Usage. Luis T. Sanchez. Paper from "Open Hearth Proceedings". v. 43. American Institute of Mining, Metallurgical and Petroleum Engineers, New York 18, N. Y. 1961, p. 258-266.

Illustration of standard practice firing profiles used with openhearths on regular nonoxygen heats, oxygen lance heats, oxygen combustion heats and oxygen lance combustion heats. Figures are given for oil, gas, tar and oxygen consumptions. (D2h)

317-D. Development of Low Alloy Steel Compositions Suitable for High-Strength Steel Castings. H. R. Larson. American Brake Shoe Co. (Wright Air Development Division). U. S. Office of Technical Services, PB 171065, July 1960, 75 p. $2.

Acceptable properties are developed in the modified 8735 and 4335 alloys in 2 and 3 in. sections, but the problem of poor ductility in heavy sections of 5% Cr steel is not solved. Spectrographic analyses and sulphur additions to high-purity heats failed to reveal the factors responsible for improved properties in high-purity heats. (D9)

318-D. Purification of Cast Iron by Oxidation Processes. R. H. T. Dixon. British Foundryman, v. 54, Apr. 1961, p. 162-170.

Effectiveness of oxygen blowing, oxygen lancing, vibration and slag addition as processes for the removal or reduction of impurities. (D10, D11n)

319-D. (German.) Recent Experiences in Steel Melting in Induction Furnaces. K. Schafer. Elektrowarme, v. 19, Jan. 1961, p. 14-20.

Alloying, deoxidation, degassing reactions between melt and furnace lining involved in melting alloyed steel in the induction furnace. Economic comparison with converter, openhearth furnace and arc furnace processes with particular reference to production of X10CrNiNb 18 9, CrAl 8 5, CrAl 20 5, CrAl 30 5, CrNi 20 20, NiCr 30 20, NiCr 60 15 and NiCr 80 20 steel. Selection of frequency range; static frequency transformation. (D6)

320-D. (Russian.) Effect of Modification on the Viscosity of Pig Iron. B. M. Turovskii and A. P. Liubimov. Izvestiya Vuz-Chernaya Metallurgiya, Sept. 1960, p. 5-7.

Investigation of viscosity changes in molten pig iron due to ferrosilicon (43.2% Si) additions in a He atmosphere at 1375° C. Viscosity related to length of time following addition of ferrosilicon. 10 ref. (D9r, P10f, 2-60, 3-67; CI-a)

321-D. (Russian.) Desulphurization of Pig Iron and Steel in Vacuum. G. N. Oiks, Han Yao-ven and A. I. Litvintsev. Izvestiya Vuz-Chernaya Metallurgiya, Sept. 1960, p. 18-28.

Vacuum induction melting of pig iron and ShKh15 steel using basic, acid, carbon and alundum crucibles with X-ray and spectroscopic study of desulphurization as affected by initial S and Mn content, temperature and vacuum practice. 4 ref. (D11n, D6, 1-73, 2-60, 2-61)

322-D. (Russian.) Behavior of Vanadium During Blowing Out in Relation to Oxidation Intensity and Metal Temperature. S. V. Mihailikov and V. P. Revebtsov. Izvestiya Vuz-Chernaya Metallurgiya, Sept. 1960, p. 29-34.

Investigation of conversion of pig iron containing vanadium using air or oxygen lancing with porcelain or quartz tubes. Relation of vanadium oxidation to gas, blowing rate, carbon content, furnace lining and temperature. Influence of initial pig composition and time. 6 ref. (D11r, D3b, 2-60, 2-61, 3-67; CI-a, V)

323-D. (Russian.) Role of Hearth Fettling in Oxidation Processes During Melting of Steel. V. I. Kozlov and V. I. Yavoiskii. Izvestiya Vuz-Chernaya Metallurgiya, Sept. 1960, p. 35-42.

Analysis of furnace lining and bath composition changes during acid openhearth operation. Composition is shown to vary with time of heat and location of sample in furnace. 13 ref. (D11r, D2, 3-67)

324-D. (Russian.) Peculiarities of the Process of Pressing Molten Steel Under High Pressures. P. N. Bidulya and K. N. Emirnova. Izvestiya Vuz-Chernaya Metallurgiya, Sept. 1960, p. 43-49.

Hydraulic pressing of molten steel in molds for mechanical property improvement. Effect of specific applied stress on strength and plasticity. Variation in density with test specimen location in pressed part. 3 ref. (D9, 3-74)

325-D. (Russian.) Quality of Steel Melted by the Duplex, Convertor-Electric Furnace Process. A. P. Potrusaev and A. M. Samarin. Izvestiya Vuz-Chernaya Metallurgiya, Sept. 1960, p. 50-56.

Use of basic convertor iron for producing ShKh15 and 45 steels in electric furnaces. Dependence of metal composition upon reduction time. Investigation of nonmetallic inclusions, mechanical properties and energy expanded. (D5a)

326-D. Consumable-Electrode Melting of Steels Present and Future. W. W. Dyrkacz. Metal Progress, v. 79, May 1961, p. 65-70.

Since its adaption to specialty steel and superalloys, consumable-electrode vacuum melting has proved to be a valuable technique for obtaining cleaner ingots which have lower gas content and better mechanical properties than comparable air-melted ingots. As a consequence, larger and larger remelting units are being built and 60,000 lb. ingots will soon be available. (D5, D8m, D9)

327-D. Pouring Degassed Steel in an Argon Atmosphere. William Wilson.

Metal Progress, v. 79, May 1961, p. 71-73.

Ingot molds can now be filled with Ar, an inert gas 38% heavier than air, to prevent ladle degassed steel from pickling by hydrogen, oxygen and nitrogen when it is teemed. The result: improved macroetches, fewer inclusions, higher ductilities and good ingot surfaces. (D9s)

328-D. Deoxidizing Steels by Vacuum. G. E. Danner and E. Dyble. Metal Progress, v. 79, May 1961, p. 74-78.

When unkilled steel is stream degassed in a vacuum, included oxygen will unite with the carbon in the steel and boil off as carbon monoxide. Extensive tests show that steel deoxidized in this manner will contain less gases and fewer inclusions. (D9s, 1-73, D8m)

329-D. Significance of Experimental Operations to Industrial Blast Furnace Practice. M. B. Royer and W. M. Mahan. U. S. Bureau of Mines, Report of Investigations 5766, 1961, 8 p.

Comparison of pressure, temperature, dust load, blast rate, coke consumption, slag volume and basicity and production rate parameters in blast furnaces using ores containing 57.9-68.4% Fe. (D1)

330-D. Argon Casting for Improving Steel Quality. M. F. Hoffman, P. G. Bailey and R. L. W. Holmes. Journal of Metals, v. 13, May 1961, p. 345-349.

Steel casting in complete Ar atmosphere results in 30-65% reduction of nonmetallic inclusions, preservation of vacuum treatment effects and a 3-24% decrease in conditioning losses. 7 ref. (D9)

331-D. Argon Teeming of Degassed Steel. William Wilson. Journal of Metals, v. 13, May 1961, p. 350-352.

Application of Ar teeming techniques to degassed steel results in increased strength, cleanliness, ductility and machinability. (D9s)

332-D. Tin as a Ladle Addition in the Casting of Iron. R. M. MacIntosh. Tin and Its Uses, no. 51, 1961, p. 1-3.

Effect of ladle additions of Sn to cast iron on the Brinell hardness and machinability of the castings. (D9m)

333-D. (German.) Behavior of Minette Ore Sinter in the Blast Furnace. Rudolf Sandhofer and Otto Becker. Stahl und Eisen, v. 81, Apr. 13, 1961, p. 501-503.

Melting of sinter having small lump size, low loose weight and a high degree of oxidation in a low blast furnace in production tests using burdens containing 80 and 100% sinter. Correlations between degree of oxidation, loose weight and calorific value and composition of waste gas. (D2a)

334-D. Argon Teeming: Extra Refinement to Vacuum Degassing of Steel. Iron Age, v. 187, May 18, 1961, p. 146-148.

Vacuum degassed steel is poured through a blanket of argon gas into ingot molds filled with argon to prevent gas pickup during teeming. Magnetic frequency, tensile and yield strength, elongation determined. (D9s, 1-73)

335-D. (German.) Control and Regulation of Material Flow in Iron Works by Means of Data Processing. Bruno Turk. Stahl und Eisen, v. 81, Apr. 27, 1961, p. 548-551.

Control of material flow in terms of data processing (balancing and accounting) of blast furnace operation including automatic burdening, blast and waste gas control. (D1, 18-74)

336-D. (German.) Investigation of Reducibility of Sinter. Jacob Willems and Gunter Quade. Stahl und Eisen, v. 81, Apr. 27, 1961, p. 552-558.

Reduction tests, using CO-CO_2 gas mixtures at 200-1000° C., on magnetic, hematitic ores and strand sinter with various amounts of fuel and lime addition. Reducibility and degree of oxidation as influenced by grain distribution, basicity and sinter addition. Significance of testing results for blast furnace smelting. (D-general, D1; RM-n)

337-D. The Continuous Steel Casting Process. Hans Hofmeister. Blast Furnace and Steel Plant, v. 49, May 1961, p. 403-406.

Operation of casting ladle, tundish, molds, cooling chambers, withdrawing rolls and flame cutting machine used in continuous casting of ingots. History of the process. (D9q)

338-D. Utilization of Fuel Gas by Injection Through Blast Furnace Tuyeres. Eugene R. Dean. Blast Furnace and Steel Plant, v. 49, May 1961, p. 417-423.

Coke oven gas and natural gas are substituted for furnace coke in production of pig iron and Spiegeleisen. Production statistics. (D1b)

339-D. Vacuum Melting of Low-Alloy Steel. Beverly W. Dunning, Jr. U. S. Bureau of Mines, Report of Investigations 5778, 1961, 14 p.

Effect of vacuum melting on nonmetallic inclusions in 1018, 1345, 2317, 4017, 5135 and 6120 alloy steels. 6 ref. (D8m)

340-D. Utilization of Nickeliferous Serpentine. Lloyd H. Banning and Wallace E. Anable. Paper from "Extractive Metallurgy of Copper, Nickel and Cobalt". Interscience Publishers, Inc., New York 1, 1961, p. 301-313.

Comparative smelting tests on various samples of nickeliferous serpentine. Utilization of Co-containing ferronickel in the production of stainless steel. 9 ref. (D1; RM-n, AD-n31, Fe-b, Ni, 17-57)

341-D. Oxygen Practice Gets Boost at Old, New Steel Plants. Steel, v. 148, May 22, 1961, p. 124, 126.

Use of oxygen at the Pueblo (Colorado) plant of Colorado Fuel and Iron Corp. and at the Portsmouth (Ohio) plant of Detroit Steel Corp. (D-general; O)

342-D. (French.) Use of Pure Oxygen as Fuel in Openhearth Furnace Fired by Low-Grade Gas. L. Septier, J. Sophron and P. Karinthy. Revue de Metallurgie, v. 58, Mar. 1961, p. 223-240.

Injection of oxygen during melting into the burners of an openhearth furnace burning producer gas is used together with additions of compressed water vapor to improve output. 16 ref. (D2g)

343-D. (French.) Hydrogen Content Below 2 Ml/100 g. for Steel Produced in the Electric Furnace. N. Chvorinov. Revue de Metallurgie, v. 58, Mar. 1961, p. 271-275.

Hydrogen content of the steel, produced in a duplex process and coming from an openhearth furnace, is reduced to below 2 ml/100 g. by utilizing an oxygen blast during the oxidation period. (D5g)

344-D. Theoretical and Practical Aspects of Vacuum Induction Melting of High Strength Steels. P. S. Schaffer. Watertown Arsenal. U. S. Office of Technical Services, PB 161928, Mar. 1960, 69 p. $2.

Hydrogen and nitrogen are reduced to low levels by the inductive stirring mechanism which exposes new molten metal surfaces to vacuum to facilitate mass transfer of these elements in solution to their gaseous states by desorption. Oxygen content is greatly reduced by the carbon boil, at which time atomic hydrogen and nitrogen diffuse into the carbon monoxide bubbles, causing further reduction of these gases. (D6, 1-73)

345-D. Vacuum Induction Melting Oxygen and Carbon in Iron. J. E. Srawley. U. S. Naval Research Laboratory. U. S. Office of Technical Services, PB 161764, Sept. 1960, 20 p. $.50.

Oxygen is removed from vacuum induction melts of electrolytic Fe to a limiting level of 20 ppm. carbon additions. The initial oxygen content is about 200-300 ppm.; a minimum of about 450 ppm. of carbon is required to lower the oxygen contents to 20 ppm. Excess carbon reacts with the crucible materials, which results in a loss of about 10% of the carbon added during heats of 4-5 hr. duration. (D6, 1-73)

346-D. (Portuguese.) Processing Iron With Nickel Content in a Small L.D. Converter. Egberto Franco and Luiz C. Correa da Silva. Boletim da Associacao Brasileira de Metais, v. 17, no. 61, 1961, p. 45-55.

Experimental refining of 20-200 kg. iron charges containing 1.80-2.63% C, 0.74-2.20% Si up to 0.20% Mn, 0.07-0.27% P, 0.02-0.04% S and 22.2-25.2% Ni under a slag composed of SiO_2, Al_2O_3, FeO, CaO, MgO and NiO. Oxygen blowing at 1-6.5 kg. per sq. cm. pressure against the surface. A steel melt with 23.3-30.7% Ni is obtained. 4 ref. (D10a)

347-D. (Pamphlet-English.) Theoretical Considerations on the Injection of Auxiliary Fuels Into the Blast Furnace. Alfred M. Decker. 7 p. 1961. Vaillant-Carmanne, S. A. 4, Place St-Michel, 4, Liege, Belgium.

Blast temperature, production and coke consumption as influenced by the injection of hydrocarbons (fuel oil, natural gas and coke oven gas) through tuyeres. (D1h)

348-D. (Pamphlet.) A Mathematical Method for Analyzing and Predicting Changes

in Blast Furnace Operation. A. L. Hodge and E. R. Wyczalek. 65 p. 1961. Linde Co., Division of Union Carbide Corp., Newark, N. J.

Calculation of heat and material balances, heat transfer, top gas temperature, driving rate and shaft gas velocity. Operational changes as influenced by blast temperature, moisture control, fuel injection, oxygen enrichment and wind rate. (D1b)

349-D. The Control of Oxygen Injection in Foundry Steelmaking. K. Knagg. Iron and Steel Institute, Journal, v. 198, May 1961, p. 14-20.

Injection of oxygen is utilized for the removal of carbon during steelmaking in electric furnaces. Specific data are given for the volume of oxygen required to remove a specific quantity of carbon from any particular initial carbon level. (D5g)

350-D. D-H Process: Vacuum Degassing Handles Openhearth Heats. Iron Age, v. 187, May 25, 1961, p. 104-105.

Vacuum degassing and alloying of openhearth and electric furnace steel by D-H process produces steel with consistently fine grain size and lower oxide inclusion content. (D9s)

351-D. The Pre-Refining of Blast-Furnace Iron and Development of the Brymbo Oxygen/Electric Steelmaking Process. Emrys Davies. Iron and Steel Institute, Journal, v. 197, Apr. 1961, p. 271-282.

Review of early experiences with pre-refining and design, development and operation of a pre-refining furnace with trials in desiliconization and dephosphorization of blast furnace metal by the injection of powdered lime and oxygen. Advantages of using pre-refined metal as 50% of the electric furnace charge in the production of carbon and low alloy steels by the oxygen-electric steelmaking process. (D5g, D11h)

352-D. (Russian.) Blast Furnace Operation on Sized Sinter. S. K. Trekalo, N. M. Yakubtsiner, V. N. Andronov, G. F. Grigor'evykh, V. D. Kailov and A. B. Shur. Stal', Dec. 1960, p. 1063-1070.

Use of two sinter classes of sizes from 3-32 mm. and from 3-150 mm., differing by the percentage of intermediate sizes. Effect of the charging sequence and the quantity of each class charged on consumption of blast, temperature, pressure drop between hearth and bosh mixture ratio of CO to CO_2 in the gas, coke consumption and slag formation. 8 ref. (D1b)

353-D. (Russian.) Behavior of Sulphur in the Operation of Openhearth Furnaces on Natural Gas With Self-Carburization. S. F. Karp, I. I. Kobeza, G. I. Mikhailov and I. A. Goncharov. Stal', Dec. 1960, p. p. 1075-1078.

Steelmaking by the scrap-ore process with 60-65% cast iron in the charge. Sulphur content, consumption of charging materials, limestone and ore, basicity and FeO content of slag and time consumed in the individual operation periods are recorded for the operation on coke oven gas-furnace gas firing and compared with the same parameters measured in the operation on natural gas. (D2h)

354-D. (Russian.) Openhearth Furnace Manufacture of Killed Steel With Oxygen Blowing. L. S. Rybakov, N. A. Khudyakov, V. S. Krivonosov and D. F. Nagovitsyn. Stal', Dec. 1960, p. 1078-1080.

Charging with 62-65% Fe, 35-38% steel scrap, approx. 5% limestone, 8-10% ore and approx. 0.5% bauxite. Blowing during the melting and finishing periods with oxygen at a rate of 1200-2400 cu.m. per hr. Rate of carbon oxidation as a function of oxygen pressure. Effect of blowing on slag composition. Influence of the slag basicity measured before the period of reduction on the phosphorus content. (D2g)

355-D. (Russian.) Technological Improvement in the Refining of Cast Iron Containing Vanadium. A. L. Klein, A. I. Pastukhov, A. H. Lekontsev, G. S. Kalganov and Yu. A. Kharitonov. Stal', Dec. 1960, p. 1081-1086.

Processing of an iron obtained from Kachkanar sinter-ore and containing 0.42-0.44% vanadium in a top-blown converter. Powdered scale and ore and water are added to the oxygen blast to control the melt temperature. A slag containing 13.12-16.40% V_2O_5 is obtained, serving as a starting material in the preparation of ferrovanadium. 3 ref. (D3f)

356-D. (Russian.) Effect of Alloying Elements on the Behavior of Oxygen and Nitrogen in Vacuum Melting. P. Ya. Ageev and B. G. Chernov. Stal', Dec. 1960, p. 1093-1096.

Experimental vacuum treatment of Fe melts containing 0-35% Cr, 0-5.50% Al, 0-6% Ti, 0-5.50% Si and 0-4.55% Cb and of Ni-base alloys containing 5-10% of Ti, Al, Cr, W, Mo or Co and 0.15-0.20%. Effect of alloying elements present on removal of oxygen and hydrogen. (D8m)

357-D. (Russian.) Casting of 1Kh18N9T Steel With Ingot Molds Lubricated With Petrolatum. Yu. G. Gurevich, B. B. Rozin, R. S. Geifman, G. A. Khasin and B. P. Okhrimovich. Stal', Dec. 1960, p. 1096-1098.

The optimum casting temperature measured in the ladle was found to be 1540° C. Time for which the melt was kept in the ladle prior to casting ranges from 5-12.9 min. Surface quality improvement by petrolatum lubrication. 4 ref. (D9, 18-73)

358-D. Fuel and Energy Required for Steelmaking in the Open-Hearth Furnace. R. Mayorcas and I. H. McGregor. Institute of Fuel, Journal, v. 34, Apr. 1961, p. 153-156.

Study of materials, oxygen and heat balance for openhearth furnaces when operating under different proportions of scrap and hot metal. Effect of waste heat and oxygen on fuel efficiency. (D2h)

359-D. Electric Smelting Titaniferous Magnetite Ore, Iron Mountain, Wyoming. H. C. Fuller and V. E. Edlund. U. S. Bureau of Mines, Report of Investigations 5776, 1961, 11 p.

Using limestone as a flux and coal as a reducing agent, a pig iron containing 95.1% Fe and 0.41% Ti is produced from an ore containing 45% Fe and 20% titanium dioxide. (D5)

360-D. Residual Elements and Their Effect on the Processing of Steel Products. G. G. Brown. Australian Institute of Metals, Journal, v. 6, Feb. 1961, p. 68-77.

Behavior of residual elements during steelmaking. Effect of elements on strength properties, transformation behavior, grain boundary phenomena, hot workability, surface behavior and weldability. 44 ref. (D-general, Q-general, 3-69)

361-D. (German.) Phase Separation of Slags During Normal Basic Bessemer Steel Refining. Hans vom Ende and Gustav Mahn. Stahl und Eisen, v. 81, May 11, 1961, p. 641-645.

Determination of the miscibility gap in liquid quasi-ternary P_2O_5-(FeO + MnO)-CaO system containing less than 3% Si (basic Bessemer slag) by chemical analysis and microscopic examination of samples taken during refining in a 30 ton converter. (D3)

362-D. Direct-Reduction Processes. J. Jackson. Iron & Steel, v. 34, May 1961, p. 192-193.

Review of several practical methods for the direct production of Fe from Fe ores. Comparison of yields and degree of reduction achieved with ores and iron sand concentrates. 21 ref. (D8j)

363-D. Oxygen Steelmaking in the Ajax Furnace of the Appleby-Frodingham Steel Co. Albert Jackson. Iron and Steel Engineer, v. 38, Apr. 1961, p. 67-76.

Openhearth furnaces are modified to allow intensive oxygen lancing with low-refractory and operation costs. High-quality steels are produced from high-phosphorus hot metal charges with increase in production of all-basic silica furnace and a decrease in operating costs attributed to the process. (D2g)

364-D. Orcarb Electric Furnace Process for the Direct Reduction of Iron Ore. W. R. Braddock. Iron and Steel Engineer, v. 38, Apr. 1961, p. 123-125.

Pilot plant production of sponge iron by a process incorporating pelletizing of ore fines with low-temperature coke and carburizing in an electric retort, pre-reduction of 80% in a rotary kiln and smelting in an electric furnace. (D8j)

365-D. (French.) Application of T.W.A. Desulphurization Process. Journal d'Informations des Industries de la Fonderie, no. 124, Mar. 1961, p. 6-9, 11.

Desulphurization of melts by lime powder blasts or mixtures of lime and bicarbonate of soda. (D11n)

366-D. Oxygen in Steelmaking--Today and Tomorrow. E. F. Kurzinski. Metal Progress, v. 79, June 1961, p. 97-102.

Since the importation of the basic oxygen converter from Austria a few years ago, the use of oxygen by this nation's steelmakers has nearly doubled. With the development of several promising processes such as the oxygen-natural gas lance, tomorrow may see production rates far greater than those of today. (D10, D-general; O)

367-D. Bethlehem Steel Expands Its Vacuum Cast Production. Iron and Steel Engineer, v. 38, May 1961, p. 163.

Discussion of Bethlehem Steel's pouring process used in producing vacuum cast ingots for press forging. Large press forgings can be produced from sounder, cleaner ingots with the possibility of flaking or microcracking practically eliminated. (D9p, 1-73)

368-D. (French.) Development of Nitrogen in the Basic Electric Arc Furnace. R. Ferry and R. Lescuyer. Revue de Metallurgie, v. 58, Feb. 1961, p. 137-149.

Nitrogen evolution determined during different stages of hard steel production, especially as a function of the carbon content of the slag. Techniques designed to eliminate or reduce nitrogen including control of carbonization. 11 ref. (D5, D11h)

369-D. (French.) Vacuum Casting of Steel. L. Colombier. Revue de Metallurgie, v. 58, Feb. 1961, p. 151-163.

Review of process parameters including treatment in ladle, operation of vacuum elevator and degassing by vacuum circulation. Data given for composition, properties and transition point of welded, thick Mn-Mo steel plate. Reduction of H_2, O_2 and N_2 in carbon or low-alloy steels. 25 ref. (D9, 1-73)

370-D. "Silex Coffeemaker" Degasses Steel. American Machinist/Metalworking Manufacturing, v. 105, May 29, 1961, p. 60.

A hydraulically mounted vacuum vessel moves up and down into a ladle to circulate steel for degassing and for small alloy additions. The vessel goes through 32 cycles treating 10% of the steel at each cycle. (D9r, D9s, 1-52)

371-D. G. K. I. & S. Ingot-Mould Foundry Traditional Site Retained for New Project at Dowlais. Foundry Trade Journal, v. 110, May 18, 1961, p. 625-631.

Foundry equipment and methods used in the production of ingot molds for steelmaking at Guest Keen Iron & Steel Co., Ltd. Topics include sand preparation, molding, cupola operation, melting, casting and cooling, sand blasting and trimming and destruction of scrap molds by detonation. (D9)

372-D. (French.) Behavior of Hydrogen in Cast Steel. Paul Bastien. Fonderie, no. 183, Apr. 1961, p. 131-138.

Hydrogen solubility as a function of pressure and temperature, ranging from 600-1800° C. Determination of hydrogen in steel by vacuum heating the solid sample. Absorption of hydrogen from humid air by a steel melt. Pipe, cracks, embrittlement of castings caused by hydrogen. Degassing by vacuum casting. 17 ref. (D11h; H)

373-D. (French.) Introduction of Various Elements to the Melt With Special Reference to Carbon. Nicolas Volianik. Fonderie, no. 183, Apr. 1961, p. 139-150.

Increase of C content in Fe melts by depositing powdered graphite on the surface and simultaneous blowing with nitrogen. Various cast irons containing 2.55-3.88% C, 0.55-2.12% Si, 0.33-0.60% Mn, 0.10-0.14 S and 0.26-1.11% P are obtained for tensile and impact strengths and hardness. 9 ref. (D11s)

374-D. Performance of Stora-Kaldo Oxygen Steelmaking Facility in France. Industrial Heating, v. 28, May 1961, p. 930-932, 934, 944.

Facility consists of two 110-ton Stora-Kaldo oxygen converter vessels which are tilted on their horizontal axis for charging, blowing and pouring and rotated on their longitudinal axis at varying speeds during refining. Advantages of process, metallurgical performance, refractory consumption, exhaust equipment, oxygen consumption and lance life; other Stora-Kaldo oxygen installations. (D10b)

375-D. Iron Ore Reduction--Kinetics and Thermodynamics. Pt. 3. Industrial Heating, v. 28, May 1961, p. 936, 940, 942, 944.

Kinetics of the reduction of hematite to magnetite and mechanisms controlling the rates of reduction at low and high temperatures. Results of experiments indicate that the thickness of the reduced layer is directly proportional to time and that the rate of reduction is proportional to the area of reacting interface. (To be continued.) (D11)

376-D. Gunned Graphite Governs Carbon Content in Steel. Steel, v. 148, June 5, 1961, p. 99.

Recarburization and deoxidation of soft heats of steel by pneumatic injection of graphitic carbon. (D11s)

377-D. (Spanish) Role of Slag in Iron Smelting. Guillermo Coll. Instituto del Hierro y del Acero, no. 70, Oct-Dec. 1960, p. 861-870.

Effect of slag composition and carbon content on oxide reduction in the blast furnace and Lubatti processes. (D1b)

378-D. (Russian.) Experience With a Blast Furnace of Large Capacity. M. Ya. Ostroukhov, V. I. Kholzakov and Yu. A. Popov. Metallurg, Dec. 1960, p. 5-9.

Technical-economic index given for one and a half year's experience with a blast furnace of large capacity using a charge consisting of agglomerate and coke of varying basicity. Effect of agglomerate preparation and loading methods on operating efficiency. (D1)

379-D. Development of Iron and Steel Industry in India. G. Pande. Institution of Engineers (India), Journal, v. 41, Jan. 1961, p. 215-224.

History and development. Pig iron and steel production and plant expansion goals. Materials and gas flow chart in an integrated iron and steel works. Composite structure of the new steel plants. (D-general)

380-D. Rapid Desulfurization to 0.002 Per Cent Sulfur. Edward J. Dunn, Jr. Modern Castings, v. 39, June 1961, p. 90-94.

Treating a 4340 steel with lime and CaMnSi before pouring produces castings with improved ductility, toughness and hardenability and reduces surface defects, red-shortness and welding porosities. Sulphur content may be reduced from 0.024-0.002%. 6 ref. (D11n)

381-D. (Spanish.) Porosity of Cast Steel. Otto Heide. Instituto del Hierro y del Acero, v. 14, Jan. 1961, p. 27-45.

Steel containing 0.11-0.51% C, 0.42-1.27% Si, 0.24-0.56% Mu, 0-0.008% O, 0-0.285% Al and 0.007-0.010% N is cast into test pieces at a pouring temperature of 1610-1710° C. Hydrogen absorption from the bentonite mold used and porosity as functions of casting temperature and Si and Al contents. 26 ref. (D9, 9-68)

382-D. (Swedish.) Thermochemical Calculations of the Blast Furnace Process. Rolf Linder. Jernkontorets Annaler, v. 144, Dec. 1960, p. 859-967.

Reactions and heat requirements for five temperature zones; influence of different variables on coke rate. 34 ref. (D1)

383-D. (German.) High Vacuum Melting of Steel in a 60 Kw. Electron-Ray Multiple-Chamber Furnace. M. von Ardeene, S. Schiller, W. Kuntscher, H. Thiel and L. Meyer. Neue Hutte, v. 6, Apr. 1961, p. 198-211.

Method and plant (60 kw. power and 20 kg. capacity) for vacuum melting of metals by bipole electron irradiation. Test melting of 4.5 kg. C 35 and X 22 CrMoV 12.1 steel and investigation of steel quality by chemical analysis and analysis of extraction residues such as oxidic inclusions. 30 ref. (D8m)

384-D. Metallurgical and Engineering Techniques in Japan. Tetsu-To-Hagane Abstracts (Abstracts from Iron and Steel Institute, Journal), no, 10, 1960, p. 5-16.

Review of improvement in steelmaking production techniques, industrial engineering and research operations. (D-general)

385-D. Trends and Present Situations of Converter Steelmaking in Japan Steel and Tube Corp. Tsuneo Kinoshita. Tetsu-To-Hagane Abstracts (Abstracts from Iron and Steel Institute, Journal), no. 10, 1960, p. 17-30.

Historical and technical review of steelmaking by Thomas converters and L-D converters in Japan. Changes in shop equipment, converter body and linings and blowing operation. Effect of chemical composition on the quality of steel. (D-general)

386-D. Co-operative Steel Research in France. J. Astier and L. Wahl. Journal of Metals, v. 13, June 1961, p. 411-416.

Research activity at IRSID with special reference to ore dressing and treatment of hot metal. Blast furnace, openhearth, basic bessemer operations and the OLP process. (D-general)

387-D. A New Approach to Ladle Degassing-Bottom Bubbling. J. Duflot, J. Verge and E. Spire. Journal of Metals, v. 13, June 1961, p. 417-418.

Vacuum degassing at IRSID of molten metal and steel using a bottom bubbling technique. Degree of vacuum, intensity of stirring and length of treatment determine efficiency of the process. Data are given for H, N, D and C content following treatment. (D9s)

388-D. OLP Steelmaking--Recent Studies and Industrial Progress. B. Trentini, P. Vayssiere and C. Roederer. Journal of Metals, v. 13, June 1961, p. 418-421.

Review of the OLP steelmaking process which uses powdered lime and oxygen to make steel from a hot metal containing Fe, 2.45% C, 2.65% Si and 1.35% P. Refined steel contains 0.060% C and 0.016% P. Changes in Fe, P, and C content of slag during OLP treatment. (D10)

389-D. Collecting Unburnt Gases From Oxygen Converters. M. Allard, P. Vayssiere and G. Namy. Journal of Metals, v. 13, June 1961, p. 421-424.

Refining gases consisting mostly of CO are collected without combustion during the refining of hot metal in top-blown oxygen converters using a pressure-control process which conducts the gases either to a dust-collecting system or directly to the atmosphere. Potential for recovery of gas of considerable calorific value. (D10, A8a)

390-D. America's First D-H Unit. Journal of Metals, v. 13, June 1961, p. 431.

Vacuum degassing of steel by the D-H process enables close control of temperature and favorable recovery of alloy additions such as of Si, Cr and Mn. Other advantages of the method include improvement in grain size and microcleanliness of the product and increase in tonnage process. (D9s, 1-73)

391-D. Fuel and Energy Required for the Manufacture of Steel by the Kaldo Process. Folke Johansson and Bo Kalling. Institute of Fuel, Journal, v. 34, May 1961, p. 172-176.

A heat balance for the Kaldo process with scrap cooling based on the figures of one month's operation of the 120-ton Kaldo furnace at the Sollac steel plant. This heat balance, when converted to 100% scrap cooling, shows a scrap melting capacity of 740 kg. of scrap per metric ton of hot metal corresponding to 623 kg. of hot metal per metric ton of steel. (D10b)

392-D. (German.) Deoxidation Problems in Modern Steel Production. E. Plockinger. Radex Rundschau, Jan. 1961, p. 485-491.

Relationships between refining processes and deoxidation (optional refining rate in melting special steels, vacuum melting and vacuum treating). Deoxidation and steel properties (crystallization microstructure, nonmetallic inclusions, workability, machinability, corrosion resistance, electric and magnetic properties). 9 ref. (D-general, N12, M27, P-general)

393-D. (German.) Improvement of Ingot Surface by Use of Corrugated Pastebord Lids in Casting. K. Krauskopf. Radex Rundschau, Apr. 1961, p. 543-545.

Sandy defect spots on ingot surfaces are avoided by using corrugated pasteboard lids during uphill casting of killed steel. Comparison of surface quality of ingots. (D9k)

394-D. The Electrochemical Theory of Smelting and Related Reactions. Xavier De Hemptinne, Henry Eyring and Taikyue Ree. Paper from "Physical Chemistry of Process Metallurgy". Pt. 1. v. 7. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1959, p. 65-93.

Development of a smelting theory based on the general theory of membrane diffusion of charged particles in an electric field. Results are applied to the desulphurization of Fe in which diffusion of ions is coupled with an irreversible chemical reaction. 11 ref. (D-general, D11n)

395-D. The Thermodynamics of Liquid Iron Silicates. John Lumsden. Paper from "Physical Chemistry of Process Metallurgy". Pt. 1. v. 7. Metallurgical Society of

AIME. Interscience Publishers, Inc., New York 1, 1959, p. 165-205.

Thermodynamic properties of the liquid system $FeO-Fe_2O_3-SiO_2$ and of non-stoichiometric magnetite can be well represented by a simple regular solution equation. In the model used the three cations Fe^{2+}, Fe^{3+} and Si^{4+} are distributed in a matrix of oxygen anions and the components can be formally regarded as FeO, $FeO_{1.5}$ and SiO_2. 15 ref. (D11n)

396-D. The Activity of Ferrous Oxide in the Stoichiometric $FeO-SiO_2$ System. C. Bodsworth and I. M. Davidson. Paper from "Physical Chemistry of Process Metallurgy". Pt. 1. v. 7. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1959, p. 233-244.

A statistical mechanical treatment is applied to the activity data for FeO in binary silicate melts to derive the thermodynamic behavior of the ferrous oxide. The activity shows a positive deviation from ideality at low-silica concentrations and changes to a negative deviation at higher silica contents. These effects can be attributed to the cation deficiency of the Fe-saturated phase. 8 ref. (D11n)

397-D. Statistico-Thermodynamical Studies on the Fe-O System in the Molten State. S. Takeuchi and K. J. Furukawa. Paper from "Physical Chemistry of Process Metallurgy". Pt. 1. v. 7. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1959, p. 245-262.

Equilibrium relations between slag composition and oxygen partial pressure are calculated based on a configurational model with few assumptions. Theoretical results are in good agreement with the measured values of Darken and Gurry from 1400-1600° C. over a wide range of composition and pressure. 8 ref. (D11n)

398-D. The Mixing of Silicates in Molten Slags. K. P. Abraham and F. D. Richardson. Paper from "Physical Chemistry of Process Metallurgy". Pt. 1. v. 7. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1959, p. 263-276.

Heats of formation of the solid solutions which can exist in the systems Ca SiO_3 + $FeSiO_3$ and Ca_2CiO_4 + Fe_2SiO_4 are measured by solution calorimetry. There are no structural changes over the range of solutions studied. The lattice parameter changes steadily as the larger ion of Ca replaces that of Fe. 13 ref. (D11n)

399-D. The Activities of Zinc Oxide and Ferrous Oxide in Liquid Silicate Slags. A. W. Richards and D. F. J. Thorne. Paper from "Physical Chemistry of Process Metallurgy". Pt. 1. v. 7. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1959, p. 277-291.

$FeO-CaO-SiO_2$ and $FeO-SiO_2$ melts containing 1-2% ZNO are equilibrated in Fe containers with a gas composed of Zn vapor, CO and CO_2 at 1200° C. Activity coefficients are determined at two FeO levels and various CaO/SiO_2 ratios. 10 ref. (D11n)

400-D. Activity of Carbon and Oxygen in Liquid Iron. Shiro Ban-Ya and Sachio Matoba. Paper from "Physical Chemistry of Process Metallurgy". Pt. 1. v. 7. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1959, p. 373-402.

The equilibrium of $CO-CO_2$ gas mixtures with carbon and oxygen dissolved in liquid Fe is studied in the range from dilute solution to 2.5% carbon from 1460-1760° C. Equations are derived for the relationship between the activity coefficient of carbon or oxygen and the concentration of carbon and for the free energy of solution of carbon. 26 ref. (D11h)

401-D. (Russian.) Process of Direct Reduction of Ferro-Oxides From the Molten Slag Electric Current. V. I. Orlow, O. A. Esin and P. M. Shurihin. Chernaya Metallurgiya, Nov. 1960, p. 12-19.

Experimental determination of the galvanic phenomenon in the furnace in the process of steel melting with slags containing various concentrations of FeO and gases. The electromotive force in the furnace is determined by the reduction of solid or liquid ferro-oxide. 20 ref. (D11n)

402-D. (Russian.) Desulphurization of Steel and Slag by Electric Current in an Arc Furnace. O. A. Esin, A. I. Pastukhov, S. I. Popel and S. K. Dzemian. Chernaya Metallurgiya, Nov. 1960, p. 20-26.

Influence of electric arc operating on a-c. or d-c. on the completeness and speed of steel desulphurization, intensification of desulphurization by addition of feldspar and by decreasing the thickness of the slag

layer and effect of C content and FeO on acceleration or inhibition of S reduction. 11 ref. (D5, D11n)

403-D. (Russian.) Desulphurization of Liquid Metal With the Aid of Slags in the Process of Vacuum Treatment. V. A. Chernyakov and A. M. Samarin. Chernaya Metallurgiya, Nov. 1960, p. 32-35.

Desulphurization of steel in a vacuum induction furnace by artificial slag powder made of lime (80%) and feldspar (20%). 5 ref. (D6, D11n, 1-73)

404-D. (Russian.) Segregation of Inclusions During Crystallization of Steel Ingots. L. B. Kosterev and H. N. Oiks. Chernaya Metallurgiya, Nov. 1960, p. 50-60.

Influence of atmospheric oxygen on the carbon and oxygen content in 08 and St. 3kp (rimming) steel ingots that are crystallized (cooled) in the open and in bottle-shaped molds. Determination of the carbon and oxygen concentration at the border of the liquidus and solidus phase and the distribution of oxidic and carbidic inclusions. 7 ref. (D9, 9-69)

405-D. (Czech.) Aluminium Loss During the Deoxidation of Carbon Steel. Premysl Fremunt and Karel Stransky. Slevarenstvi, v. 9, Apr. 1961, p. 126-131.

CSN 422652.1 steel containing 0.27-0.37% C, 0.30-0.50% Si, 0.60-0.91% Mn and 0.010-0.025% S is manufactured in an arc furnace with basic lining. Deoxidation by Al addition is carried out in the furnace or in the ladle before the casting of test bars to study the effect of the two different deoxidation methods on the Al loss. 23 ref. (D5c)

406-D. Oxygen in Openhearth Steelmaking. J. W. Kirkpatrick. American Iron and Steel Institute, New York, May 24, 1961, 35 p.

Development of process and oxygen roof lance practice. Data on openhearth capabilities using these practices. Economic considerations. 20 ref. (D2g)

407-D. (French.) Process Control in Iron and Steel Production. Andre Roos. Metallurgie, v. 93, Apr. 1961, p. 313-329.

Control of charging blast pressure and temperature and top gas pressure, composition and temperature during blast furnace operation. Temperature control in the basic Bessemer process by correct dosage of additions. Control of C, S, P and Mn contents in a openhearth melt. Radiographic testing of ingots. Temperature, combustion rate and pressure control during heating in a soaking pit. (D-general)

408-D. (Czech.) Manufacture of Semi-Killed Steel. Gellert Repasi. Hutnicke Listy, v. 16, Apr. 1961, p. 229-235.

Computation from the carbon content of the correct Al quantity needed for deoxidation performed in the ladle. Use of bottle-shaped ingot molds. Distribution of Al in the ingot. Mechanical properties of sheet rolled from the ingots. (D9)

409-D. (Czech.) Effect of the Sulphur Contained in the Fuel Oil on the Sulphur Content of Openhearth Steel. L. Georgiev and I. Kasik. Hutnicke Listy, v. 16, Apr. 1961, p. 236-240.

An openhearth furnace is fired with an oil containing 0.6% S or 1.7-2.6% S. Transition of S from the furnace atmosphere into the melt by radioactive tracing or statistic-mathematical methods. Effect of S in fuel oil on S content of steel. 15 ref. (D2)

410-D. (Czech.) Hydrogen Evolution After the Solidification of Steel. Jiti Vaclavinek. Hutnicke Listy, v. 16, Apr. 1961, p. 280-281.

CSN 422650 steel alloy steel with 11% Cr and 1.5% Mo, or containing 5% Mn, 18% Cr, 4% Ni and 0.2% N, and gray cast iron are cast into cylindric samples and tested for hydrogen evolution. Quantity of freed hydrogen as a function of time. Relationship between hydrogen evolved and total hydrogen contained in the metal. (D9s, D11h)

411-D. (Pamphlet.) Metallurgical Aspects of the Manufacture of Large Rimming Ingots. B. W. Bowen. 1961. 5 p. American Institute of Mining, Metallurgical and Petroleum Engineers, 29 W. 39th St., New York 18, N. Y.

Study of carbon and sulphur segregation during the processing of steel rimming ingots. A practical method of segregation control is capping with Al shots. (D9, 9-69)

412-D. The Dephosphorization of Pig Iron. G. Reginald Bashforth. Current Engineering Practice, v. 3, Mar. 1961, p. 27-30.

Pig iron is dephosphorized with minimum decarburization by holding the melt

in a cupola and introducing an oxygen lance. The melt is maintained at a temperature which will increase the exothermic dephosphorization rate while decreasing the endothermic decarburization rate. Desiliconization, also an exothermic reaction, occurs simultaneously with dephosphorization. (D11n)

413-D. High-Vacuum Induction Melting. I. S. Servi. Metals Engineering Quarterly, v. 1, May 1961, p. 103-111.

Melting, refining and alloying of steel in a vacuum induction furnace to produce up to 4500 lb. ingots of low-alloy bearing and stainless steels. Products have higher ductile to brittle transition temperatures, lower impurity content and higher fatigue strength. (D6)

414-D. Rates of Reduction of Some Iron Ores in a Fluidized Bed. H. H. Brant and W. E. Marshall. Paper from "Physical Chemistry of Process Metallurgy". Pt. 2. v. 8. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1959, p. 647-669.

Reaction rates of different Fe ores reduced by hydrogen rich gases in a small laboratory device simulating a fluidized bed. Effect of gas quantity and hydrogen content, caking and reduction characteristics of the ores on low temperature direct reduction processes. (D8j, D11, B15q)

415-D. Rate and Mechanism of the Hydrogen Reduction of Fine Hematite Ores. John B. Henderson. Paper from "Physical Chemistry of Process Metallurgy". Pt. 2. v. 8. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1959, p. 671-688.

Reduction of two high-grade Australian hematite ores by hydrogen by weighing the water evolved in the reaction and by analysis of reduction mechanisms and factors affecting the rate of reduction. Influence of temperature on reduction rate is explained by the difference in permeability to water of the reduced Fe above and below the rate maximum of 550° C. 32 ref. (D8j, D11)

416-D. Kinetics of the Carbon-Oxygen Reaction in Liquid Iron. Kichizo Niwa, Mitsuo Shimoji, Tamiya Kishida and Yukiyoshi Itoh. Paper from "Physical Chemistry of Process Metallurgy". Pt. 2. v. 8. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1959, p. 689-703.

Measurement of carbon oxidation in liquid Fe by oxygen blowing at 1550° C. Analysis of reaction mechanism and diffusion film theory. Mathematical expressions are devised for nucleation, growth and motion of carbon monoxide bubbles in liquid Fe and for reaction rates in the openhearth furnace. 13 ref. (D11r, D2g)

417-D. Analysis of Factors Affecting Temperature Drop Between Tapping and Teeming in Steelmaking. N. L. Samways, T. E. Daney, K. Li and J. Halapatz. Paper from "Physical Chemistry of Process Metallurgy". Pt. 2. v. 8. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1959, p. 1029-1063.

Bath and teeming stream temperatures measured with calibrated thermocouples on 73 openhearth and 25 basic oxygen heats covering a range of grades. Theoretical calculation of temperature drop for a range of ladle refractory temperatures and tapping, holding and teeming ties. Effects of ladle additions on temperature. Comparison of theoretical values with temperature coefficients derived from a least squares solution of linear equations relating the variables between tapping and teeming. 9 ref. (D9n, D9p, 2-61)

418-D. Vacuum Distillation of Minor Elements From Liquid Ferrous Alloys. Michel Olette. Paper from "Physical Chemistry of Process Metallurgy". Pt. 2. v. 8. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1959, p. 1065-1087.

Effect of vacuum melting on the As, Cu, Sn, Al, Si, Mn, S and P contents of Fe alloys and commercial steel. Tentative theory of distillation of minor elements out of Fe melts. Vapor pressures of several pure elements and of impurities above their dilute solution in Fe. 22 ref. (D8m)

419-D. Application of Physical Chemistry to the Basic Oxygen Steelmaking Process. A. Decker and P. Metz. Paper from "Physical Chemistry of Process Metallurgy". Pt. 2. v. 8. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1959, p. 1089-1109.

Operational procedure for basic oxygen steelmaking process with injection of powdered lime. Relationships between O

and C, O and Mn, and Fe and P_2O_5 contents of the slag and Fe content and basicity of the slag and desulphurization. 32 ref. (D2d, D2g)

420-D. Physical Chemistry of Titanium in the Blast Furnace. F. D. Delve, H. W. Meyer and H. N. Lander. Paper from "Physical Chemistry of Process Metallurgy". Pt. 2. v. 8. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1959, p. 1111-1139.

Solubility of Ti in carbon saturated Fe from 1500 and 1600° C. under neutral and nitrogen atmospheres. Characteristics of precipitated phases of TiC and Ti (C, N). Rate and manner of reduction of TiO_2 into carbon saturated Fe from silicate slag. Effects of TiO_2 on blast furnace operation. 20 ref. (D1, D11n, P12e; Fe, Ti)

421-D. Factors Affecting Dephosphorization and Desulfurization in Basic-Electric Steel Production. John Zotos. Paper from "Physical Chemistry of Process Metallurgy". Pt. 2. v. 8. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1959, p. 1229-1252.

Statistical analysis of equilibrium steelmaking data indicating that good correlation is obtained when dephosphorizing power is a logarithmic function of the product of the slag's basicity times, its oxidizing power and when the desulphurizing power is a logarithmic function of the quotient of the slag's basicity divided by its oxidizing power. Statistical analysis of slag and metal compositions obtained during the production of AISI 4140, 4325, 4330 and 1040 basic electric steels. Equations for estimating dynamic phosphorizing and desulphurizing powers of basic electric slags at any stage of a heat. 13 ref. (D5, D11n)

422-D. Some Mechanisms in the Refining of Steel. B. M. Larsen and L. O. Sordahl. Paper from "Physical Chemistry of Process Metallurgy". Pt. 2. v. 8. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1959, p. 1141-1179.

Review of experimental data and survey of thermochemical parameters for 100-lb. melts in laboratory indirect arc furnaces simulating processes in large scale furnaces including control of rate of low steady state boil in steel refining by the rate of diffusion in gas boundary film just above the top surface of the slag, influence of oxygen spray on boil rate and volatilization of sulphur, variation of nucleation and growth of carbon monoxide bubbles and slag-interface area with boil rate, and limitation on boil rate under heavy ore feeding due to rate of heat flow in slag boundary films. 10 ref. (D5, D11n, 1-54)

423-D. Sulfur Control in the Blast Furnace When Using Sinter Burdens. J. G. Sibakin, J. C. McKay and P. M. Audette. Paper from "Physical Chemistry of Process Metallurgy". Pt. 2. v. 8. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1959, p. 1183-1212.

Blast furnace operating data used to determine influence of slag composition and temperature on desulphurizing power of blast furnace slags with lime-silica ratio being judged the best approximate method for expressing slag basicity. Compositional limits are suggested for slag and for self-fluxing center. 13 ref. (D1a, D11n)

424-D. Effects of Applied Current on Desulfurization of Iron. M. Ohtani and N. A. Gokcen. Paper from "Physical Chemistry of Process Metallurgy". Pt. 2. v. 8. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1959, p. 1213-1227.

Influence of electric current on desulphurization in a system of liquid Fe and blast furnace type slag. Effects of current intensities, slag and metal composition and bubbling of carbon monoxide on the rate of desulphurization. 5 ref. (D11n, D1)

425-D. Mathematical Model for Sulfur Distribution in the Open Hearth. Gordon F. Lilly. Paper from "Physical Chemistry of Process Metallurgy". Pt. 2. v. 8. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1959, p. 1327-1355.

Mathematical model is derived relating sulphur content of low-carbon openhearth steels at tap to relevant operating variables such as slag volume, slag composition, metal weight and sulphur in the charge. Evaluation of changes in openhearth practice. 16 ref. (D2, D11n)

426-D. (Spanish.) Defects in Quality Steels and Special Steels. Pt. 2. Jeronimo Vazquez Lopez. Anales de Macanica y Electricdad, v. 37, Sept-Oct. 1960, p. 241-263.

Discussion of porosity and pipe caused by absorbed gases, pipe developing after cold rolling followed by descaling and bright annealing and inclusions caused by slags, refractories, mold sand or oxidation products. Effect of additions and composition, especially the Mn/Si ratio, on the formation of inclusions. 12 ref. (D9, 9, 2-60; ST)

427-D. New "Fluid Mold Casting" Process Improves Forging Ingots. Western Machinery and Steel World, v. 52, June 1961, p. 50-51.

Production of steel ingots using a fluid mold casting process in which floating molten slag coats the mold wall filling imperfections as the molten metal rises in the mold. Application to casting of stainless and toolsteels. (D9k)

428-D. Oxygen Roof Lancing in Open Hearth Furnaces. Pt. 3. Industrial Heating, v. 28, June 1961, p. 1140, 1142, 1148.

Lance design and cooling techniques to minimize lance failure. (To be continued.) (D2g)

429-D. Sulfur Equilibria Between Gases and Calcium Ferrite Melts. E. T. Turkdogan and L. S. Darken. Metallurgical Society of AIME, Transactions, v. 221, June 1961, p. 464-474.

Fe-Ca-O melts are equilibrated with sulphur and oxygen-bearing gases from 1290-1620° C. At oxygen partial pressures below 10^{-4} atm. the sulphide reaction occurs and at higher oxygen pressures the sulphur dissolves in the melt principally as sulphate ions. 31 ref. (D11h, D11n, P12d; Fe-b, Ca, 14-68, S)

430-D. A Thermochemical Model of the Blast Furnace. H. N. Lander, H. W. Meyer and F. D. Delve. Metallurgical Society of AIME, Transactions, v. 221, June 1961, p. 485-492.

Calculation of the changes in blast-furnace performance brought about by burden and/or blast modification using a method consisting of three simultaneous equations derived from material and heat balances. 17 ref. (D1)

431-D. Synthetic Inclusions in the FeO-MnO-MnS-SiO_2 System in Equilibrium With Resulfurized Steel. E. N. Silverman. Metallurgical Society of AIME, Transactions, v. 221, June 1961, p. 512-517.

Mixture of MnS, $2FeO.SiO_2$, $2MnO.SiO_2$, FeO and MnO are prepared synthetically and used to study the planes $2FeO.SiO_2$-$2MnO.SiO_2$-MnS, FeO-MnO-MnS, and FeO-MnO.SiO_2-MnS in the quaternary system by equilibration from 1900-2400° F. Equilibrium phase-temperature composition diagrams and solid-liquid relations are established to determine the nature of inclusions in steels and fluxing reactions and heat treatment parameters for their modification. 12 ref. (D11n, D11s, M24d, 9-69; Fe-b, 14-68)

432-D. Acid Bessemer Oxygen-Steam Process. G. M. Yocom. Metallurgical Society of AIME, Transactions, v. 221, June 1961, p. 536-539.

Blowing in acid Bessemer converters with a 50-50 mixture of oxygen-steam, combined with a dephosphorizing treatment in the steel ladle, resulting in low-carbon steels of low nitrogen (0.002%) and low phosphorous (under 0.035%) contents, which have physical properties equivalent to openhearth steels of similar analysis. (D3b)

433-D. (German.) Use of Oxygen in Openhearth Furnaces. Hans Kosmider, Herbert Neuhaus, Hans-Jurgen Langhammer and Herman Schenck. Stahl und Eisen, v. 81, May 25, 1961, p. 701-707.

Oxygen top-blowing by two lances during refining of 30-75% basic Bessemer pig iron and 70-25% scrap melts in a producer gas heated 60-ton basic openhearth furnace. Control of brown smoke formation by small lance-to-bath distance. Refining metallurgy. Efficiency. (D2g)

434-D. (German.) Heat Balance and Waste Gas Volumes of a Large Size Arc Furnace. Robert Gorgen. Stahl und Eisen, v. 81, May 25, 1961, p. 707-711.

Measurement of incoming and waste energies in establishing a heat balance during conventional melting and oxygen refining of 0.14 and 0.30% carbon steel in a 80-ton arc furnace. Waste gas volumes as influenced by oxygen. (D5b)

435-D. Modern Trends in Refractories Practice in Iron and Steel Works. H. R. Lahr. Refractories Journal, v. 37, May 1961, p. 134-144.

Review of steelmaking processes including history and design of open-hearth furnaces, oxygen procedures, use of magnesia brick and charging operations. Design and data on the Maerz-Boelens furnace, openhearth furnace substructure and blast furnaces. 5 ref. (D-general, W17g, W18r; RM-h)

436-D. Application of Oxygen to Openhearth Furnaces. A. Jackson. Refractories Journal, v. 37, May 1961, p. 146-156.

Application as an aid to combustion or directly to metal lancing. Furnace designs with emphasis on lancing in an Ajax furnace. Description of lance types. (D2g)

437-D. Blueprint for Integrated Flow Production of Steel. Engineering, v. 191, June 9, 1961, p. 805.

Layout of new Spencer Steelworks at Llanwern, England, showing relative positions of principal production and ancillary units. Description of production flow from receipt of raw materials to dispatch of finished goods. (D-general, A5)

438-D. Aspects of Predicting Blast Furnace Behavior. A. L. Hodge. Iron & Steel, v. 34, May 19, 1961, p. 232-238.

Mathematical model of blast furnace process developed from empirical and theoretical thermochemical data for programming in the electronic computer. Prediction of effects of changes in blast and burden and their relationship to heat transfer, temperature distribution, production rate and top gas composition and other variables. (D1, 17-56)

439-D. Pre-Refining of Blast-Furnace Iron and Development of the Brymbo Oxygen/Electric Steelmaking Process. Emrys Davies. Iron & Steel, v. 34, May 19, 1961, p. 253-257.

Desiliconizing and dephosphorizing hot metal for the blast furnace by injecting oxygen and lime through a water-cooled lance in a pre-refining operation. (D11h, D11n, 1-52)

440-D. Operation of the Oxygen/Steam Blown Converters at the VLN Steel Plant of the Steel Co. of Wales Ltd. M. C. Harrison and P. Truscott. Iron & Steel, v. 34, May 19, 1961, p. 258-264.

Preparation and installation of suitable tar and dolomite converter linings and bottoms. Influence of lime quality and oxygen/steam ratio on slag composition and the P, S and N content of the steel produced. Mechanical properties of the cold reduced and annealed steel. (D3, W18p; RM-h, 17-57)

441-D. (Russian.) Regulation of the Thermal System for Blast Furnaces. A. D. Gotlib. Izvestiya VUZ--Chernaya Metallurgiya, Feb. 1961, p. 10-21.

Instructions for substantial improvement in blast furnace thermal process regulation to increase output and reduce coke consumption. 9 ref. (D1)

442-D. (Russian.) Process of Hydrogen Removal From Liquid Steel When It Is Blown Through With Gases. B. A. Baum, K. T. Kurochkin and P. V. Umrikhin. Izvestiya VUZ--Chernaya Metallurgiya, Feb. 1961, p. 22-31.

The process of hydrogen transition from the liquid metal to the gas phase is described in three consecutive stages. The speed of this process is influenced by the molization speed of the hydrogen in the top layer of the metal, by the quantity of the used gas, the metal temperature and the depth to which the hydrogen gas delivery tube is inserted into the molten metal. 19 ref. (D9s)

443-D. (Russian.) The Influence of Compressed Air Blown Through the Bath on the Quality Characteristics of the Martin Scrap Process. M. Ya. Medzhibozhskii and A. K. Gurov. Izvestiya VUZ--Chernaya Metallurgiya, Feb. 1961, p. 32-38.

Melting time for a 30-ton charge, ingot quality, ferric oxide content of the slag, firebrick durability and rate of carbon removal as influenced by blowing compressed air for 15 min. through the melting bath. Data show compressed air expenditure, fuel consumption and furnace temperature distribution. 4 ref. (D-general)

444-D. (Russian.) How Much Hydrogen Does Alloyed Electric Steel Contain. E. S. Kalinnikov and I. P. Zabaluev. Izvestiya VUZ--Chernaya Metallurgiya, Feb. 1961, p. 45-50.

Effectiveness of hydrogen removal from a deoxidized electric steel which has been held in vacuum for 12 min. during pouring is compared with the same process carried out in a casting ladle. Effectiveness of vacuum treatment in the casting ladle can be

increased by more recent methods of steel deoxidation. The hydrogen content in the electric steel before the removal of the charge from the furnace is directly dependent on the air humidity, which remains practically the same during removal of the charge from the furnace to the casting ladle. Values found are for molten alloyed electric steels at approximately 1550° C. 9 ref. (D9s)

445-D. (German.) Preliminary Production Tests in Smelting of Iron Ore Pellets in the Blast Furnace. Paul Maertens and Arthur Poos. Stahl und Eisen, v. 81, June 8, 1961, p. 778-782.

Test smelting of 30-40 mm. diameter ore pellets in a blast furnace with 6.25 m. hearth diameter and of 20-25 mm. diameter pellets in a blast furnace with 8.75 m. hearth diameter, in the production of basic Bessemer pig iron. Data are given for material and heat balance. (D1a)

446-D. (German.) Material and Heat Consumption in Pig Iron Production in the Electric Furnace. Borut Marincek. Stahl und Eisen, v. 81, June 8, 1961, p. 782-787.

Material and heat balance in production of basic Bessemer, hematite and basic openhearth pig iron by the electric reduction furnace in relation to subdivision of burden into a theoretical ("pure") and a slag containing burden. Influence of scrap additions to burden on process parameters. (D5)

447-D. Vacuum-Cast Ingot--Biggest Ever Made. Iron Age, v. 187, June 29, 1961, p. 42.

Vacuum casting of a Ni-Mo-V alloy steel into a single-piece generator rotor for an 800,000 kw. steam turbine. A special mold 120 in. in diameter and 175 in. high is used for pouring. Forging into final shape is followed by heat treatment to achieve designated mechanical properties. (D9, 1-73, F22; SS, Ni, Mo, V)

448-D. (Japanese.) Gas Contents in Molten Slag. Pt. 1. Influence of Water Vapor Pressure in Air on Gas Contents in Molten Steel. Yoshihiko Abe. Tetsu-to-Hagane (Iron and Steel Institute of Japan, Journal), v. 47, May 1961, p. 693-698.

Variation of hydrogen content and total Fe oxide contents in molten basic electric furnace and openhearth slags as a function of water vapor pressure and temperature as determined by vacuum fusion analysis through heating from 1400-1500° C. 7 ref. (D11g, D11n, 2-60, 2-62)

449-D. (Japanese.) Study of Degassing From Iron-Base and Nickel-Base Alloys Containing Chromium by Vacuum-Induction Melting. Masao Kawahata and Tetsuya Watanabe. Tetsu-to-Hagane (Iron and Steel Institute of Japan, Journal), v. 47, May 1961, p. 715-720.

Investigation of the reduction of the oxygen content of melts by using hydrogen and carbon during vacuum melting. Experimental oxygen and nitrogen values are compared with predicted values for deoxidation of Fe and Ni alloys containing 0-20% Cr, including Inconel and 304 stainless, after addition of 0.30% C or impinging with dry hydrogen, with holding from 1570-1620° C. for various times. (D8m, D9s, D11r; Fe-b, Ni-b, Cr)

450-D. (Translation-Brutcher no. 5032.) Blast Furnace Control by Computers. V. Loskutov. Promyshlenaya Ekonomicheskaya Gazeta, v. 5, no. 42, 1960, p. 3.

Review of Soviet developments, general principles involved, advantages of breaking down the blast furnace process into zones using a series of computers. Automatic continuous computation of the direct-reduction coefficient. (D1, X14)

451-D. (Translation-Brutcher no. 5093.) Desulphurization of Steel and Slag in the Arc Furnace by Electric Current. O. A. Esin. Izvestiya VUZ--Chernaya Metallurgiya, Nov. 1960, p. 20-26.

Data based on 40 heats in a 1/2-ton arc furnace using direct as well as alternating current of industrial frequency. Initial and final compositions of metal and slag; variation of sulphur content in metal and slag of various heats with d-c. and a-c.; effect of slag volume; best slag composition for maximum sulphur removal into gas phase. (D5b)

452-D. (Russian.) Crystallization of Steel Under Pressure. B. B. Gulyaev, M. F. Makelski and V. O. Nazarenko. Liteinoe Proizvodstvo, Dec. 1960, p. 33-34.

Investigations of microstructure, and impact and tensile strength of 20L, 35L and IX 18N9TL steels crystallized under piston pressure of 2000-6000 kg. per. cm^2. Effect of casting pressure on mechanical and physical properties including density, plasticity, shrinkage and porosity. (D9, M27, P-general, Q-general, 3-74; ST)

453-D. (Translation-Brutcher no. 5025.) Dimensions of the High Voidage Zones in the Blast Furnace Stock Column. V. K. Gruzinov. Izvestiya VUZ--Chernaya Metallurgiya, Aug. 1958, p. 3-6.

Formation of ellipsoid zones with an increased volume of voids above the raceways in the blast furnace. Change of ellipsoid top to funnel shape under blast furnace conditions. Calculation of dimensions of high voidage ellipsoids; relation of latters' height to projection of raceways on the horizontal plane; advantage of large projections for high driving rates. (D1)

454-D. (Translation-Brutcher no. 4931.) Heat Extraction in the Secondary Cooling Zone During Continuous Casting of Steel. A. D. Akimenko and A. A. Skvortsov. Izvestiya VUZ--Chernaya Metallurgiya, July 1960, p. 54-59.

Method for calculating the quantity of steam formed from cooling water fed through sprays. Laboratory experiments giving data on nature and rate of cooling with rollers over which low pressure water is poured as against spray cooling. Data on effect of some variables on rate of heat extraction in secondary cooling, such as spacing of supporting rollers. (D9q)

455-D. (Translation-Brutcher no. 5179.) Natural Gas in the Reduction Reactions of Iron Ores in a Fluidized Bed. K. P. Lavrovskii, A. L. Rosental and A. Kh. Eglit. Izvestiya Akademii Nauk SSSR, OTN Metallurgiya i Topliva, Feb. 1961, p. 13-19.

Results of laboratory and pilot plant experiments on various ores with various Fe contents. Relation between reaction rate and time of reduction with 68% Fe hematite; catalytic and non-catalytic stages. Possibility of creating conditions precluding any sticking together of the solid particles in the bed without resort to inert additions. (D8j)

456-D. (Translation-Brutcher no. 5167.) Production of Steel Ingots Whose Pipe Welds Up in Subsequent Hot Working. G. N. Oiks and F. A. Sokolov. Izvestiya VUZ--Chernaya Metallurgiya, Mar. 1961, p. 37-39.

Proposed relatively simple and inexpensive setup for steel melted in an ordinary furnace with access of air and then run into an intermediate ladle under vacuum for deoxidation and alloying and finally poured into a mold, also under vacuum. (D9, 1-73)

457-D. (Translation-Brutcher no. 5086.) Determination of Humidity of Blast Furnace Wind. A. M. Chernyshev and A. A. Baikova. Trudy Institute Metallurgii Imeni, v. 4, 1960, p. 53-57.

Operation of blast furnaces on blast of constant humidity; fundamentals of psychrometry. Development of a new chart specifically for the determination of blast furnace humidity for blast furnaces. (D1b)

458-D. (Translation-Brutcher no. 5124.) Blast Furnace Operation on Natural Gas. M. A. Shapovalov. Metallurg, Aug. 1960, p. 4-6.

Previously abstracted from original. See item 543-D, 1960. (D1b)

459-D. (Translation-Brutcher no. 5067.) Desulphurization of Pig Iron and Steel in Vacuum. G. N. Oiks. Izvestiya VUZ--Chernaya Metallurgiya, Sept. 1960, p. 18-28.

Previously abstracted from original. See item 321-D, 1961. (D11n, 1-73)

460-D. (Translation-Brutcher no. 5081.) Oxidation of the Impurities Present in Steelmaking Baths. V. I. Yavoiskii and A. F. Vishkarev. Izvestiya VUZ--Chernaya Metallurgiya, May 1960, p. 39-48.

Previously abstracted from original. See item 459-D, 1960. (D11r)

461-D. (Translation-Brutcher no. 5121.) Increasing the Output of an Experimental Blast Furnace by Incorporating Oxygen and Carbon Monoxide Into Blast. K. Spolders and N. Wenzel. Stahl und Eisen, v. 81, Mar. 1961, p. 149-154.

Previously abstracted from original. See item 197-D, 1961. (D1h)

462-D. (Translation-Brutcher no. 5045.) Absorption and Elimination of Gases in the

Top Pouring of Heavy Forging Ingots. E. Schurmann, M. Hater and A. Fricke. Stahl und Eisen, v. 81, Mar. 1961, p. 172-183.

Previously abstracted from original. See item 200-D, 1961. (D9s, 1-73)

463-D. Quality Steel--From the Open Hearth. Machine and Tool Bluebook, v. 56, July 1961, p. 127-129.

Ladles of molten steel are degassed by repeated raising and lowering of the level of a "snorkel" extending down from a vessel overhead. Vessel pressure is reduced causing the molten metal to be pushed up the snorkel into the vessel. Steel produced is free of inclusions and voids in tonnage quantities. (D9s, 1-52)

464-D. (German.) Influence of Alloying Elements in Steel. Christian Gg. Enke. Metall-Reinigung + Vorbehandlung, v. 10, May 1961, p. 69-70.

Review of alloying elements effect in refining of steel and as factors influencing steel properties including mechanical, corrosion and working properties for additions of C, Si, P, O, N, S, Cr, Al, Mn. Role of Al, Mn and Si in deoxidation of steel. (D11, Q-general, R-general, 2-60; ST)

465-D. West of Scotland Iron and Steel Institute, Journal, v. 67, 1959-1960, 257 p.

A collection of papers and discussions on pressure vessels and brittle fracture, slag composition and influence on blast furnace practice, spectrometric instrument for steel analysis, crack propagation on mild steel, self-fluxing sinter, installation of an 80-ton electric arc melting furnace, engineering aspects of an openhearth steel plant and the production of Fe by methods other than the blast furnace. (D-general, Q26, S11a, T26q, W18s; CN, ST)

466-D. Slag Composition and Influence on Blast Furnace Practice. K. C. Sharp. Paper from "West of Scotland Iron and Steel Institute, Journal", v. 67, 1959-1960, p. 15-44.

Review of published data on composition of blast furnace slags. Burdening policy with particular reference to British practice. Influence of blast temperature, MgO content in blast furnace slag and high slag basicity on blast furnace operation. 11 ref. (D1)

467-D. (German.) Study on Kinetics of Reactions in Ferrous Extraction Metallurgy. Pt. 1. Sintering, Degassing and Reducing. Ludwig von Bogdandy. Archiv fur das Eisenhuttenwesen, v. 32, May 1961, p. 275-286.

Application of the theory of kinetics to technical processes including reactions between solids (in a heap) and gas and between liquid Fe and gas; phase boundary reactions, reduction of iron oxide by gas and of small oxide particles in a fluidized bed. Application of process parameter to blast furnace operation and modern reduction techniques without solid reducing agent. (D11, D1)

468-D. (German.) Kinetics of Reactions in Ferrous Extraction Metallurgy. Pt. 2. Evaporation and Refining. Ludwig von Bogdandy. Archiv fur das Eisenhuttenwesen, v. 32, May 1961, p. 287-296.

Kinetics of carbon refining of pig iron in Bessemer converter, openhearth furnace, L-D converter and rotor processes are discussed in terms of theories and hypotheses including drop-nucleus formation, diffusion in two-phase (liquid-to-gas bubble) material transport and formation of gas bubbles in liquids. (D-general, D11)

469-D. (German.) Investigation of Equilibria in Magnesiowustites and Magnesioferrites. Norbert G. Schmahl, Bertram Frisch and Gunter Stock. Archiv fur das Eisenhuttenwesen, v. 32, May 1961, p. 297-302.

Measurement of the isothermic decomposition equilibria of Fe_2O_3-MgO mixtures under CO/CO_2 gas from 800-1000° C. Data are given for phase equilibria in the Fe-Mg-O system and thermodynamic activities of FeO in the FeO-MgO system. (D11n, M24c, P12d; Fe-b, Mg, O)

470-D. (German.) Reactions of Manganese Containing Iron With Its Oxides in Lime Crucibles From 1600-1800° C. Wilhelm Anton Fischer and Hans-Joachim Fleischer. Archiv fur das Eisenhuttenwesen, v. 32, May 1961, p. 305-313.

Measurement of equilibrium concentrations of liquid metal (Fe-O-Mn) and liquid slag phase (FeO-MnO-CaO) in equilibrium with solid lime from 1600-1800° C. Study of phase equilibria in FeO-MnO-CaO system. Influence of CaO on deoxidation of steel by Mn. (D11n, D11r, P12d; Fe-b, Mn, O)

471-D. (Czech.) Recarburization of Gray Cast Iron in an Arc Furnace. Milan Brhel and Jan Suchanek. Slevarenstvi, v. 9, May 1961, p. 188-190.

Use of crushed graphite electrodes, petroleum coke, pitch coke or foundry coke as a carburizing agent. Manufacture of synthetic cast iron by melting and recarburizing steel scrap. Dependence of the recarburization rate on the density of the carburizing agent. (D5, 2-60; CI-n, AD-n34, 17-57)

472-D. Oxygen in Open Hearth Steelmaking. J. W. Kirkpatrik. Blast Furnace and Steel Plant, v. 49, July 1961, p. 621-632.

History and development of oxygen steelmaking. Oxygen for flame enrichment; oxygen roof lancing. Heat efficiency in roof lancing is compared to conventional practice. Economic and statistical considerations. 20 ref. (D2g)

473-D. (German.) Mathematical-Statistical Investigation of Factors Influencing Characteristic Operation Data on the Low-Shaft Furnaces at Calbe (Saale). Dieter Reimann and Hans Burger. Neue Hutte, v. 6, May 1961, p. 276-283.

Statistical evaluation of data, obtained in long-time (2 1/2 yr.) production tests, in the production of pig iron from domestic ores using low-grade coke. Correlations between coke consumption, burden recovery, blast temperature, blast humidity and coke composition. 17 ref. (D8n)

474-D. Vacuum Casting of Steel. J. Levaux and L. Hannon. Vacuum, v. 10, Dec. 1960, p. 435-443.

Evaluation of degassing effects on the hydrogen content and the number of oxidized inclusions, elongation, reduction in area crack susceptibility and impact strength of vacuum cast forging ingots. (D9s, 1-73, Q-general, 2-60; ST)

475-D. Improving Steel Quality by Casting of Ingots Under Argon. M. F. Hoffman, P. G. Bailey and R. L. W. Holmes. Industrial Heating, v. 28, July 1961, p. 1321-1324, 1326.

Technique and equipment used in mold purging and teem stream protection by argon during casting. Inclusion ratings, gas analysis and conditioning requirements of argon cast ingots. (D9, 2-66; ST, 9-69)

476-D. Some Features of Basic Oxygen Steelmaking With Basic Hot Blast Cupolas. E. R. Richards. Industrial Heating, v. 28, July 1961, p. 1328, 1330, 1334, 1336, 1396.

Method of producing low-sulphur steel from Fe and steel scrap and pig iron with a reducing basic slag in the cupola and an oxidizing basic slag in the oxygen furnace. Design and operation of the cupolas and furnace. Composition analysis of the hot metal and cupola slag. (D10, 1-65)

477-D. (Russian.) Diagram of Elements Affinity to Oxygen and Its Application for Thermodynamic Investigations of Reducing Processes in a Blast Furnace. A. A. Sigov and V. A. Shurkhal. Izvestiya VUZ--Chernaya Metallurgiya, Apr. 1961, p. 15-25.

Formulas and diagrams for metallurgical reactions during blast furnace operations including affinity to oxygen of the involved elements, their chemical composition, interaction and stability, their thermodynamic reactions during the reducing process and their influence on the chemical composition of the slag. 5 ref. (D1b)

478-D. (Russian.) Experiments on Direct Production of Iron From Ores in a Boiling Layer. N. N. Dobrokhotov, K. E. Makhorin and O. S. Nichiporenko. Izvestiya VUZ--Chernaya Metallurgiya, Apr. 1961, p. 26-30.

Fe ores are heated to the boiling point in a reducing preheated steam or methane atmosphere. Effect of temperature, quality and size of the ores and quantity and quality of the gas. (D8j)

479-D. (Russian.) Thermal Experiment for Regulating Conditions in a Blast Furnace on the Basis of Gas Analysis. A. D. Gotlib, P. G. Goncharov, V. E. Levchenko, A. A. Himmelfarb, V. P. Pevtsov and A. M. Lapa. Izvestiya VUZ--Chernaya Metallurgiya, Apr. 1961, p. 31-37.

Determination of whether the CO_2, CO and H content in a blast furnace gas reflects a true picture of the Fe reduction process inside the furnace. Quantity and quality of ore and coke in the furnace, nature and content of the added Fe scrap, additional oxygen and

natural gas added to the compressed air and moisture content of the limestone and air are considered in terms of effects on thermal balance. (D1)

480-D. (Russian.) Influence of Manganese on the Speed of Desulphurization of Low-Carbon Iron. A. S. Tumarev and A. Kh. Urazgil'deev. Izvestiya VUZ--Chernaya Metallurgiya, Apr. 1961, p. 38-45.

Alloy containing Fe and Mn in various proportions is desulphurized in basic Martin slags of different compositions. 10 ref. (D11n, 2-60; Fe-b, Mn)

481-D. (Russian.) Changing Hydrogen Content in the Molten Metal During Melting in a Martin Furnace. D. Ya. Povolotskii. Izvestiya VUZ--Chernaya Metallurgiya, Apr. 1961, p. 46-52.

Investigation of the process of hydrogen removal from the molten metal bath of a basic Martin furnace into the furnace atmosphere together with CO bubbles and of the hydrogen re-entry into the molten metal through the slag as dependent on the original hydrogen content of the ore, scrap Fe, heating material and air. 16 ref. (D2a)

482-D. (Russian.) Study of the Viscosity of Sour Slags for Melting Electric Steels. A. I. Kholodov and V. S. Ignat'ev. Izvestiya VUZ--Chernaya Metallurgiya, Apr. 1961, p. 53-58.

Influence of SiO_2 and CaO on the viscosity of a slag at different temperatures during melting of electric steel in an arc furnace with acid refractory. Influence of SiO_2 on viscosity at 1515, 1550 and 1580° C.; influence of CaO at 1530, 1550 and 1570° C. (D5a, P10f, 2-60, 2-61; RM-q)

483-D. (Russian.) Influence of Discharge Slag on the Contamination of Steel With Nonmetallic Inclusions. P. M. Danilov and L. N. Karachentseva. Izvestiya VUZ--Chernaya Metallurgiya, Apr. 1961, p. 59-66.

Investigation of cast, forged and rolled ball bearing steel. Slag is made radioactive by an oxide of Ca^{45} to study the quantity and nature of the inclusions. 8 ref. (D11n; ST, SGA-c, 9-69)

484-D. (Russian.) Influence of Charge Weight on the Productivity of Martin Furnaces. V. K. Gorin. Izvestiya VUZ--Chernaya Metallurgiya, Apr. 1961, p. 162-166.

Investigation of the possibility of increasing the productivity of Martin furnaces 33-77% by doubling the weight of the charge and creating the right proportion between length, width and depth of the melting bath. 7 ref. (D2a)

485-D. (Russian.) Technical-Economical Considerations of Martin Furnace Operation When Different Intensifiers Are Used in the Melting Process. I. A. Medvedev, I. I. Kobilyakov, N. A. Nareiko and Yu. G. Dubina. Izvestiya VUZ--Chernaya Metallurgiya, Apr. 1961, p. 192-198.

Advisability of using oxygen and superheated steam (330-350° C.) for melting in the Martin furnaces taking in consideration the increase in output, economy in fuel, metal and overhead, reduction in initial cost of new furnaces and utilization of the byproducts of the oxygen producing plants. (D2a, D2g)

486-D. Electric Furnace or Cupola Basic Oxygen Converter for the Nonintegrated Steel Plant. D. A. Sutch and H. C. Manley. Iron and Steel Engineer, v. 38, July 1961, p. 101-107.

Comparison of the two processes in terms of rate of operations, flexibility, operational cost, quality of raw materials, product range and the ability to integrate existing facilities. (D5, D10c)

487-D. Cupola Metal Increases Open Hearth Production. Wilt H. Steinheider. Iron and Steel Engineer, v. 38, July 1961, p. 108-111.

Improvement of cold charge shop operation by addition of hot cupola metal. Metal is tapped from the cupola at 2750° F. and delivered to the furnaces at 2500° F. Details of cupola construction and desulphurization. (D2a)

488-D. (Pamphlet.) The British Steel Castings Research Assoc. Eighth Annual Report. 1961. 37 p. British Steel Castings Research Assoc., 5 East Bank Rd., Sheffield 2, England.

A review of research during the year covering steelmaking, deoxidation, desulphurization, molding and coremaking and heat treating, cleaning and

testing of castings. (D-general, D9, E-general, 10-54; ST)

489-D. Vacuum Steelmaking. A. M. Samarin. Iron and Steel Institute, Journal, v. 198, June 1961, p. 131-141.

Conditions for melting and pouring steel under vacuum pressures are discussed with the kinetics of the process. The deoxidizing power of carbon in vacuum is determined by holding liquid Fe with different carbon content at 1590° C. Decarbonization and desulphurization of stainless steel scrap is accomplished by remelting in a vacuum induction furnace. 17 ref. (D8m, D6, D11, 1-73)

490-D. Vacuum Casting of Steel at Steel, Peech & Tozer. Metal Treatment and Drop Forging, v. 28, July 1961, p. 296.

Vacuum casting of steel in commercial quantities. Process facilitates hydrogen removal and lowers carbon, sulphur and oxygen content. Transverse and impact properties and ductility. Equipment and sequence of operations. (D9, 1-73, 1-52, Q7, Q23; ST)

491-D. (French.) Steelmaking by the OLP Process. B. Trentini. Technique Moderne, v. 53, May 1961, p. 177-182.

Cast iron containing 0.1-2.1% phosphorus is refined in a converter with basic lining by top blowing with an oxygen/powdered-lime mixture. A steel containing approximately 0.06% C, 0.32% Mn, 0.02% P, 0.01% S and 0.0015% N is obtained after ferromanganese addition. Data are given for elastic limit, tensile strength, elongation and hardness in the cold rolled state. (D10c, Q-general, 2-60; ST)

492-D. (German.) Operation of Electric Furnaces for Steel Melting From the Viewpoint of Electrotechniques. W. Bettzieche. VDE-Fachberichte, v. 21, 1960, p. 46-50.

Power requirements and characteristic electrical data for melting of steel charges in electric furnaces as influenced by line current and disturbances in power line. (D5)

493-D. (German.) Several Research Results in Deoxidation of Metal Melts. A. M. Samarin. Monatsberichte der Deutschen Akademie der Wissenschaften zu Berlin, v. 2, June 1960, p. 375-385.

Thermodynamics of oxygen solutions in liquid metals, especially Fe. Influence of alloying elements on solubility of oxygen. Application to deoxidation of liquid metal melts. (D11r, 2-60, P12e; Fe, 14-60, O)

494-D. H-Iron Passes the "Acid Test". Iron Age, v. 188, Aug. 3, 1961, p. 78-79

Description of pilot plant operations during production of metallic Fe by reducing Fe ore with hydrogen gas. The H and Fe ore react in a series of four fluid beds at 850° F. and a pressure of 440 psi. (D8j)

495-D. (Italian.) Electrical Furnace Pig Iron in Italy. P. Nigri and G. Moga. Fonderia Italiana, v. 10, May 1961, p. 153-160.

Electric and blast furnace operations are compared in terms of tonnage requirements, capital investment and flexibility, both in starting and stopping the process and in production of various grades of pig iron and ferroalloys. (D5, D1, W-general)

496-D. (German.) The Metallurgy of Free Cutting Steel. Technica, v. 10, June 23, 1961, p. 865-866.

Review of technological parameters in production and processing of rolled, forged, drawn and heat treated free cutting steel (9 S 20, 9 SPb 23, 10 S 20, 9 SMn 23, 9 MnPb 23, 15 S 20, 22 S 20, 35 S 20, 45 S 20 and 60 S 20 steels) such as control of converter temperature, casting rate, deoxidation, composition and heat treatment. Data are given for mechanical properties and microstructure. (D-general, F-general, J-general, P-general, Q-general; SGA-k, AY)

497-D. (Russian.) Effect of Method for Hot Metal Delivery on Disintegration of Continuous Ingots by Hot Cracks. E. A. Iodko. Izvestiya VUZ--Chernaya Metallurgiya, Dec. 1960, p. 31-38.

Supply of metal for continuous casting of steel ingots is studied. Location and number of pouring spouts, entrance angle of metal, carbon content and pouring temperature are observed to affect the number and length of cracks. Skin formation and skin erosion are also investigated. (D9q, 1-52, 9-72)

498-D. (Russian.) Continuous Oxidation of Pig Iron Elements. V. V. Revenko and K. V. Demykin. Izvestiya VUZ--Chernaya Metallurgiya, Dec. 1960, p. 39-45.

Directing a jet of oxygen to hit a falling stream of molten Fe in a converter designer so that top and bottom blowing can be effected separately and/or together. The method of blowing and the height of the metal stream are observed to affect the composition of the metal. (D11r, D3b)

499-D. (Russian.) Manufacture of Manganese Alloys From Usinsk Manganese Ores. A. D. Kramarov, N. V. Tolstoguzov, E. Ya. Zarvin, V. P. Timmerman, A. M. Levin and A. K. Gurov. Izvestiya VUZ--Chernaya Metallurgiya, Dec. 1960, p. 46-54.

Laboratory electric furnace smelting of Mn ores containing 19.9-42.5% Mn. Composition of metal and slag, distribution of Mn between metal and slag and basicity depend upon ore composition and flux. Parameter governing design and operation of a production furnace. (D5, 1-53, 17-55; Mn-b)

500-D. (Russian.) Utilization of Silicon-Manganese From Usinsk Ores for Reduction of Steel. E. Ya. Zarvin, A. D, Kramarov, N. V. Tolstoguzov, G. K. Gurov, A. M. Levin and V. P. Timmerman. Izvestiya VUZ-Chernaya Metallurgiya, Dec. 1960, p. 55-62.

Openhearth refining using Si-Mn (62.1% Mn, 15.4% Si, 0.51% P) as reducing agent, indicating P content and loss of reducing agent as functions of reducing time and methods. The same factors are indicated as affecting O, N and H content. (D2a, D11; AD, Mn-b, Si, 17-57)

501-D. (Russian.) Technical Production Indicators for Openhearth Furnaces. M. A. Glinkov. Izvestiya VUZ--Chernaya Metallurgiya, Dec. 1960, p. 135-138.

Parameters are established for the evaluation of openhearth furnace efficiency. Tonnage capacity, hearth area and various other factors are considered. 4 ref. (D2)

502-D. (Russian.) Technical Production Indicators of Openhearth Furnaces. I. D. Semikin. Izvestiya VUZ--Chernaya Metallurgiya, Dec. 1960, p. 139-145.

Discussion of technical factors affecting openhearth furnace operations including heat utilization, heat losses, thermal smelting requirements and the thermal power of the furnace. Heat dissipation per ton of steel and furnace construction are also examined. 4 ref. (D2)

503-D. (Russian.) Automation of Hot Handling in an Openhearth Furnace. V. G. Antipin. Izvestiya VUZ--Chernaya Metallurgiya, Dec. 1960, p. 146-150.

Automation of openhearth furnace operations is analyzed in reference to heat and nature of charge. Temperature control depends on heat of additions, losses and charge composition, namely the relative amount of scrap, ore or pig iron. (D2, S16, 18-74)

504-D. (Russian.) Effect of Hydrogen in Steels on the Economics of Metallurgical Production. N. A. Shriro. Izvestiya VUZ--Chernaya Metallurgiya, Dec. 1960, p. 166-172.

Effect of hydrogen in steel and moisture content in air during smelting on plasticity and flaking tendency of steels. Methods of reducing hydrogen in liquid steels. Dependence of hydrogen content on temperature control, ingot and ladle cleanliness and pouring practice. 18 ref. (D9s, N15e, Q23, 3-69)

505-D. (Russian.) Slag Practice in the Refining of Steel in Top Blown Oxygen Converters. S. D. Gagin. Izvestiya VUZ--Chernaya Metallurgiya, Dec. 1960, p. 173-182.

Converting of Fe containing 0.6-0.9% Si, 1.4-1.7% Mn, 0.1% P, and 0.05-0.07% S. Slag and metal composition depends on time. P content determined by temperature, amount CaO used, slag basicity and FeO concentration in slag. Effect of lance height above slag on slag oxidation and on amount of FeO. 5 ref. (D3b, D11)

506-D. Degassing Unit Processes Steel in Vacuum. Tool and Manufacturing Engineer, v. 47, Aug. 1961, p. 54-56.

Ladles of molten steel are degassed by drawing molten metal through a suction nozzle into an evacuated vessel, releasing the degassed metal back into the ladle and repeating the operation until the desired degree of gas removal is achieved. The process also permits the addition of alloying elements under vacuum. (D9s, D9r, 1-73)

507-D. (Italian.) Free Way to the Molten Cast Iron by an Air Drill. Giacomo Storace. Fonderia, v. 10, June 1961, p. 250.

Blast furnace charging and air drilling of a taphole in the crucible to give a free way to the molten metal. (D1a)

508-D. (Czech.) Semi-Killed Steel. J. Uricar. Hutnicke Listy, v. 16, Feb. 1961, p. 88-94.

Openhearth steelmaking including deoxidation by FeMn additions in the furnace and FeSi additions in the ladle. Tapping temperature is 1620-1680° C. and casting temperature is 1450-1490° C. Macrostructure and sulphur segregation. 15 ref. (D2, M27; ST-k, 9-69)

509-D. (Czech.) Effect of the Cleanness of Ceramic Pouring Systems on the Micropurity of Railroad Wheel Tire Steel. Pt. 2. Theodor Myslivec, Josef Cadek, Miroslav Mandl, Jaroslav Vrsek, I. Brodsky and M. Lubovsky. Hutnicke Listy, v. 16, Feb. 1961, p. 94-102.

Influence of pouring system cleanness and material used on quantity of FeO, MnO, SiO_2, Al_2O_3 and CaO inclusions in the steel. The inclusions are traced by Ca^{45} isotope. 20 ref. (D9p, T23; ST, 9-69)

510-D. (Czech.) Tin Plate Steel Manufactured in an Experimental Oxygen Blown Converter. Josef Teindl, Augustin Havlik and Zdenko Zdenek. Hutnicke Listy, v. 16, Feb. 1961, p. 103-107.

A charge of 7000 kg. openhearth Fe, 200 kg. scrap, 7.65% lime 1.65% scale and 0.07% bauxite is refined with an oxygen consumption of 75 cu. in. per ton of raw Fe. The steel, which contains 0.04% C, 0.020-0.021% Mn, 0.03-0.04% Si, 0.038-0.039% P, 0.03% S, 0.015% Cu and 0.006-0.007% N, is rolled and Sn plated. Ingot, rolling and tinning defects. 16 ref. (D3, F23, L17; ST, 9)

511-D. (Russian.) Production of Ingots With Self-Sealing Pipe. G. N. Oiks and G. A. Sokolov. Izvestiya VUZ--Chernaya Metallurgiya, Mar. 1961, p. 37-39.

A method of using special molds for casting ingots without double degassing, either in vacuum or in a neutral atmosphere. The process decreases nonmetallic inclusions and avoids the necessity to cut off a part of the ingot on account of defective shrinkage. The expenditure for all materials is reduced. (D9k, D9s, 1-73, 9-67)

512-D. (Russian.) Regulation of the Combustion in Martin Furnaces Judging by the Oxygen Content. Yu. N. Tuluevskii, A. A. Dobrokhotov, S. I. Akhmanaev and E. P. Chistova. Izvestiya VUZ--Chernaya Metallurgiya, Mar. 1961, p. 184-191.

Regulating 340 ton openhearth furnace in order to obtain optimum efficiency by controlling the composition of the heating material and combustion. Air-gas mixtures, gas evolution from the melt. 10 ref. (D2, D11j)

513-D. Iron Production in Current Development. W. H. Dennis. Mining Magazine, v. 105, July 1961, p. 13-18.

Review of nonblast furnace methods of direct reduction of Fe ore. Design, operation, size and conversion efficiency of the Krupp-Renn, R-N, Strategic-Udy, Wiberg-Soderfors, Electrometall and fluidized and fixed bed reactor furnace systems. Grade and composition of the ore and of the metal or sponge iron produced. (D8j)

514-D. Thermal Analysis of the Iron Blast Furnace Process. H. N. Lander. News in Engineering, v. 33, July 1961, p. 21-27.

A thermochemical model and graphical heat balance methods are described with applications for the prediction of steady-state performance under various operating conditions and for the development of procedures for analyzing the kinetic behavior of the process. 11 ref. (D11k, 17-56)

515-D. Pressure Pouring Tested in Full Scale Slab Molds. Steel, v. 149, Aug. 7, 1961, p. 74, 76.

Production of carbon and stainless steel slabs 14 ft. long, 3 1/2 ft. wide and 5 in. thick using a direct casting technique in which air pressure forces the molten steel upward through a ceramic tube and into a semipermanent

graphite mold. (D9p, 3-74; CN, SS, 4-52)

516-D. (Ukranian) Modification of Magnesium Cast Iron. A. V. Chornoval. Dopovidi Akademii Nauk Ukrainskoi RSR, Feb. 1961, p. 183-186.

Addition of FeSi or CaSi to prevent chilling during solidification of castings. Effect on overcooling, graphite inclusions and free cementite content. 8 ref. (D9r, N12, 2-60; CI, Mg)

517-D. Open Hearth Furnace Research. Australian Mechanical Engineering, v. 48, July 5, 1961, p. 33-37.

Use of small-scale clear plastic models which reproduce gas flow features of full-scale unit at room temperature to provide data for modifications of design of regeneration. (D2, 1-53, 17-51, 17-56)

518-D. Experimental Smelting of Utah and Wyoming Iron Ores. Nick Derick and J. P. Riott. U. S. Bureau of Mines, Report of Investigations 5817, 1961.

Replacing part of a burden of Utah iron ore with pellets produced from Atlantic City Wyoming concentrates and substituting a high quality Eastern coke (Fairless) for Utah coke in order to increase maximum wind rate in the blast furnace. (D1a; Fe, RM-n, RM-j43)

519-D. (Spanish.) Use of Oxygen and Powdered Lime in Steelmaking. E. Trentini, P. Vayssiere, J. Francais and M. Allard. Instituto del Hierro y del Acero, v. 14, Jan.-Mar. 1961, p. 263-274.

Refining by top blowing oxygen containing powdered lime in a converter or an openhearth furnace, or by lancing the oxygen-lime suspension into the openhearth bath. Desiliconization, dephosphorization and decarbonization. 12 ref. (D10, D11n)

520-D. (Spanish.) Use of Low Frequency Induction Furnaces in the Manufacture of Highly Homogeneous and Pure Metals. Luis Maria Ojeda Segur. Instituto del Hierro y del Acero, v. 14, Jan.-Mar. 1961, p. 275-280.

Elimination of micro-impurities by induction heating during the melting or alloying process carried out in the induction furnace. Theories of the heating process. (D6)

521-D. A Survey of Oxygen Steelmaking. Donald Garmonsway. New Scientist, v. 11, July 20, 1961, p. 153-155.

Various techniques are based on the principle of the Bessemer converter in which oxygen enters the molten iron either through nozzles inserted in the base of the vessel or through a water cooled pipe or lance from above. Oxygen is also used in the conventional openhearth process. (D10)

522-D. Sulphur Is Captured in Slag. Demag Courier, v. 3, June 30, 1961, p. 3.

Design and operation of a shaker ladle used to desulphurize molten pig iron by shaking and thoroughly mixing quicklime powder or calcium carbide with the molten metal to produce pig iron in a quality previously unachievable. (D11n, 1-52; AD-a)

523-D. Vacuum Melting Makes More Perfect Metals. Union Carbide Metals Review, v. 4, Summer 1961, p. 2-5.

Use of vacuum in an induction furnace during melting and pouring in arc melting of an electrode formed in pure air or in a vacuum induction furnace and in pouring air-melted metal into a mold (vacuum degassing) improves ductility, impact strength, fatigue strength and tensile, rupture and magnetic properties of various steels, superalloys and refractory metals. (D8m, D9s, C5m, C25, P16, Q-general; ST, SGA-h, EG-d37)

524-D. Alloy Quality Versus Steel Quality. E. R. Saunders, W. D. Forgeng and J. W. Farrell. Union Carbide Metals Review, v. 4, Summer 1961, p. 22-24.

Effects of inclusions in alloy additives on inclusions in steel. Cleanliness of the ferroalloys has no measurable effect on quality of steels because inclusions in the additives separate rapidly from the bath. Alloy additives influence inclusion formation by changing the solubility relationships of oxygen and sulphur. (D-general, 3-69; ST, 9-69)

525-D. (German.) Summarizing Presentation of Equilibria Between Iron and Lime-Containing Phosphate Slags. Gerhard Tromel, Wolfdietrich Fix and Hans Werner Fritze. Archiv fur das Eisenhuttenwesen, v. 32, June 1961, p. 353-359.

Establishment of phase equilibria in the quaternary system Fe-FeO-CaO-P_2O_5 by measuring metal-slag equilibria in P_2O_5-containing lime crucibles at temperatures from 1550-1675° C. Microstructure investigation and chemical analysis of equilibrated phases. (D11n, M27, S11; RM-q)

526-D. (Translation-Brutcher no. 4926.) Continuous Blowing of Hot Metal in Runner With Oxygen. V. A. Fuklev. Izvestiya VUZ--Chernaya Metallurgiya, July 1960, p. 60-67.

Promise of continuous oxygen blowing of liquid pig irons in runners, a practice in line with other continuous metallurgical processes and a more complete suppression of brown fumes. Development of a special runner design to eliminate many of the current shortcomings. Optimum depth of penetration of oxygen jets, enabling calculation of the number of lances required and the quantity of oxygen needed. (D8n)

527-D. (Translation-Brutcher no. 5105.) Rate of Flow Granular Materials From an Opening and the Shape of the High-Permeability Zone. B. S. Fialkov and V. K. Gruzinov. Izvestiya VUZ--Chernaya Metallurgiya, Dec. 1960, p. 17-22.

Similarity of laws obeyed by the movement of the blast furnace stock column with special reference to the fusion zone and the coke combustion zone at the tuyeres and the movement of granular materials when they are let out through the opening. Change in pressure at tuyere level as function of charge-column height; stages in the formation and collapse of arches as recorded by cinematography. (D1)

528-D. (Translation-Brutcher no. 5177.) Equipment for Vacuum Degassing of Steel. I. Mydlarz. Problemy Projektowe, Feb. 1960, p. 53-59.

Two vacuum degassing plants designed according to the Bochumer-Verein principle. Data on volumes of gas to be drawn off at various pouring rates and vacua design details of vacuum tank seals. (D9s, 1-52, 1-73)

529-D. (Translation-Brutcher no. 5108.) Mechanism of Longitudinal Cracking on Surface of Continuous Cast Billets. Y. Aketa and K. Ushijima. Tetsu-to-Hagane (Iron and Steel Institute of Japan, Journal), v. 46, 1960, p. 1733-1740.

Process of solidification and stress development in square-section continuous cast billets in mold. Relation between mold wall and billet shell; stress state in this connection; equation for stresses. Effect of shape of mold corners, uniformity of cooling, especially of billet sides, casting temperature and casting speed upon longitudinal surface cracking. (D9q; ST, 9-72)

530-D. (Translation-Brutcher no. 5154.) Effect of Deoxidation With a Mn-Si-Al Alloy on Quantity and Composition of Oxide Inclusions in Steel. Yu. T. Foryst, V. A. Mchedlishvili and A. M. Samarin. Trudy Institute Metallurgii, v v. 5, 1960, p. 22-35.

Quantities of oxide inclusions as related to the different deoxidizer alloys and the size of the inclusions. Al/Si ratio in Mn-Si-Al deoxidizer alloy raised from 0.01 to 0.025, with constant Mn-Si ratio, in presence of large amounts of oxygen and effect on inclusion content; significance of Mn/Si ratio. Data on effect of increased Mn/Si ratios on oxide inclusion content. Explanation of harmful effect of deoxidation of steel bath with Al alone, additionally to use of complex deoxidizers. (D11r; AD-r31, 9-69)

531-D. (Translation-Brutcher no. 5134.) Kinetics of Direct Oxidation of Impurities in Liquid Iron. S. I. Filippov and S. Z. Martynov. Izvestiya VUZ--Chernaya Metallurgiya, Jan. 1961, p. 5-11.

Laboratory study of rates of oxidation of various elements dissolved in liquid iron at different rates of feed of gaseous oxidizing agents. Gaseous oxidizing agents include argon + oxygen; carbon dioxide data on their utilization coefficient under various conditions. (D11r)

532-D. (Translation-Brutcher no. 5088.) Reactions in Rotary Steelmaking Vessels With Oxygen Top Blowing. P. E. Hardt, G. Vocke and H. Schenck. Stahl und Eisen, v. 81, Mar. 1961, p. 155-163.

Previously abstracted. See item 198-D, 1961. (D2g)

533-D. (Translation-Brutcher no. 5089.) On the Metallurgy of the "Phoenix Lancing" Process. E. Schurmann, K. K. Aschendorff, H. Hofges and E. Kohler. Stahl und Eisen, v. 81, Mar. 1961, p. 163-172.

Previously abstracted. See item 199-D, 1961. (D3)

534-D. (Translation-Brutcher no. 5110.) Production of Lime-Containing Sinter and Its Smelting, With Special Reference to Sulphur Removal From Sinter and Pig Iron. B. Weilandt and F. Kruse. Stahl und Eisen, v. 81, May 1961, p. 295-302.

Previously abstracted. See item 262-D, 1961. (D11n)

535-D. (English.) Research on the Activity of Components in Iron Blast Furnace Slag. Pt. 3. Measurement of the Activity of Silica and Alumina in the $CaO-MgO-SiO_2-Al_2O_3$ System. Koji Sanbongi and Yasuo Omori. Tohoku University, Science Reports of the Research Institutes, v. 13, June 1961, p. 174-182.

Effect of MgO on the activity of SiO_2 and Al_2O_2 in the slag of $CaO-SiO_2-Al_2O_3$ is measured by the emf. method of double cell. 6 ref. (D11n, P12b; RM-q)

536-D. Hydrogen Reduction Advantages Shown. Steel, v. 149, Aug. 14, 1961, p. 158-159.

Pulverized Fe ore is reduced by hydrogen in a series of four fluid beds at 850° F. and a pressure of 440 psi. The briquettes obtained after passivation are suitable for use in electric furnaces. (D8, 2-61, 3-74, H14, R10c; Fe, 17-57)

537-D. Steelmaking Processes. Frederick C. Langenberg. Metals Review, v. 34, Aug. 1961, p. 17-18.

Review of steelmaking techniques and equipment. Design and operation of the Kaldo converter, L-D converter, Rotor furnace and openhearth furnace. Vacuum degassing and continuous casting of steel. (D-general, 1-52)

538-D. Vacuum Melting--Bigger Ingots for Bigger Markets. C. L. Kobrin. Iron Age, v. 188, Aug. 17, 1961, p. 93-94.

Increased production of vacuum melted ingots composed of low and high alloy steels by a consumable electrode furnace for ingots up to 60 in. in diameter with a weight of 80,000 lbs. (D8m)

539-D. (Japanese) Gas Content of Molten Steel Just Before Tapping. Pt. 2. Influence of Water-Vapor Pressure in Air on Gas Contents in Molten Steel. Yoshishiko Abe. Tetsu-to-Hagane (Iron and Steel Institute of Japan, Journal), v. 47, July, 1961, p. 902-907.

Distribution and equilibrium relations of oxygen and hydrogen in the molten steel and the $CaO-SiO_2$ slag of baths in basic electric are furnaces during melting in air from 1560-1624° C. 16 ref. (D11h, D5)

540-D. (Russian.) Reactions of Carbon and Oxygen in Liquid Iron. A. Yu. Polyakov, A. M. Samarin and Syui Tszen-Tszi. Izvestiya Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk, Metallurgiya i Toplivo, Jan. 1961, p. 3-9.

Temperature dependence of carbon and oxygen activity for various concentrations. Oxygen solubility as a function of carbon concentration, pressure and temperature. 15 ref. (D11g, 2-60, 2-61, 3-74; C, O)

541-D. (Russian.) Distribution of Dissolved Admixtures in Rimming Steel, Over the Ingot Volume. D. E. Temkin. Izvestiya Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk, Metallurgiya i Toplivo, Jan. 1961, p. 10-14.

Computation of the concentration of carbon and other elements based on their diffusion coefficient, ingot diameter and distances from the ingot surface and the crystallization front. Solidified-shell thickness and crystallization speed as functions of time. (D11s, N12, 3-67; ST-d)

542-D. (Russian.) Effect of Preparation and Composition of Slag Forming Substances on Dephosphorization of Steel. S. I. Lebedev and A. E. Khlebnikov. Izvestiya Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk, Metallurgiya i Toplivo, Jan. 1961, p. 20-23.

Electrolytic Fe containing 1.9% P is melted in a laboratory furnace and treated at 1600° C. by addition of Fe ore,

lime, scale and bauxite in the granulated, compacted or sintered state. Temperature of additions and dephosphorizing power. 6 ref. (D11n, 2-60)

543-D. (Russian.) Generation of Vibrations in Molten Metals. I. I. Teumin. Izvestiya Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nau, Metallurgiya i Toplivo, Jan. 1961, p. 24-30.

Vibrations at frequencies of 1000-10,000 cps. are introduced to the top or bottom of the solidifying ingot or to the melt in a special ladle prior to casting to influence crystallization and thus mechanical and technological properties. (D9k, D9m, N12, Q-general; 14-60)

544-D. (Russian.) Reduction of Roasted Pellets Manufactured From Concentrates, by Gases. G. V. Gubin, V. I. Karmazin and G. D. Shkovyra. Izvestiya Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk, Metallurgiya i Toplivo, Jan. 1961, p. 147-149.

Reduction of Fe concentrates at 600-1000° C. in a stream of CO, H, humid or dry natural gas. Reducibility and reduction velocity as functions of temperature and time. It is found that the reduction power of natural gas at 1000° C. is comparable with that of CO gas. (D-general)

545-D. (Russian.) Reduction of Iron Ores Containing Organic Substances. N. A. Vasyutinskii and S. K. Gregnev. Izvestiya Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk, Metallurgiya i Toplivo, Jan. 1961, p. 149-151.

Ores containing organic carbon or carbon + siderite are heated in closed 1Kh18N9T steel tubes and held at 600-900° C. for 1 hr. Partial reduction to magnetite by the natural carbon and siderite admixtures acting as reducing agents is achieved. Effect of temperature. 4 ref. (D-general)

546-D. Melting in the Electron Beam Furnace. G. Ogiermann. Vacuum, v. 10, Dec. 1960, p. 454-465.

Description of the furnace unit, melting technique and practice and metallurgical aspects of the process. Block diagram of electronic control. Capacity of the furnaces with ring cathode arrangement as a function of melting temperature and mold diameter. (D8p, C5k, W18)

547-D. Operation of the Oxygen/Steam Blown Converters at the VLN Steel Plant of the Steel Company of Wales Ltd. M. C. Harrison and P. Truscott. Iron and Steel Institute, Journal, v. 198, Aug. 1961, p. 341-352.

Application of a double slag process using bottom-blown converters for making low-carbon, deep drawing steel from a high phosphorus iron. Lining and bottom making practice are reviewed with plant design and operation. (D3f)

548-D. Desulphurization of Induction Melted Plain Carbon and Low Alloy Steels. Charles H. Lumpp, Jr. American Institute of Mining Metallurgical and Petroleum Engineers, Preprint, Nov. 30-Dec. 2, 1960, 5 p.

Method for sulphur removal and maintenance of specific sulphur levels in induction melted steel using a burnt lime and fluorspar basic slag. Description of the induction furnaces and furnace lining practice. 4 ref. (D11n, D6)

549-D. Casting Procedures for Ferroalloys. H. W. Rathmann. American Institute of Mining, Metallurgical and Petroleum Engineers, Preprint, Nov. 30-Dec. 2, 1960, 6 p.

Technological parameters and application of casting methods for ferroalloys including solidification-in-place; bare metal casting in sand beds, in graphite molds and in cast iron molds; pig machine casting and casting through slag. (D9)

550-D. Effect of Vacuum Degassing on Steel Quality. A. L. Lehman. American Institute of Mining, Metallurgical and Petroleum Engineers, Preprint, Nov. 30-Dec. 2, 1960, 10 p.

Review of the metallurgical advantages of vacuum degassing such as average removal of 63% of the hydrogen, uniform cross sectional distribution of hydrogen and improved ductility in aged and unaged Ni-V-Mo forgings. Design and operation of the vacuum degassing equipment. (D9s, 1-52, 1-73, Q-general, 2-60; AY)

551-D. Optimum Desulphurization and Dephosphorization of Steels in Air Induction Furnaces. John Zotos and David A. Colling. American Institute of Mining, Metallurgical, and Petroleum Engineers, Preprint, Nov. 30-Dec. 2, 1960, 6 p.

Desulphurization of steel by refining a highly deoxidized steel bath under a basic, fluid slag and by inoculation with Co-base alloys and dephosphorization by processing a highly oxidized steel bath under a highly basic, oxidizing slag. Two expressions are derived for the dynamic dephosphorizing and desulphurization powers existing during the production of steel as a function of the slag parameters. 7 ref. (D11n, D11s D6)

552-D. More Pig Iron for Less Coke--Coal Injection and Oil Firing. British Steelmaker, v. 27, Aug. 1961, p. 261.

Production of pig iron by techniques which replace up to 30% coke with milled coal for auotmatic injection into blast furnaces through lances a placed usually in tuyeres. An alternative and competitive technique is an oil firing system intended to reduce coke consumption. (D1; SI-a, RM-k, RM-j)

553-D. (German.) Blast Furnace Smelting Tests With Lime Coke. Paul Huttemann and Robert Mintrop. Stahl und Eisen, v. 81, Aug. 3, 1961, p. 1041-1047.

Test melting of lime coke (8% lime) in a blast furnace of 800 tons per day (basic Bessemer pig iron) capacity. Investigation of smelting metallurgy with emphasis on metal slag composition and desulphurization reaction. (D1, D11)

554-D. (German.) Increase of Production of Openhearth Furnaces by Investigation of Gas Flow. Hans-Jurgen Darmann, Alfred Esch and Heinz Moller. Stahl und Eisen, v. 81, Aug. 3, 1961, p. 1057-1062.

Investigation of gas-flow pattern by pressure measurement and computation. Increase of heat efficiency and production and improvement of refractory wear by structural changes which improve gas flow. (D2h)

555-D. Vacuum Degassing of 500 Lb. Melts for Carbon Steel Castings. D. E. Parsons. American Institute of Mining, Metallurgical and Petroleum Engineers, Preprint, Nov. 30-Dec. 2, 1960. 34 p.

The effect of vacuum spray casting and of vacuum ladle degassing of melts of 0.30% carbon steel is studied by comparison of 12 x 12 x 4 in. slab castings, made from degassed and nondegassed metal, after sectioning and heat treatment of 6 x 6 x 4 in. samples. Data are tabulated for reduction in gas content, change in macrostructure, gas porosity, tensile ductility, impact strength and fatigue notch sensitivity. (D8s, 1-73, Q-general, 2-60; CN-g)

556-D. Refractories for the New Steelmaking Processes. Pt. 2. J. H. Chesters. Refractories Journal, v. 37, July 1961, p. 200-204.

Evaluation of refractories in oxygen-blown openhearth, Ajax furnaces, large arc furnaces, stram-oxygen converters and oxygen-converter processes. Factor influencing life and performance of refractories are reviewed in terms of the changing pattern of steelmaking (i. e., the increased use of oxygen) 14 ref. (D-general, W18, W17; RM-h, 17-57)

557-D. Fuel and Energy Requirements for Some Possible Future Steelmelting Processes. M. W. Thring. Institute of Fuel, Journal, v. 34, July 1961, p. 272-274.

Processes discussed in terms of fuel consumption include counterflow steelmelting, with details of a German application; pneumatic steelmaking, in which waste gases are utilized for the preheating of the next charge; flexible hot metal, cold scrap processes, using both oxygen blowing and fuel firing; and electric arc furnace steelmaking. (D-general, 10-51, 10-53)

558-D. (German.) Temperature Profile and Reaction Kinetics in the Blast Furnace. Gerhard Hegnert and Kurt Hedden. Chemie-Ingenieur-Technik, v. 33, July 1961, p. 469-478.

Measurement of temperature distribution and gas composition in a basic Bessemer pig iron blast furnace by probe tests and analysis of reaction pattern and reaction kinetics. Investigation of coke consumption as influenced by coke reactivity. (D1, D11j, D11k)

559-D. (German.) Continuous Casting of Alloy Steels. B. Tarmann. Radex Rundschau, Mar. 1961, p. 579-589.

Review of technology for continuous casting of tool, stainless and wear resistant Mn steels in terms of casting plant design; properties and defects of continuous castings such as microstructure, mechanical properties, shrink holes and longitudinal and vertical cracks; and cost analysis and technical index. (D9q, 10-54)

560-D. The D-H (Degassing and Alloying) Process. Walter L. Finlay and Charles D. Preusch. Blast Furnace and Steel Plant, v. 49, Sept. 1961, p. 867-877.

Intermediate between the conventional steel vacuum depassing process and vacuum induction melting process, it controls the interstitial compound-forming elements C, H_2, O_2 and N_2 by vacuum removal as gases without oxidation or slag interaction. (D9s, 1-52, 1-73)

561-D. New Trends and Ideas in Operation and Design of Open Hearth Furnaces. Stephen Wortman. Blast Furnace and Steel Plant, v. 49, Sept. 1961, 878-889, 893.

Firing rates are increased by atomizing liquid fuels with natural gas using combustion oxygen, oxygen lancing and adding carbon. Production is alternatively increased by using oxygen-gas roof burners, all basic openhearth furnaces and newly designed roofs, slag pockets, downtakes and checker chambers. (D2, 1-52, 10-54, 17-51, 17-57)

562-D. (German.) Gas Passage Through Burden in the Upper Part of the Blast Furnace. Eugen Peetz and Gerhard Winzer. Stahl und Eisen, v. 81, Aug. 17, 1961, p. 1101-1107.

Test charging of sintered blast furnace burden and measurement of gas flow rate on a model representing the upper part of a blast furnace shaft (natural size). Establishment of gas passage profiles as influenced by burdening technique, (i. e. distance between bell and wall of furnace shaft and pouring height). (D1a)

563-D. (German.) Means of Increasing Refining Rate in Oxygen Top Blowing (Rapid Refining). Hans Kosmider, Herbert Neuhaus, Max Wirth and Hermann Schenck. Stahl und Eisen, v. 81, Aug. 17, 1961, p. 1107-1116.

Test refining by oxygen top blowing of acid and basic Bessemer pig iron in a 2-ton pilot converter with and without additional stirring using rock lime for slag formation and scrap and ore for cooling. Investigation of refining kinetics. (D3f)

564-D. Argon Atmosphere Teeming Upgrades Premium Steels. Steel, v. 149, Sept. 11, 1961, p. 110, 112.

Die steels, alloy steels and superalloys teemed in argon atmospheres possess improved mechanical properties and cleanliness as compared with those teemed in air. (D9p, Q-general, 2-60; ST, SGA-h)

565-D. Influence of Cold-Reduction and Heat-Treatment Combinations on Hydrogen Solubility and Permeability in Steel. R. M. Hudson, K. J. Riedy and G. L. Stragand. Corrosion, v. 17, July 1961, p. 86-88.

The direct relation of cold reduction on hydrogen solubility is shown to persist through subsequent heat treatment and later cold reductions. Hydrogen permeability increases with cold reduction to a limit (below 30% reduction for initial hot rolled steel), after which the permeability is inversely related. Tests also confirm that the maximum value of hydrogen desorption rate in water and in dry nitrogen at 38° C. occurs below 30% reduction. (D11h, J2, 1-64; ST)

566-D. Vacuum Casting of Steel. Metallurgia, v. 64, July 1961, p. 26.

Equipment, sequence of operations and properties of the produced steel with particular reference to hydrogen, oxygen, carbon and sulphur contents, ductility, transverse properties, impact properties and transition temperature. (D9, 1-52, 1-73, Q-general; ST)

567-D. Making, Working and Testing of Steel. Metallurgia, v. 64, July 1961, p. 31-36.

Review of pilot projects carried out at the Sheffield Station of the British Iron and Steel Research Assoc. including spray refining of blast furnace metal, degassing of molten steel, electric steelmaking, continuous casting, forging production, wire drawing, manufacture of sheet and strip, manufacture of rounds and sections, mechanical and physical properties and analytical techniques. (D-general, A9j, F-general, P-general, Q-general, S11; ST)

568-D. (Japanese.) Teeming in Protective Atmosphere. Pt. 2. Studies on Nonmetallic Inclusions, Especially Sand Marks in Steel. Zenichiro Takao, Kiichi Narita, Kazuo Kanda and Atusi Miyamoto. Tetsu-To-Hagane (Iron and Steel Institute of Japan, Journal), v. 47, Aug. 1961, p. 1156-1162.

Effects of teeming 1030, 1040 and SCM21 steel melts in air, nitrogen and argon on nature and amount of oxide inclusions, oxidation rates, occurrence of sand marks during deformation and recovery of Al acting as

the deoxidizer and austenite grain refining agent. (D9p)

569-D. Metalworking's Technological Explosion--Steelmaking. Pt. 3. C. L. Kobrin. Iron Age, v. 188, Sept. 14, 1961, p. 169-176.

Survey of direct reduction, oxygen blowing, vacuum arc melting, continuous casting, sinter and fuel injection and vacuum degassing methods in steelmaking. (D-general, 10-54)

570-D. (German.) Ingot Top Heating (Hot Top Techniques). Pt. 1. Survey on Techniques and Theoretical Basis. Karl-Ludwig Kiesel and Peter Schulz. Neue Hutte, v. 6, July 1961, p. 391-399.

Techniques include heating by gas-oxygen mixture. Use of exothermic reactants added after casting or applied as a lining in ingot top; and electrical heating including the Kellogg Hot Top Technique. Theoretic investigation of heat flow. (D9, D11k, 10-54; ST)

571-D. Pneumatic Steel Processes Replace Old Open Hearths. Steel, v. 149, Sept. 25, 1961, p. 150, 153.

Comparison of L-D, Demag, Rotor, Kaldo and oxygen processes with openhearth furnaces with regard to amount and quality of output. (D10, D2, 1-52)

572-D. (German.) Reducibility of Several Egyptian Iron Ores. Hermann Schenck, Hans-Peter Schulz and Raouf Radwan. Archiv fur das Eisenhuttenwesen, v. 32, July 1961, p. 431-436.

Isothermal reduction tests of Fe ore specimens (cubes) of varying Fe and gangue content, using Co and CO/CO_2 mixtures as reducing agents, at 800-1100° C. Investigation of hydrate and carbonate decomposition by differential thermal analysis. (D-general)

573-D. (German.) Equilibria Between Carbon, Oxygen and the Metals Chromium and Manganese in Oxygen Refining in the Basic Arc Furnace as Influenced by Temperatures. Pt. 1. Chromium. Kurt Tesche. Archiv fur das Eisenhuttenwesen, v. 32, July 1961, p. 437-450.

Oxygen test refining of steel (1.25-12.5% Cr, 2.5-12.5% Mn) in a 300 kg. arc furnace under a lime-fluorspar slag. Investigation of Cr distribution as influenced by temperature, FeO and slag basicity. (D5, D11, 2-60, 2-61)

574-D. (German.) Kinetics of Deoxidation of Liquid Iron. Ludwig von Bogandy, Wolfgang Meyer and Iwan N. Stranski. Archiv fur des Eisenhuttenwesen, v. 32, July 1961, p. 451-460.

Measurement of nucleus formation and growth in deoxidation of laboratory melts by Zr and Fe-Zr alloys in a carbon-tube resistance furnace under Ar protective atmosphere. Study of dissolution rate of deoxidants. (D11r, D5)

575-D. Developments in Iron and Steelmaking. Australian Mechanical Engineering, v. 49, Aug. 5, 1961, p. 38-44.

Topics include the use of pellets or sinter as blast furnace charge; factors influencing blast furnace productivity; and description of the direct reduction process and of various oxygen processes. (D-general, 10-54)

576-D. (German.) Influence of Ionization on Degassing in Electron Beam Melting. Paul Muller. Zeitschrift fur Metallkunde, v. 52, July 1961, p. 488-491.

Estimation of the effect of ionization of gases in electron beam melting on the tendency of electric breakdown and on the degassing effect on the melted metal. (D8, D9s, D11g)

577-D. (Translation-Brutcher no. 4943.) On the Lining of Basic Oxygen Furnaces. S. Maehara and T. Kohtani. Tetsu-To-Hagane (Iron and Steel Institute of Japan), v. 45, Sept. 1959, p. 957-959.

Improvements in the lining of 50-ton basic oxygen furnaces in Japan, principally based on use of burnt and of tar-bonded dolomite bricks; as against imported magnesite brick. Physical properties and chemistry of refractories; details on three lining practices (D10a; RM-h)

578-D. (Translation-Brutcher no. 4947.) Basic Oxygen L-D Furnace Operated on High Hot Metal Charges. S. Maehara, T. Kohtani and K. Tagiri. Tetsu-To-Hagane (Iron and Steel Institute of Japan), v. 45, Sept. 1959, p. 959-961.

Possibility of adjusting the additions of lime, millscale, limestone and ore without inviting slopping as the holding capacity of the L-D oxygen furnace goes up in the course of the campaign. Cooling efficiencies of millscale, linestone

and Fe ore compared with that of steel scrap. (D10a)

579-D. (Translation-Brutcher no. 5117.) Behavior of Hydrogen in Basic Arc Furnace Steel Bath During Oxidizing Stage. S. Nagata Tetsu-To-Hagane (Iron and Steel Institute of Japan), v. 45, Sept. 1959, p. 966-967.

Study of hydrogen content in oxygen-blown basic arc furnace steel heats as affected by limestone or burnt lime added during blowing or between blowing and slag-off. (D5)

580-D. (Translation-Brutcher no. 5069.) Krupp-Renn Process Granules and Sponge Iron as Coolants in the Basic Oxygen L-D Process. E. Plockinger and K. Borowski. Technische Mitteilungen Krupp, v. 18, Jan. 1960, p. 1-8.

Previously abstracted. See item 177-D, 1961. (D10a)

581-D. (Translation-Brutcher no. 5074.) Special Features of High Pressure Treatment of Liquid Steel. P. N. Bidulya and K. N. Smirnova. Izvestiya VUZ-Chernaya Metallurgiya, Sept. 1960, p. 43-49.

Previously abstracted. See item 324-D, 1961. (D9, 3-74)

582-D. (Translation-Brutcher no. 5051.) New Developments Concerning the L-D (Basic Oxygen) Process. R. Rinesch. Berg und Huttenmannische Monatshefte, v. 105, Nov. 1960, p. 302-313.

Previously abstracted. See item 126-D, 1961. (D10a)

583-D. (Translation-Brutcher no. 5247.) Operating Results of the New Tobata Basic Oxygen. Y. Mitarashi and S. Morita. Tetsu-To-Hagane (Iron and Steel Institute of Japan), v. 46, Oct. 1960, p. 1180-1182.

Report on a new Japanese L-D basic oxygen plant put into operation in Sept. 1959. Data on ladle life, hot metal ratio and composition; charge to tap time; lining life; mold consumption; breakdown of heat time; temperature control; refractories consumption; breakdown on repair times, hourly furnace production, downtimes and ingot production for the first seven months of operation. (D10a)

584-D. (Translation-Brutcher no. 5149.) Hydrogen Problem in Alloy Steels From the Electric Furnace. E. S. Kalinnikov and I. P. Zavaluev. Izvestiya VUZ--Chernaya Metallurgiya, Feb. 1961, p. 45-50.

Previously abstracted. See item 444-D, 1961. (D9s)

585-D. (Translation-Brutcher no. 5109.) Reactions in Rotary Steelmaking Vessels With Oxygen Top Blowing. Pt. 2. P. E. Hardt, G. Vocke and H. Schenck. Stahl und Eisen, v. 81, no. 5, 1961, p. 311-320.

Previously abstracted. See item 263-D, 1961. (D10c)

586-D. (Translation-Brutcher no. 5193.) Preliminary Smelting Trials of Iron Ore Pellets in the Blast Furnace. P. Maertens and A. Poos. Stahl und Eisen, v. 81, no. 12, 1961, p. 778-782.

Previously abstracted. See item 445-D, 1961. (D1a)

587-D. (French.) Application of Vacuum Bubbling to Degassing of Metals in Ladle. J. Verge, J. Duflot, E. Spire and M. Michaud. Revue de Metallurgie, v.58, June 1961, p. 465-482.

Fe or steel held in a ladle in a low vacuum is treated with a current of inert gas bubbles, substantially dehydrogenating the metal with a 50% reduction of C and O content and an absence of renitriding even in the case of N bubbling. 15 ref. (D9s, 1-73)

588-D. (French.) Continuous Casting of Steel at the British Iron and Steel Research Assoc. and the Centre National de Recherches Metallurgiques. G. Fenton, G. Littlewood and J. Zaeytydt. Revue de Metallurgie, v. 58, June 1961, p. 483-487.

Parameters governing choice of molds for continuous casting of low-carbon, killed and rimming steel. Influence of cooling methods on quality and surface properties of ingots. 14 ref. (D9q, J2; ST, 5-59)

589-D. Vacuum Deoxidation of Steel for Large Ingots. George E. Danner and G. Taylor. Paper from "Vacuum Metallurgy Conference, Transactions, 1960". Interscience Publishers, Inc., New York 1, 1961, p. 225-233.

Deoxidation of electric furnace steel for large forging ingots, using vacuum stream degassing facilities, resulting in reduction of inclusion content and distribution, improved ingotism and

greater soundness and cleanness of castings. Comparison with vacuum stream degassed and air cast steels by ultrasonic testing and metallographic methods. (D9s, 1-73, M-general, Q-general, 9-69; ST-f)

590-D. Argon Teeming of Degassed Steel. William Wilson. Paper from "Vacuum Metallurgy Conference, Transactions, 1960". Interscience Publishers, Inc. New York 1, 1961, p. 235-241.

Forging ingots of 4340 steel and Cr-Ni-Mo die steel are teemed in argon atmospheres from vacuum degassed electric furnace melts with subsequent heat treatment, forging, surface finishing, ultrasonic and mechanical testing, magnetic particle inspection and macrostructure examination. Gas pickup and cleanliness are evaluated and structure surface and mechanical properties including ductility and forgeability are compared to air cast specimens. (D9p, D9s, M28, Q-general, 9-69; ST)

591-D. The D-H Vacuum Process for Molten Steel. P. J. Wooding and W. Sieckmann. Paper from "Vacuum Metallurgy Conference, Transactions, 1960". Interscience Publishers Inc., New York 1, 1961, p. 243-252.

Thermochemical parameters and operating principles for vacuum degassing of steel by the D-H process in which atmospheric pressure is used to force successive portions of the molten metal up through a refractory-line nozzle into the treatment vessel. Application to low and medium carbon, killed and semikilled and stainless steel. Effect of cyclic variation of the nozzle immersion depth, time and temperature of treatment and vacuum surface area of the melt on gaseous H, O and N removal, impurity reduction and CO evolution. 8 ref. (D9s, D11, 2-60, 3-69)

592-D. Specify Vacuum-Processed Steel for Forgings That Will Not Fail. H. R. Daniels. Metalworking, v. 17, Oct. 1961, p. 69-71.

Steels and alloys for forgings and die block produced by vacuum metallurgy techniques including consumable electrode arc melting, induction melting, castings, teeming and degassing (with particular reference to the D-H process). Effect of vacuum refining and alloying on composition and mechanical properties, particularly fatigue. Examples for application to H-11 tool, 52100, 8620, 4340 and carbon steels. (D8m, D9, 1-73, F22, 17-52; ST)

593-D. Oxygen Teams Up With Fuel to Hike Iron Output. C. L. Kobrin. Iron Age, v. 188, Oct. 5, 1961, p. 69-71.

Oxygen is added to natural gas and oil for injection through tuyeres in blast furnace operations. Coke replacement and production are influenced. (D1h, 1-52; RM-m)

594-D. The Burning Question in Blast Furnaces. Steelways, v. 17, Sept. 1961, p. 21-24.

Utilization of natural gas or fuel oil to supplement coke in steelmaking processes in terms of economic factors including equipment maintenance and operational factors including blast furnace temperatures. (D1b; RM-j43, RM-k30, RM-m35)

595-D. Recent Developments in Pig Iron Blast Furnace Construction--Raw Materials and Practice. Donal M. Morrison. Mines Magazine, v. 51, Sept. 1961, p. 25-26, 34.

Developments in blast furnace design and operation including use of moisture in the blast, of blast temperatures up to 2000° F., of supplementary hydrocarbon fuels injected at the tuyeres and of pelletizing as a means of upgrading low-grade ores. (D1, B16b; RM-k, RM-n, NM-b)

596-D. Ore Cooling in the Basic Oxygen Steelmaking Process. Jack Worsman. Paper from "Regional Technical Meetings, 1960". American Iron and Steel Institute, New York, 17, 1961, p. 271-278.

Use of a magnetite ore as a scrap replacement during steelmaking is evaluated as to yield, blow and bath temperature, blowing time, oxygen consumption and slopping. (D10, 1-65)

597-D. Practical Applications of a Thermochemical Model of a Blast Furnace. H. S. Turner. Paper from "Regional Technical Meetings, 1960". American Iron and Steel Institute, New York 17, 1961, p. 371-391.

Analysis of thermal balance and combustion and slag-metal reactions

using a thermochemical model. Effects of burden and blast modifications. 9 ref. (D11, D1, 17-56)

598-D. New Steelmaking Processes. Australasian Manufacturer, v. 46, Aug. 12, 1961, p. 48-50.

Oxygen enrichment techniques including L-D (Linz-Donawitz), P-R (Phoenix-Rheinrohr), lime additive and rotor processes are studied as they affect composition and dephosphorization. The production of oxygen-blown and basic Bessemer steel is compared in terms of European practice. (D10, D11, 10-54)

599-D. (French.) Metallothermic Steelmaking Process. Journal du Four Electrique, v. 66, May 1961, p. 151-152.

Use of a metallic reducing reagent instead of coke. Fe ore is mixed with a fuel obtained by the reduction of waste products, containing 40-50% Si, approx. 25% Al, 15-20% Fe and some Ti and C and charged to a furnace after limestone addition. A steel containing 0.01-0.04% C and less than 0.01% Si is obtained. (D8)

600-D. (French.) Continuous Casting of Steel. Journal du Four Electrique, v. 66, 1961, p. 171-172.

Casting of 1 ton of steel per min. into four billets. After leaving the mold, surface solidification has taken place and the cast billet is guided by rollers into water cooled chambers where it is cooled by a mist of water sprayed on the surface. The casting speed varies between 0.5 and 2.5 m. per min. Billets of 115-200 mm. square section and 2.40-4 m. length are obtained. (D9q, 1-52)

601-D. Process Kinetics of Oxygen Steelmaking. W. O. Philbrook. Journal of Metals, v. 13, Sept. 1961, p. 613-620.

Chemical principles, jet and lance mechanisms and process reactions including oxygen absorption, carbon boil, slag-metal mixing, phosphorus elimination, sulphur reduction and process control. 19 ref. (D10, D11)

602-D. Basic Oxygen Steelmaking in Colorado. George Grosvenor. Journal of Metals, v. 13, Sept. 1961, p. 621-624.

Plant layout and operations and equipment including charging, teeming and storage facilities. Technical indexes given for heats, timing, output, charges and chemical analysis of steel and Fe. (D10, 1-52, 1-65, 18-67)

603-D. Cleveland Receives Basic Oxygen Steelmaking. J. A. Glasgow. Journal of Metals, v. 13, Sept. 1961, p. 625-627.

Installation, design data and operating procedures including hot charging, teeming and ingot handling and use of precipitators, computers and water cooling system for a two-furnace 200-ton per hr. facility. (D10, 1-52, 1-65, 18-57)

604-D. Great Lakes' Basic Oxygen Furnaces. R. B. Morgan. Journal of Metals, v. 13, Sept. 1961, p. 628-630.

Plant layout, functions and facilities including scrap handling and charging, teeming and ingot handling and gas and fume control. (D10, 1-52, 1-65, 18-67)

605-D. Sharon Steel's Kaldo Furnaces. R. N. Merk and D. R. Berg. Journal of Metals, v. 13, Sept. 1961, p. 635-637.

Installation, design data, operating procedures and plant layout for a Kaldo basic oxygen steelmaking two-furnace facility. Comparative technical indexes are given for this and other Kaldo units using hot metals of high and low phosphorous content. (D10b, 1-52, 1-65, 18-67)

606-D. Sweden's Second Kaldo Plant. Carl Sebardt. Journal of Metals, v. 13, Sept. 1961, p. 638-640.

Review of development of the Kaldo oxygen furnace process with attention to design and installation of an integrated plant at Oxelosund for producing low-phosphorus steel. Survey of changing and operational procedures with data for technical index. (D10b, 1-52, 1-65, 10-54, 18-67)

607-D. (German.) Equilibria Between Carbon, Oxygen and the Metals Chromium and Manganese as Influenced by Oxygen Refining in the Basic Arc Furnace. Pt. 2. Manganese. Kurt Tesche. Archiv fur das Eisenhuttenwesen, v. 32, Aug. 1961, p. 503-508.

Equilibria in steel and slag obtained during oxygen refining of production melts are given in terms of "apparent equilibrium constants" and discussed as functions of temperature (1550-1750° C.), basicity of slag and concentration of steel. (D11n, 2-60, 2-61; Cr, Mn)

608-D. (German.) Determination of Activity of Manganous Oxide in Liquid Manganous Oxide-Silica Slags at 1550° C. Hermann Schenck, Martin G. Frohberg and Tarek El Gammal. Archiv fur das Eisenhuttenwesen, v. 32, Aug. 1961, p. 509-511.

Measurement of Mn distribution between liquid MnO-SiO_2 slags and carbon-saturated iron at 1550° C. Evaluation of interaction parameter of C on Mn and computation of activity of MnO in slag. (D11n; Mn)

609-D. Silicomanganese Helps Produce Cleaner Steels. Steel, v. 149, Oct. 9, 1961, p. 126, 129.

Blocking the heat in furnace before tapping using silicomanganese which penetrates the slag and dissolves at the slag-metal interface, yielding Si and Mn for effective deoxidation and reduction of slag to metal transfer. (D11n, D11r; ST, Si, Mn)

610-D. Better Steel Ingots by New Casting Process. Machinery Lloyd (Overseas Edition), v. 33, Sept. 16, 1961, p. 45-46.

High-speed steel is cast into molds which have inner exothermic linings, making a homogeneous ingot having a structure free from heavy central carbide segregation. (D9k, 1-52; TS-m)

611-D. (Russian.) Reduction of Oxygen in Arc Vacuum Melting of Special Steels. H. N. Okorokov, A. Y. Koliakov and A. M. Samarin. Izvestia Akademii Nauk SSSR--Metallurgiya i Toplivo, Mar. 1961, p. 3-9.

Deoxidation and purification from nonmetallic inclusions by surface concentration, by elimination of O in the form of CO and by flotation with the aid of ascending gas bubbles. Effect of physical characteristics of inclusions and of boiling intensity on oxygen reduction. 8 ref. (D8m, D11r, 1-52; ST)

612-D. (Russian.) Phase Composition of Openhearth and Synthetic Phosphate Slags. A. V. Rudneva and I. Y. Kozhevnikov. Izvestiya Akademmi Nauk SSSR--Metallurgiya i Toplivo, Mar. 1961, p. 10-16.

Synthetic phosphate slag is obtained by melting constituents in an induction furnace to determine its crystal structure. Data are given for saturation of phosphate slags with P_2O_2 to dephosphorize Fe. 5 ref. (D11n, M26)

613-D. (Russian.) Investigation of Viscosity of Synthetic and Natural Slags of Silico-Chromium Nature. N. L. Zhilo. Izvestiya Akademii Nauk SSSR--Metallurgiya i Toplivo, Mar. 1961, p. 17-24.

Synthesis of $MgO-Al_2O_3-SiO_2$ slag in proportions resembling the ratio of Si-Cr slag and study of its viscosity from 1450-1675° C. to determine the effect of temperature and of silicon-carbide inclusions. 8 ref. (D11n)

614-D. (Russian.) Viscosity of $CaO-SiO_2$-CaS Slags. A. S. Panov, I. S. Kulikov and L. M. Zylev. Izvestiya Akademii Nauk SSSR--Metallurgiya i Toplivo, Mar. 1961, p. 25-30.

Petrographic and viscosimetric analysis of $CaO-SiO_2$-CaS slag with $CaO-SiO_2$ ratio constant and CaS content variable. Solidus and liquidus temperatures are determined. 14 ref. (D11n, N12)

615-D. The Ajax Furnace and Process. A. Jackson. NML (National Metallurgical Laboratory) Technical Journal, v. 3, May 1961, p. 7-12.

Technological parameters for equipment and operation of oxygen lance process for the production of steel from phosphoric pig iron. (D10, 1-52)

616-D. (French.) Vacuum Techniques. Leon Moreau. Industrie Nationale, Feb. 1961, p. 35-47.

Vacuum treatment of steel and resultant carbon and oxygen contents as functions of the partial pressure of CO contained in the gas phase above the melt surface with hydrogren and nitrogen contents varying with the temperature and partial pressures. Vacuum arc melting of Ti and Zr sponges. (D8m, C5h, 1-73; ST, Ti, Zr)

617-D. (German.) Conversion of 30-Ton Openhearth Furnaces From Producer Gas to Natural Gas-Oil Heating. E. Pink, O. Krifka and A. Schoberl. Radex Rundschau, no. 4, Aug. 1961, p. 647-656.

Production tests in melting of unalloyed and alloyed steels with 0.02-1.5% C, 0-1.8% Cr and 0-4% Ni from solid metal (70% scrap, 30% pig iron) using various burner and furnace designs. Output and refining rate are measured as influenced by flow rate of fuel jet. Improved heat transfer by installation of burner in furnace roof. (D2h, 1-53; ST, RM-k30, RM-m35, RM-m36)

618-D. Future Trends in Iron and Steel-Making. A. K. Gupta. Tisco (Tata Iron & Steel Co., Journal), v. 8, Oct. 1961, p. 220-229.

Technological developments in blast, low shaft and electric furnaces, cupola, converter, open-hearth and oxygen steelmaking processes to overcome difficulty of inferior raw materials and higher production costs. 25 ref. (D-general, 10-54)

619-D. (German.) Trends of Development in Ferrous Extraction Metallurgy. Bernhard Knapp. Gluckauf, v. 97, July 19, 1961, p. 886-888.

Review of the use of pure O, H and CO and of vacuum processes in refining, smelting, continuous casting and rolling of steel. (D-general, 10-54)

620-D. (German.) Injection of Reducing Agents Through the Tuyeres of a Blast Furnace. Alfred Decker. Stahl und Eisen, v. 81, Sept. 14, 1961, p. 1264-1270.

Methods derived from experimentation to increase efficiency and blast temperature of blast and low-shaft furnaces by injection of water vapor and hydrocarbons (light oil or methane) into tuyeres and by oxygen enrichment of blast. (D1h, 1-52; EG-q, NM-b, 17-57)

621-D. (German.) Hot Blowing of Basic Bessemer Converters After Relining and Bottom Change Using the Bottom Burner Technique. Alfred Latour and Leo Heinen. Stahl und Eisen, v. 81, Sept. 14, 1961, p. 1270-1274.

Conventional converter drying by wood coke firing or gas or oil heating. Development of a technique in which a gas-air-oxygen mixture is fed through the converter bottom using the bottom as burner. (D3f, 1-65)

622-D. (German.) Investigation of Material Properties of Foamed Slag. Walther Kayser. Stahl und Eisen, v. 81, Sept. 14, 1961, p. 1288-1292.

Measurement of grain strength of foamed slag of varying chemical composition by crushing tests of the Hummel type and by wear testing by the Los Angeles method. Development of a significant measure to assess the quality of foamed slag. (D11n, 1-53; RM-q)

623-D. (German.) Study of Reactions of Phosphorus in Iron Alloys. Pt. 2. Siegfried Bohmer. Bergakademie, v. 13, June 1961, p. 399-406.

Review of literature on reactions of phosphorus with slag and metal in refining of pig iron in the puddle furnace, basic openhearth furnace and in the Bessemer process. Decarburization and dephosphorization curves in conventional and oxygen refining. (D11, 10-54; Fe-b, P)

624-D. The Design of Electric Reduction Furnaces for Ferro-Alloy Production. J. J. Coetzee. South African Institute of Mining and Metallurgy, Journal, v. 61, July 1961, p. 541-559.

Application of continuous self-baking electrode to ferroalloy furnaces with special reference to the baking process and the conduction of large electric currents to the electrode. (D5, T1f)

625-D. The Kaldo Process. P. A. Young. Iron & Steel, v. 34, Oct. 1, 1961, p. 455-462.

Review of oxygen steelmaking process using a vessel with a high rotational speed and a low pressure lance. Included are graphical analyses of changes in operating conditions during the production of low, medium and high-carbon steel and a comparison of oxygen steelmaking processes. 12 ref. (D10b, 1-52, 10-54)

626-D. As-Cast Cast Iron Compact Graphite. R. W. Heine and T. W. Mueller. Modern Castings, v. 40, Oct. 1961, p. 103-109.

Effect of additions to the melt and variations in base composition of the Fe on the production of compact graphite in the as-cast structure of cast irons. (D11, N8s, 2-60; CI)

627-D. Induction Melting and Degassing Installation. O. E. Erickson. Modern Castings, v. 40, Oct. 1961, p. 127-128.

Production of stainless steel with a low gas threshold level and improved ductility by using an installation consisting of a 300 kw. induction melting unit with two one-ton furnaces arranged so that a vacuum degassing chamber may be placed over either one. (D6, D9s, 1-52, 1-73, Q23p; SS)

628-D. Chemicals Consumed in the Manufacture of Steel. J. S. Doerr. U. S. Steel Corp. Technical Paper, Science and Technology, v. 8, no. 1, 1961, 5 p.

Survey of applications of chemicals in steel refining, hot forming, finishing and inorganic coating including oxygen, acids, lime, alkalis, oils, coke, aluminum oxide and fluoride, magnesium chloride, titanium and uranium tetrafluoride, artificial cryolite, zirconium chloride and sodium sulphate. Production and consumption data are given for use of electrolytic Mn and minor metals in steelmaking. 5 ref. (D-general, 10-54)

629-D. Effect of Burden Materials and Practices on Blast Furnace Coke Rate. R. V. Flint. Reprint from "Chicago Regional Technical Meeting of AISI", Sept. 27, 1961, 36 p.

Coke rate relationships are established in the development of formulas to aid in operations analysis and planning cost control, raw material and facility planning and product costing. Discussion of variables and examples of applications. 13 ref. (D1a, 1-52, 17-53; RM-j43)

630-D. Energy Requirements for Iron Ore Reduction. R. Wild. Institute of Fuel, Journal, v. 34, Sept. 1961, p. 381-392.

Various processes for the reduction of Fe ore to Fe metal are classified according to the fuel used. Smelting efficiency and thermal efficiency are compared on the basis of the energy required. 32 ref. (D-general; RM-j, RM-k, RM-m, 16-61)

631-D. Vacuum Casting--Faster Steel Production. Machinery Lloyd (Overseas Edition), v. 33, Sept. 30, 1961, p. 39.

Removal of oxygen and hydrogen to improve ductility, transverse properties and impact strength. (D9s, 1-73, Q-general; ST)

632-D. Revolutions in Iron and Steelmaking. Howard K. Worner. Mining & Chemical Engineering Review, v. 53, Aug. 15, 1961, p. 60-66.

Review of new and conventional processes along with recent advancements which improve productivity. Oxygen and openhearth processes and electric steelmaking are included. (D-general, 10-54)

633-D. (German.) Application of the Ionic Theory to Metallurgical Slags With Particular Emphasis on Oxygen and Sulphur Distribution. Martin G. Frohberg. Archiv fur das Eisenhuttenwesen, v. 32, Sept. 1961, p. 597-606.

Thermodynamic treatment of ionically dissociated acid and basic slags and interpretation of oxygen and sulphur distribution between liquid Fe alloys and liquid slags in terms of ionic theory. (D11n, 1-54, 2-60; Fe)

634-D. Blast Furnace Tapping Goes Automatic. Iron Age, v. 188, Oct. 26, 1961, p. 96.

Remote-controlled tapping jack cuts tapping time to 1 min. or less, increases steel production and reduces safety hazards. (D1f, 1-52, 18-74)

635-D. Blast Furnace Fuel Oil Injection. W. R. Rombough. Journal of Metals, v. 13, Oct. 1961, p. 743-745.

Equipment, instrumentation, test results and process control factors for the substitution of oil for coke in furnace operation. (D1, 1-52; RM-k30)

636-D. (English.) Study on Continuous Casting of Steel. Yoshio Aketa, Kantaro Sasaki and Kiyoto Ushijima. Tetsu-To-Hagane (Overseas), v. 1, June 1961, p. 31-37.

Experimental study of the effect of primary cooling including mold shape, evenness of cooling, casting temperature and casting speed; and of the effect of secondary cooling including evenness of cooling, intensity of cooling and casting temperature, on the surface cracking and inner cracking of continuous cast silicon-magnanese steel billets. 6 ref. (D9q, 1-53, 2-61, 9-72)

637-D. New Oxygen Process for Australia. Castings, v. 7, Aug. 1961, p. 44-45.

Process and equipment parameters for L-D process requiring the establishment of tonnage oxygen plants to deliver the liquid and gaseous oxygen required. (D10a, 1-52; EG-q)

638-D. Some Aspects of Predicting Blast-Furnace Behavior. A. L. Hodge. Iron and Steel Institute, Journal, v. 199, Sept. 1961, p. 6-15.

A mathematical method for analyzing and predicting blast-furnace performance using a computer is derived, with

special attention to rate processes including heat transfer in the shaft, temperature gradients, carbon for direct reduction, hydrogen reduction and shaft gas velocity. Principal equations are derived for technological effects of variations in relative quantities of bosh gas and charged solids, production rate, burden ratio and fuel injection. 12 ref. (D1, D11)

639-D. The Influence of Three Foreign Cations on the Reduction of Magnetite. V. J. Moran and A. E. Jenkins. Iron and Steel Institute, Journal, v. 199, Sept. 1961, p. 26-33.

Microscopy is used to study the influence of small concentrations of B, Cr and Al during the solid state reaction between Fe and magnetite to study the controlling processes in the hydrogen reduction of magnetite. 9 ref. (D11h, 3-69)

640-D. Natural Gas Injection Into the Blast Furnace at Lone Star Steel Co. F. W. Farmer. Iron and Steel Engineer, v. 38, Oct. 1961, p. 88-95.

The gas injection process is described in terms of cost, coke consumption rates, gas analysis and ore content. (D1; RM-m35)

641-D. Solutions to Basic L-D Plant Layout Problems. J. W. Irvin. Iron and Steel Engineer, v. 38, Oct. 1961, p. 165-173.

Basic oxygen steelmaking with emphasis on factors involved in vessel size selection and layout of the furnace shop and auxiliary equipment. Methods of scrap and hot metal handling, raw materials, slag control, flux materials and gas cleaning. (D10a, 1-52, 18-67)

642-D. Blast Furnace Coal Injection Offers Promise. Iron and Steel Engineer, v. 38, Oct. 1961, p. 175.

The use of coal injection with oxygen enrichment is discussed in terms of fuel requirements and costs. (D1a; RM-j42, 17-57)

643-D. Vacuum Process Upgrades Forging Steels. Steel, v. 149, Oct. 23, 1961, p. 76, 78.

Purification of molten steel with additions of Si or Al using the Dortmund Horder cyclic vacuum process. Alloy content homogeneity and reduced heating time are obtained by H, O, C and P degassing and cyclic processing of metal prior to alloy addition. (D8m, D9s, 1-63, 1-73)

644-D. (Italian.) Fabrication and Application of Charcoal Iron in Foundry and Iron Metallurgy. Joachim von Elpons. Fonderia Italiana, v. 10, Sept. 1961, p. 349-367.

Production of charcoal iron in Europe and Australia as compared with the fabrication of cast iron. Application of charcoal iron for making malleable cast iron, nodular cast iron, ingots, plates, molds and crucibles. Comparison of physical and mechanical properties. (D-general, E-general, Q-general; Fe-m, CI)

645-D. (German.) Kinetics of Precipitation Reactions in Liquid Metals. L. V. Bogdandy, W. Meyer and I. N. Stranski. Zeitschrift fur Elektrochemie, v. 65, Aug. 1961, p. 560-565.

Deoxidation of steel melts with various oxygen contents by Zr in a Tammann furnace with investigation of precipitation of ZrO_2 by microscopic examination. Study of reaction mechanism and kinetics of Zr deoxidation. (D11r)

SECTION E

FOUNDRY

1-E. Grey and White Solidification of Cast Iron. Mats Hillert. American Society for Metals, Transactions, Preprint no. 216, v. 53, 1961, p. 555-567.

The unusual solidification sequence in cast irons showing inverse grayness or inverse chill was recently explained in terms of variations in cooling rate. New experiments are presented which emphasize the importance of the high rate of formation of ledeburite once cementite has been nucleated. 14 ref. (E25n; CI)

2-E. (French.) Casting of Iron Flywheels. Journal des Informations Techniques des Industries de la Fonderie, Sept. 1960, p. 1-2.

Pouring and molding of a 150 lb. pipe-free flywheel composed of low carbon cast iron. (E19, E23; CI)

3-E. (French.) Construction of Turn Over Matchplates. Journal des Informations Techniques des Industries de la Fonderie, Sept. 1960, p. 3-5.

Foundry patternmaking and molding processes. (E17, E19)

4-E. (French.) Molding of a Compressor Body. Journal des Informations Techniques des Industries de la Fonderie, Sept. 1960, p. 11.

Pouring and molding of a 17-ton pearlitic iron compressor body cast in two parts in sand molds. (E23, E19; CI)

5-E. (French.) Steel Foundry Practice. Metallurgie et la Construction Mecanique, v. 92, Sept. 1960, p. 655-661.

Effect of pouring, feeding and molding directions on casting design. (E-general; ST)

6-E. Small Foundries and Laboratory Service. Foundry Trade Journal, v. 109, Nov. 3, 1960, p. 557-558.

Control of casting quality by making wedge-shaped samples from the melt. Ladle and cupola practice. (E25, E10a)

7-E. British Cast Iron Research Association. Foundry Trade Journal, v. 109, p. 559-564, 566.

Casting of malleable white and chilled iron; use of sands and refractories. Casting defects and corrosion of castings. (E-general; CI)

8-E. Operating Experience With a Lining-Less Water-Cooled Cupola. M. E. Rollman and D. J. Pusack. Foundry Trade Journal, v. 109, Nov. 3, 1960, p. 565-566.

Production of high-strength gray iron for machine tool castings using a water-cooled cupola. Melting practice permits close control of carbon and Si content. (E10a; CI-n)

9-E. Methods of Overcoming Faults and Defects in the Die Casting Shop. T. P. Barbicane. Machinery (London), v. 97, Oct. 26, 1960, p. 965-973.

Hand finishing of cavities in die casting tools; use of lubricants and release agents in dies; design of overflow wells; and metal handling practice. (E13)

10-E. (German.) Cold Blast Siegerland Special Pig Iron. K. Schwindt. Technica, v. 9, Sept. 23, 1960, p. 1219-1224.

Production of special pig iron by melting in a cold blast cupola and finishing in controllable rotating ladle and mixer. Chemical composition, mechanical properties and microstructure. Applications in pressure cells for diesel motors. (E10a, Q-general, M27; CI-a)

11-E. Present-Day Foundry Practice L. C. Barton. Machinery Lloyd (Overseas Edition), v. 32, Oct. 8, 1960, p. 45-48.

Methods of oddside molding and use of pattern plates, cores and corewashes in sand casting. Use of cupolas and crucibles in metal melting practice. (E11, E10)

12-E. Production and Properties of Cast-Iron Bar. J. Cumberland. Foundry Trade Journal, v. 109, Oct. 27, 1960, p. 523-533.

Production of cast iron alloy bars by static and continuous die casting processes. Data are given for microstructure and mechanical properties of the bars. (E13; CI, 4-55)

13-E. Investment Casting in Vacuum. Australasian Manufacturer, v. 45, Oct. 22, 1960, p. 44-46, 48-51.

Induction melting and casting of Ni-base alloys to produce ingots of low gas content using a vacuum indirect arc furnace and vacuum induction furnace. (E15, C5, 1-73; Ni-b)

14-E. (German.) Application of Lost-Wax Process for Automobile Parts. Fritz Woydich. Fertigungstechnik und Betrieb, v. 10, Oct. 1960, p. 588-591.

Lost wax casting of stainless and toolsteels. Microstructure and properties of castings composed of Cr-V steel. (E15, M27; SS, TS)

15-E. Switch to Electric Melting Boosts Foundry Flexibility. Steel, v. 147, Nov. 28, 1960, p. 122, 124.

Production of alloy and carbon steels at high melting rates using electric arc furnaces which permit the production of large or small heats and the manufacture of castings in several sizes. (E10r, W18s; AY, CN)

16-E. Two Casting Processes Team Up to Improve Foundry Efficiency. Iron Age, v. 186, Dec. 1, 1960, p. 130-131.

Casting of alloy steels by a process combining ceramic-shell and investment molding to obtain high precision aircraft components. (E15, E16c, T24; AY, SS)

17-E. Low Pressure Die-Casting. H. K. Barton. Metal Industry, v. 97, Nov. 4, 1960, p. 375-379.

Die castings of Al crankcase halves and crankcase heads. Production, pressure testing and assembly. (E13, T21c; Al, 17-57)

18-E. (German.) Importance of Controlled Solidification for Proper Design. H. Hafner. Schweizerische Technische Zeitschrift, v. 57, Oct. 20, 1960, p. 841-845.

Theoretical investigation of influence of sand edges on solidification rate for metal melts, with emphasis on steel, malleable and gray cast iron. Results demonstrated. 7 ref. (E25n; ST, CI)

19-E. (French.) 11% Mg Aluminum Alloy for Castings. Louis Grand. Revue de l'Aluminium, v. 37, July-Aug. 1960, p. 847-855.

Molding practices and properties of molds. Influence of Fe and Si impurities, Be, Mn, Zr, Ti, Zn and Cu additions and heat treatment on mechanical properties of castings. 9 ref. (E-general, Q-general, 2-60; Al-b, Mg, AD-q40)

20-E. Magnesium Die Castings for Automobiles. A. R. Tinetti. Metal Progress, v. 78, Dec. 1960, p. 82-85.

Seven types of parts weighing up to 1/2 lb. are being cast of AZ 91 B Mg alloy in cold chamber die-casting machines. Larger parts are being considered for the future. (E13, T21; Mg)

21-E. A Century-Old Test of Metal. Harold J. Roast. Metal Progress, v. 78, Dec. 1960, p. 99-100.

Historical note on the casting of "Big Ben" 102 years ago at the Whitechapel Bell Foundry in London. (E-general, A2)

22-E. Mechanized Work-Unloading Device Makes Die Casting Fully Automatic. Clayton C. Batt, Jr. Machinery, v. 67, Dec. 1960, p. 126-129.

Hot, tedious manual removal of die castings is replaced by a novel unloader built into the tools. Used as parts of an ingenious handling device are the integral runners which support the ejected castings during the transfer to the automatic degating station. The operation cycle is now much shorter and efficiency improved. (E13)

23-E. GM's Compact V-8 Uses Permanent Molded Block and Heads. Foundry, v. 88, Dec. 1960, p. 66-67.

Casting of Al cylinder blocks in hydraulically-operated permanent molds having retractable mandrels to hold the centrifugally cast gray iron cylinder linings in position during pouring of the block. (E12, T21b, W19g; Al, 17-57)

24-E. Gating Malleable Iron Castings. Hans J. Heine. Foundry, v. 88, Dec. 1960, p. 68-73.

Effect of pouring rate and sprue height on the rate and direction of molten metal slow. Techniques for removing entrapped slag and avoiding turbulent flow in a gating system for malleable Fe castings. 4 ref. (E22p; CI-s)

25-E. New Patternmaking Materials. Robert LeMaster. Modern Castings, v. 38, Dec. 1960, p. 53-55.

New techniques in wood patternmaking appear likely through a carvable epoxy available in plank or paste form. Advantages claimed are elimination of grain or knots; uniform swelling; less shrinkage; higher heat distortion point; flame resistance and elimination of aging and drying. Epoxy can be worked with standard woodworking equipment. (E17)

26-E. Centrifugally Cast Steel Tubing. E. D. McCauley. Modern Castings, v. 38, Dec. 1960, p. 56-65.

Certain advantages in centrifugally casting steel tubing can be realized using considerably higher speeds with the elimination of the usual hot tearing and cracking problems. In production, 20-ft. flasks are lined with a flowable ceramic type refractory and compacted by spinning. The tube diameter can be produced to any given size depending only on the volume of the lining mix. 7 ref. (E14; CN)

27-E. Solidification of Aluminum Castings. M. C. Flemings, S. Z. Uram and H. F. Taylor. Modern Castings, v. 38, Dec. 1960, p. 66-80.

Influence of solidification behavior on foundry characteristics, including shrinkage and feed metal requirements, hot tearing and fluidity. Interrelationships between solidification behavior, soundness, structure and mechanical properties of cast Al. 36 ref. (E25n; Al)

28-E. Solidification of Copper Alloys. R. W. Ruddle. Modern Castings, v. 38, Dec. 1960, p. 81-86.

Commonly cast Cu alloys may be divided into two groups according to their method of solidification. One freezes by the mechanism of skin or shell formation, the other by a pasty or mushy manner. Data on rates of feeding, alloy feeding mechanism, grain refinement and segregation effects. 5 ref. (E25n; Cu)

29-E. Solidification of Metals. W. K. Bock. Modern Castings, v. 38, Dec. 1960, p. 87-91.

Summary of several papers on the solidification of Al and Cu alloys obtaining a desirable grain structure involves a careful selection of mold material, mold density, pouring temperature, selection and location of exothermic compounds and use of foreign body nuclei. 4 ref. (E25n)

30-E. Magnesium Foundry Practice Development. J. House. Modern Castings, v. 38, Dec. 1960, p. 92-96.

New alloys allow higher temperature applications and higher strength applications at both room and elevated temperatures. Increasingly more intricate, high quality castings are being produced with more versatile physical properties. (E-general; Mg)

31-E. (Swedish.) Coremaking in Hot Core Boxes. Gjuteriet, v. 50, Oct. 1960, p. 142-144.

A sand mixture containing a thermosetting binder is rammed by hand, blown, jolted or pressed into a core box held at 200-230° C. where hardening occurs. Bending strength of cores as a function of baking time. (E21)

32-E. (Czech.) Manufacture of SG-Cast Iron. Josef Vincenc. Slevarenstvi, v. 8, Oct. 1960, p. 351-353.

Cast iron is preheated to 800° C., inoculated with Mg in a ladle closed by an air-tight lid, then cast from an open ladle. (E25q; CI, Mg)

33-E. (Czech.) Sand Molds Rammed at Higher Compressions. Josef Dlezek. Slevarenstvi, v. 8, Oct. 1960, p. 341-347.

Molding of mixtures containing 15% clay, 7% bentonite and 3-5% waterglass or coal powder. Data for compressibility as a function of loading velocity and effect of ramming on compressive strength, porosity and density. 9 ref. (E19)

34-E. (Czech.) Thermal Expansion of Cores During Drying. Miroslav Prihoda. Slevarenstvi, v. 8, Oct. 1960, p. 360-362.

Cores made from a mixture of 30% new sand and 70% old sand with a moisture content of 7% are dried for 11 hr. at 300° C. Data for thermal expansion and contraction as functions of temperature and core temperature as a function of cooling time. (E21)

35-E. (Czech.) Casting in a Slant Position. Ladislav Steffek. Slevarenstvi, v. 8, Oct. 1960, p. 363-365.

Steel machine parts and gears are sand cast with the mold at an angle of 10-15° with the horizontal. Effect of this method on precision, metal consumption and casting surfaces. (E11, T7a; ST)

36-E. Large, Intricate Parts of All Metal Types Precision Cast by Ceramic Mold Technique. Industrial Heating, v. 27, Nov. 1960, p. 2450-2451, 2458.

Casting of brass, bronze, stainless steel, tool and die steel and high temperature alloys to close tolerances using a ceramic mold with a microcrazed structure developed during mold production. The small fissures prevent molten metal from entering into them but are large enough to accommodate the expansion of the ceramic particles when heated by the metal. (E16b, W19g; Cu-n, Cu-s, SS, TS, SGA-h)

37-E. Shrinkage Defects in Iron Castings. J. H. Gittus. Iron & Steel, v. 33, Nov. 1960, p. 552-555.

Effect of metal composition, melting and pouring temperatures and inoculation on the incidences of shrinkage characteristics such as draws, sinks, internal porosity and hot tears in test castings of gray iron. (To be continued.) (E25, 2-60, 2-61)

38-E. The Use of Oil-Petro Bond Sand for Higher Finish in Brass and Bronze Castings. O. E. Johnson. Castings, v. 6, Sept. 1960, p. 31, 33, 35, 37.

Comparative study of bentonite-water bonded sand and oil bonded sand containing Petro Bond (an organic ammonium montmorillonite) for use in molds in a nonferrous foundry. Data for hardness, green strength, permeability and oil and Petro-Bond percentages of molds cast from the Petro-Bond sand. (E18, E11; Cu-n, Cu-s)

39-E. (French.) Use of the Vallak Sinkhead Box. Mines et Metallurgie, Sept. 1960, p. 481-482.

Use of a light-weight box made of bricks or other shaped pieces in a mixture of coke powder, sawdust and a binder and coated on inside with thin layer of refractory material to reduce shrinkage of ingots in the mold during casting of steel. (E-general, E25q, W19C; ST)

40-E. (German.) Steel Scrap Content of Burden in Melting Cast Iron in the Cupola Furnace. H. Siepmann, H. Pacyna and H. W. Hauptvogel. Giesserei, v. 47, Nov. 3, 1960, p. 608-614.

Statistical analysis of use of steel scrap in melting cast iron in acid and basic hot and cold blast cupola furnaces between 1950 and 1960. Correlations between use of steel scrap and iron quality with emphasis on carbon content. (E10a, 10-54, CI)

41-E. (German.) Automation of Die Casting. Ernst Brunhuber. Giesserei, v. 47, Nov. 3, 1960, p. 634-693.

Design and mode of operation of automatic pneumatic and hydraulic die casting machines for light metals (Al and Mg alloys), gray and malleable cast iron. Special problems such as proper heat transfer in die during operation; mechanical locking and opening of dies. (E13, 1-52; Al-b, Mg-b)

42-E. (German.) Reconditioning and Re-Use of Zinc Die-Casting Scrap. Wolfgang Wolf. Giesserei, v. 47, Nov. 3, 1960, p. 640-644.

Storing and remelting of scrap in gas or oil heated cast iron containers with large surfaces at temperatures under 480° C. Purification of melts by salts or filters (NH_4Cl, $ZnCl_2$ and others) from oxides, gases and metallic and nonmetallic impurities. Remelting of electroplated Zn scrap. (E26; Zn, 5-61)

43-E. (French.) Manufacture of High Strength Cast Irons by Introduction of

Nitrogen With Calcium Cyanide. Nicolas Volianik. Fonderie, Aug. 1960, p. 307-324.

Effect of nitrogen formed by dissociation of calcium cyanide in bath on mechanical properties and structure of cast irons. Improvement of properties as a result of increase in number of eutectic cells and modification of form of graphite. Treatment is applicable to all grades of hypo and hypereutectic irons, optimum proportion of cyanide to be injected being governed by equivalent carbon of alloy. 15 ref. (E25q, Q-general; CI, N)

44-E. (French.) Study of a Hot-Blast Cupola (Philipon Type). Blast Temperature and Condition of Metal Charge. J. C. Margerie and E. Tallec. Fonderie, Aug. 1960, p. 325-342.

Experimental melts with blast temperatures between 300-650° C. and metallic charge composed of steel scrap and ferrosilicon and silocomanganese briquettes. Influence of blast temperature and thickness (0.2-20 mm.) of scrap on bath temperature, hourly production, Si and Mn melting losses, carburization and desulphurization of bath, basicity and degree of oxidation of slag, composition and temperature of charging hold gases, structure and mechanical properties of cast product. 5 ref. (E10a)

45-E. (Italian.) The Use of High-Capacity Induction Furnaces in Iron Foundries. A. Tagliaferri. Fonderia, v. 9, Sept. 1960, p. 411-415.

Evaluation of induction furnaces in production of ordinary and special analysis iron castings with attention to control of bath temperatures, low melting loss, relatively low power requirements. (E10r, W18a)

46-E. (German.) Melting in the Water-Cooled Cold Blast Cupola Furnace. Harald Thalmeier. Giesserei-Technik, v. 6, Sept. 1960, p. 266-269.

Melting of GG-18 cast iron in a pilot furnace (600 mm. inside diameter) and production furnace (700 mm. inside diameter). Design, efficiency, heat balance and coke consumption of furnace. Use of furnace with basic lining. (E10a)

47-E. (German.) Size of Shell Mold, an Important Factor in Lowering Molding Costs in Shell Molding. Hans Bohme. Giesserei-Technik, v. 6, Sept. 1960, p. 275-277.

Evaluation of most economical mold size for molding with resin-coated quartz sand during production of cast iron bushings. (E16, T7d; CI)

48-E. (German.) Experiments With a Basic Cupola Furnace. Otto Gerstmann. Giesserei-Technik, v. 6, Sept. 1960, p. 279-280.

Melting of cast iron (3.1-3.5% C, 0.058-0.083% S) in an 800 mm. ID cupola furnace with magnesite lining. Dependence of carbon and sulphur content in Fe on temperature. (E10a, 2-61)

49-E. (German.) Fast-Hardening Molding Mixtures With Dextrin, Sulphite-Lye-Dextrin and Soda Waterglass-Dextrin Bases. Alfred Gebauer. Giesserei-Technik, v. 6, Sept. 1960, p. 280-281.

Mixing, baking (160-180° C.) and coating of cores and molds composed of sand containing 1-2% dextrin, 2% sulphite lye and 4% soda waterglass. Data for composition and mechanical properties of the dextrin mixtures. (E21)

50-E. (Pamphlet.) The Federated PT (Pressure-Tight) Process. Bulletin No. 200, 1960, 2 p. American Smelting and Refining Co., 120 Broadway, New York 5, N. Y.

Use of a new refining treatment to control the distribution and form of solidification shrinkage and obtain pressure tightness in Al sand and permanent mold castings. (E11, E12, E25n; Al)

51-E. (Book.) Patternmaker's Manual. 1960. 406 p. American Foundrymen's Society, Inc., Des Plaines, Ill.

Selection of lumber for wood patterns; patternmaking from wood, plastic, plaster and gypsum cement; and storage of patterns. (E17)

52-E. (Translation-Brutcher no. 4939.) Fluidity Characteristics of Liquid Cast Iron Flushed With Methane Gas. L. Sofroni, C. Cosneanu and E. Nicoloiu. Studii si Cercetari de Metalurgie, v. 4, Apr. 1959, p. 525-535.

Effect of flushing with methane gas upon castability and the ensuing changes in structure. Action of methane compared with that of Mg and other inoculants. Effect on initial expansion and

contraction, shrinkhole formation and density, hot tearing, graphite structure, mechanical properties and gas evolution during solidification. (E25n, E25p; CI)

53-E. (Translation-Brutcher no. 4885.) Spheroidal Cast Iron Production by Inoculating Gray Cast Iron With Salts. Cestmir Hlousek. Slevarenstvi, v. 7, Oct. 1959, p. 425-432.

See item 37-E, 1960. (E10, E25q, 2-61, 3-67; CI-r, AD-p36)

54-E. (German.) Material Problems for Thin-Walled Gray Iron Castings. Josef Gerold. Freiberger Forschungshefte, B 45, 1960, p. 53-79.

Melting of 1.11-4.66% Si containing cast iron in a cupola furnace with and without subsequent inoculation with FeSi to establish a cast iron diagram of microstructure at saturation versus test bar diameter. Use of information in diagram to eliminate material faults caused by nonuniform microstructure in castings with less than 10 mm. wall thickness. Faults caused by gas holes and separation of free carbon during cooling. (E10a, E25q, M27; CI, Si)

55-E. (German.) Assessment of Coke for Melting in Cupola Furnace. Wolf Friedel. Freiberger Forschungshefte, B 45, 1960, p. 86-116.

Derivation of empirical conversion factors to determine equivalent coke amounts for different coke qualities during melting in water cooled cold blast cupola furnaces. Test melting of pig iron with coke of varying qualities in a pilot cupola furnace to determine influence of coke quality on Fe temperature. (E10a; CI-a)

56-E. (German.) Experiences and Results Gained During Reorganization of a Foundry for Large Scale Production of Light and Thin-Walled Steel Castings by Automated Flaskless Soda-Waterglass-CO_2 Moulding. Karl Haake and Willi Kleinfeld. Freiberger Forschungshefte, B 45, 1960, p. 117-142.

Reorganization of a steel foundry with two Bessemer converters and three cupola furnaces is discussed in terms of transportation of sand and preparation of return sand, molding and core production and supply and storing of CO_2 and soda water glass. (E-general, 18-67)

57-E. (German.) Results of Recent Investigations on Pin Holes in Cast Steel. Joseph Czikel. Freiberger Forschungshefte, B 45, 1960, p. 7-20.

Test melting of GS 45.1, GS 52.1 and GS 60.1 cast steel of varying solidification temperature ranges in 5 and 10 ton arc furnaces to prove a theory explaining the formation of pin holes in terms of interdendritic surface shrink holes. Influence of shape of casting, solidification range of steel and mold coating on formation of pin holes. (E25n, D5a; ST)

58-E. Big Investment Castings. Pt. 2. Henry Lefer. Precision Metal Molding, v. 18, Dec. 1960, p. 34-35.

Wax patternmaking, slip casting and firing processes for production of ceramic shells. Application in the casting of large stainless steel parts (up to 3 1/2 ft. long, weighing over 45 lb.) with ultimate tensile strengths of 200,000 psi. (E15; SS)

59-E. Vacuum Die Casting. Precision Metal Molding, v. 18, Dec. 1960, p. 29-30.

Metallurgical and physical properties of Zn and Sn alloy die castings produced in a closed system maintained at a vacuum of 29 1/2 -30 in. Hg. Data are given for density, elongation, yield point, melting point, Rockwell T hardness and shrinkage. (E13, 1-73, P-general, Q-general; Sn-b, Zn-b)

60-E. Some Aspects of the Production of Cast Steel Axleboxes for the Locomotive Industry. J. McConnell. British Foundryman, v. 53, pt. 2, Nov. 1960, p. 469-476.

Molding sand technique; core sand technique; green sand cores; gating; chills and denseners; use of knock-off risers. (E11, E19; ST)

61-E. Anomalous Expansion During the Cooling of Clay-Bonded Silica Sand. J. Goodison and J. White. British Foundryman, v. 53, pt. 2, Nov. 1960, p. 477-479.

When bentonite-bonded sand test-pieces are cooled from temperatures above that of the hot strength peak, the contraction due to the beta to alpha quartz conversion is followed by a marked expansion. This is also observed when ball-clay bonded sand test-pieces are cooled from above their hot strength peak. No expansion is observed, however, with either material when it is cooled from temperatures below the peak. (E18r)

62-E. Toward a Science of Gating Castings. John G. Kura. Battelle Technical Review, v. 9, Dec. 1960, p. 3-7.

Definition of a gating system; the significance of the Reynolds number; some principles of gating; calculating the gating system. (E22p)

63-E. (German.) Core Drying in High-Frequency Furnaces. H. C. Grassmann. Elektro Warme, v. 18, Oct. 1960, p. 323-328.

Baking of cores with organic binders at temperatures up to 220° C. by 30 kV, 15 MHz, 5-60 kW high-frequency furnaces. Construction details; economics. (E21h, W19k)

64-E. Automatic Pouring of Aluminum Sand Castings. Jack C. Miske. Foundry, v. 89, Jan. 1961, p. 71-81.

Conversion from gray iron to Al casting production at Pontiac Motor Division in the manufacture of timing chain covers. The new facilities can produce from 4-5 tons of Al per hr. on a continuous basis, while this amount of Al can be melted and poured by one man. (E23; Al)

65-E. Risering of Malleable Iron. Hans J. Heine and Robert A. Peacock. Foundry, v. 89, Jan. 1961, p. 82-89.

Function of risers for malleable iron castings; riser shapes, sizes and locations; effect of riser tops on feeding efficiency; effect of taper on riser efficiency; proper riser neck areas for castings of various shapes and ratios. 10 ref. (E22q; CI-s)

66-E. Technical Reports at the Die Casting Exposition and Congress. Foundry, v. 89, Jan. 1961, p. 171-181.

Resumes of papers presented at the First National Die Casting Exposition and Congress, Detroit, Nov. 8-11, 1960. Topics covered include die design; die building; use of Al die castings in automobile engines; application of sound waves in die casting; quality control; automation in die casting; vacuum die-casting. (E13)

67-E. (English.) Aspects of Olivine Sand as Molding Material in Steel Foundries. K. Beckius and A. Huldt. Jernkontorets Annaler, v. 144, Sept. 1960, p. 708-736.

Typical properties and compositions; crushing behavior; resulting changes on heating and cooling. Behavior of sand grains when heated by cast steel. (E18r, E19)

68-E. Aluminum Engine Block Die Cast for the Rambler. Materials in Design Engineering, v. 51, Dec. 1960, p. 9.

Six-cylinder, in-line block weighs 67 lb. --53 lb. of Al and 14 lb. of cast iron cylinder liners. The blocks are produced on special 2000 ton die casting machines. Liners and camshaft bores are incorporated in the single operation. (E13, T21b; Al)

69-E. Flow of Metal Through Screens. Y. J. Birch and G. Llewelyn. Foundry Trade Journal, v. 109, Nov. 24, 1960, p. 659-666.

Use of screens to exclude oxide from the mold when casting Mg-base and other light alloys. Uniform flow and minimum amount of turbulence and exposed metal are achieved by placing the screens far from the sprue base or by using a wire-wool ball in the sprue side of the well. 7 ref. (E-general; Mg-b)

70-E. False Joints in Molding Practice. Foundry Trade Journal, v. 109, Nov. 24, 1960, p. 667-671.

Use of false joints, which part a mold section independent of the main mold parts during hand-molding of certain types of castings such as grooved pulleys. The free section formed by the false joint rests on a suitable seating and is secured against misplacement by the molten metal during pouring. (E19)

71-E. Factors Affecting the Surface Quality of Steel Castings. Castings, v. 6, Oct. 1960, p. 29, 31, 33.

Extracts from the annual report of the British Steel Castings Research Assoc. on mold paints and washes, factors affecting the erosion of molds by molten steel, friability of green sand molding mixes on air drying and the collapsibility of CO_2-sodium silicate mixes. (E25q; ST)

72-E. (French.) The Manufacture of Solid and Hollow Copper Alloy Blanks. Paul Balanche. Fonderie, June 1960, p. 223-238.

Sand, static chill, centrifugal and continuous casting: technology, metallurgy and tooling. (E-general; Cu-b)

73-E. The Relation of Blast Quantity and Combustion Ratio in Cupola Operation. Kiyashi Ishikawa, Ichiro Saeda and Toshio Suzuki. Imono (Japan Foundrymen's Society, Journal), v. 32, Sept. 1960, p. 619-624.

Effect of blast input on melt temperature and combustion ratio. 8 ref. (E10a)

74-E. (Japanese.) Contribution of Padding to the Sound Area of Castings. Masataka Sugujama and Tatsuichi Fukusako. Imono (Japan Foundrymen's Society, Journal), v. 32, Sept. 1960, p. 642-648.

Effect of increased thickness and characteristic freezing made on the soundness and mechanical properties of castings of yellow brass, Sn bronze, pure Al and steel. 9 ref. (E25n, Q-general, 3-73; Al, Cu-b, ST)

75-E. Unusual Stainless-Steel Casting. Foundry Trade Journal, v. 109, Dec. 1, 1960, p. 689-692.

Molding of an 8 1/2 lb. candelabra pedestal cast in 18-8 stainless steel using a CO_2 mix to facilitate hand ramming and gassing. Green facing sand is used for the mold parts. (E11; SS)

76-E. Hollow Sprue: Radical Design Proves Out in Production. Iron Age, v. 186, Dec. 29, 1960, p. 50-51.

Precision investment castings composed of 4140 steel, Be, Al alloys and 17.4 PH alloy produced using a hollow ceramic sprue to reduce segregation and decarburization. Metal is poured into the sprue while the ceramic-shell mold is under the influence of a vacuum assist. (E15; Al-b, Be, SS, ST)

77-E. The Measurement of Relative Density of Sand. Shigeru Kitago and Fumiwo Kozaki. ASTM Bulletin, Sept. 1960, p. 36-40.

Maximum and minimum densities are determined for fine, medium and coarse sand after compacting by a vibration method. The one-layer, one-point method of vibration is used for measuring maximum density and the spout or dish method for minimum density. 5 ref. (E18r)

78-E. Vacuum Die Casting--the Present Position. H. K. Barton. Machinery (London), v. 97, Nov. 30, 1960, p. 1251-1259.

Effect of vacuum casting on the mechanical characteristics and internal porosity of large thin castings. Methods of improving heat transfer and control of metal flow and reducing back pressure during casting. (E13, 1-73)

79-E. Methods of Overcoming Faults and Defects in the Die Casting Shop. T. P. Barbicane. Machinery (London), v. 97, Nov. 30, 1960, p. 1259-1261.

Use of infrared heating to preheat dies at even working temperatures. Relationship of die defects to faults in casting procedure. (E13, E25q)

80-E. Shrinkage Defects in Iron Castings. J. H. Gittus. Iron & Steel, v. 33, Dec. 1960, p. 584-586.

Molds of rigidity comparable to that of dry sand are produced by milling sodium silicate with the sand and blowing CO_2 through the completed mold. Fe castings produced in the molds are tested for porosity and shrinkage defects; melts of malleable iron are tested to show the effect of oxygen on porosity. (E19, E25q; Fe)

81-E. New Furfurol Binders Reduce Core Cost. Modern Castings, v. 39, Jan. 1961, p. 31-33.

Furfuryl alcohol, urea formaldehyde resin and an acid catalyst are mixed with silica sand. Mix is blown into metal core box heated to 400-600° F. and cures in 12-30 sec. Process eliminates driers, ovens, rods and wires and reduces time and cost in coremaking. (E21; NM-f45)

82-E. How to Grain Refine High Silicon-Aluminum Alloys. J. Sulzer. Modern Castings, v. 39, Jan. 1961, p. 38-43.

Use of 0.10-0.16% P to eliminate coarse grain structure and improve machinability of hypereutectic Al-20% Si alloys. Use of alloys in automobile parts. 7 ref. (E25q, T21; Al-b, Si, 17-57)

83-E. Aluminum-Uranium Alloy Centrifugal Casting. N. E. Daniel, E. L. Foster and R. F. Dickerson. Modern Castings, v. 39, Jan. 1961, p. 53-59.

Casting of hollow Al-35 w.% uranium cylindrical extrusion billets. Melt temperature, mold and pouring spout configuration, mold speed and method of pouring. 6 ref. (E14; Al-b, U)

84-E. Chilling Behavior of a Roll-Type Cast Iron. K. E. Pinnow and R. W. Lindsay. Modern Castings, v. 39, Jan. 1961, p. 75-84.

Superheating temperature, pouring temperature and charge materials effects on chill characteristics are evaluated by making chill castings from melts of constant chemical composition. Superheating and pouring temperatures are precisely measured by immersion thermocouples. 10 ref. (E22r, 17-52, 2-61)

85-E. Systematic Approach to Sand Design and Control. Progress Report 2. Clay Bonded Sand Dry Properties. A. H. Zrimsek and G. J. Vingas. Modern Castings, v. 39, Jan. 1961, p. 85-92.

Dry properties of clay-sand-water combinations. Data presented complement that given in the previous progress report. Systems covered are those of western and soutnern bentonite and fireclay. (E18r)

86-E. (Japanese.) Compression Rate in High Temperature Tests on Molding Sand. Mototaka Mut Aguchi. Imono (Japan Foundrymen's Society, Journal), v. 32, Oct. 1960, p. 685-689.

Correlation between compressive stress and compression rate of foundry sand bonded with bentonite during casting of steel or cast iron. (E18p, E11; CI, ST)

87-E. (Japanese.) Design of Shower Gates for Molds. Nobutaro Kayama and Hiroshi Okita. Imono (Japan Foundrymen's Society, Journal), v. 32, Oct. 1960, p. 690-695.

Effect of the shape of the shower gate on the length of continuous flow during the casting of gray cast iron and Wood's metal. (E22p, D9, C5; CI-n, Bi-b)

88-E. (Japanese.) Construction and Operation of a Water Cooled Cupola. Ryozo Sato and Kanju Sato. Imono (Japan Foundrymen's Society, Journal), v. 32, Oct. 1960, p. 722-728.

Use of a water cupola to improve the uniformity of melting and efficiency during casting. 4 ref. (E10a)

89-E. (Czech.) Improvement of Quality in Ball Bearing Steel by Electroslag Remelting. Ivo Petrman and Ivan Kasik. Hutnicke Listy, v. 15, Nov. 1960, p. 839-851.

Rolled or cast rods are remelted into a water cooled ingot mold by a method resembling the electroslag welding process. Effect of remelting on surface quality, grain size, homogeneity, density, S, H and N contents and the quantity and shape of inclusions. 10 ref. (E10, E25; ST, SGA-c, 4-55, 5)

90-E. The Application of Ultrasonic Energy to Ingot Solidification. Pt. 1. D. H. Lane, J. W. Cunningham and W. A. Tiller. Metallurgical Society of AIME, Transactions, v. 218, Dec. 1960, p. 985-990.

The effect of ultrasonic vibrations on ingot solidification and the mechanisms involved in refining the grain structure are considered theoretically and experimentally. A technique for introducing the ultrasonic vibrations to the freezing interface is applied to the consumable electrode arc melting of 304 and 316 stainless steel, an austenitic Fe-Cr-Mn alloy and Ni-Al alloy. Effect on equiaxed grain growth and nucleation frequency. 15 ref. (E25n, E25q, 1-74, M-general, N-general; Fe-b, Ni-b, SS-e)

91-E. The Application of Ultrasonic Energy to Ingot Solidification. Pt. 2. D. H. Lane and W. A. Tiller. Metallurgical Society of AIME, Transactions, v. 218, Dec. 1960, p. 991-994.

Application of a zone melting technique for investigating the effect of ultrasonic irradiation upon ingot solidification. Effect of ultrasonic power level, freezing velocity, constant or variable frequency, direction of irradiation and transducer-coupling bar joint upon the grain size and the nucleation probability in the layer of liquid adjacent to the freezing interface of 316 stainless steel. (E25q, 1-74, C28k; SS-e)

92-E. (French.) Precision in Coring With Standard Tools Using New Synthetic Resins. M. Jacques Roth. Fonderie, Oct. 1960, p. 409-418.

A new coring process using a synthetic resin agglomerate binder to insure precision of cores and elimination of most finishing operations and corrections on castings. Advantages given include ease of sand preparation, reduction of baking time and unlimited storage possibilities. (E21)

93-E. Shell Coremaking. Metal Industry, v. 97, Dec. 1960, p. 460.

Design of an integrated coremaking apparatus composed of five basic units including core blower, oven feed, oven, knockout (ejection) table and corebox return grid. (E21, W19)

94-E. Technical Control of Steelfoundry Processes. Foundry Trade Journal, v. 109, Dec. 8, 1960, p. 723-729.

Summaries of papers presented at the annual conference of the British Steel Castings Research Assoc. on ladle practice, pouring of molds, inspection of molds, welding in the foundry, factors affecting control of heat treatment of steel castings and ultrasonic detection of defects in cast steel. (E-general; ST)

95-E. Tricks of the Trade. "Jacques". Foundry Trade Journal, v. 109, Dec. 8, 1960, p. 731-734.

Pattern for casting a grinder head is reconstructed for vertical molding by using a stripper-block and cover-core. (E17)

96-E. (German.) Experiments in Melting With Carbide Additions in the Cupola Furnace. Werner Hass. Giesserei-Technik, v. 6, Oct. 1960, p. 293-295.

Melting of cast iron in a 900-1000 mm. ID cupola furnace with 0.6-1.2% carbide additions to coke burden. Measurement of waste gas composition and temperature, iron temperature, amount and pressure of blast and melting efficiency, to evaluate influence of carbide addition on melting. (E10a; CI, NM-a35)

97-E. (German.) Use of Radioactive Isotopes in Foundry Industry. Siegbert Wadewitz. Giesserei-Technik, v. 6, Oct. 1960, p. 311-312.

Use of radioactive tracers in thickness measurements and analysis of transformation mechanisms and structures. Equilibrium reactions and composition of castings. Application to study of wear in foundry equipment. (E-general, 1-59)

98-E. (French.) Combined Effect of Shrinkage and Atmospheric Pressure on the Formation of Foundry Defects. Francois Boussard. Fonderie Belge, v. 30, Nov. 1960, p. 285-292.

Deflection, cavities and spongy porosity are observed in angle irons and grooved plates cast in iron containing 0.2-1.4% phosphorus due to contraction of metal before and during solidification, their shape and appearance depending on massiveness of castings and hot spots formed during solidification. Principles for prevention of these defects, including use of atmospheric feeder head. (E25n, 9-68; CI)

99-E. (Book-French.) Guide to the Design of Light Alloy Castings. 58 p. 1960. Editions Techniques des Industries de la Fonderie, 12 Ave. Raphael, Paris, France.

Composition, physical, mechanical and technological properties of standard French Al casting alloys. Selection of alloy, casting method (sand or chill) and design and layout of simple and complex shapes. 14 ref. (E-general; Al-b)

100-E. Hollow Tree Castings Have Big Potential. Steel, v. 147, Dec. 26, 1960, p. 58-60.

Use of hollow wax or plastic sprues in ceramic shell molding with vacuum casting to reduce cost and produce castings of uniform hardness. A high temperature burnout operation is used to remove patterns and partially set the ceramic. (E19c, E16c, 1-73)

101-E. (German.) Progress in Technology of Magnesium Cast Alloys. E. F. Emley. Giesserei, v. 47, Dec. 1, 1960, p. 703-713.

Review of casting and molding methods including shell casting, CO_2 molding and plastic molding. Determination of susceptibility to casting defects. Corrosion prevention by pickling, anodic oxidation and plastic coating. Applications in aircraft components. (E16c, E19, R10, T24; Mg-b)

102-E. Silicone Rubber Molds for Short-Run Castings. H. A. Smith. Product Engineering, v. 31, Dec. 26, 1960, p. 50-51.

Use of fluid silicone rubber in flexible molds and patterns for casting metal or plastic parts. These are room-temperature vulcanizing silicone compounds that, when catalyzed, cure into firm, rubbery solids without external heating. (E17, E19)

103-E. Iron Foundry Scrap Reduction. Mass Production, v. 36, Nov. 1960, p. 94-96.

Reduction of scrap loss from 24 to 8% by modifying baking procedures, eliminating breakage by handling castings cold and pouring at higher temperatures. (E-general)

104-E. (Czech.) Changes Increasing the Efficiency of Cupolas. Milan Brhel. Slevarenstvi, v. 8, Nov. 1960, p. 383-384.

Increase of furnace efficiency and reduction of lining wear by a special design and arrangement of tuyeres and blast system. (E10a)

105-E. (Czech.) New Casting Method for the Manufacture of Cylinder Inserts. Cestmir Pazourek and Jiri Ptacnik. Slevarenstvi, v. 8, Nov. 1960, p. 384-386.

Centrifugal casting of cylinder inserts for combusion engines in rotating sand molds. Fe composition: 3.1% C, 1.85% Si, 0.75 Mn, 0.20% P and 0.06% S. (E14, T21b; Fe)

106-E. (Czech.) Defect Shell Castings. Vladislav Svab. Slevarenstvi, v. 8, Nov. 1960, p. 386-387.

Defects observed in cast engine cylinders with cooling fins are thought to be caused by excessive porosity of molds and cores or chemical reactions occurring between mold and metal and can be avoided by correct choice of binders, quantity of the binder used, sufficient removal of gases in casting, correct casting velocity and temperature, shape of castings, solidification velocity and melt composition. (E16c, E25q, T21b; CI)

107-E. (Czech.) Centrifugal Casting of Heavy Bronze Bushings. Rudolf Koula. Slevarenstvi, v. 8, Nov. 1960, p. 388-391.

The correct number of mold rotations is determined from the desired inner and outer diameters of the bushing and the specific properties of metal compositions. The permanent mold is lined with 1-1.5 mm. thick Cu sheet and casting takes place at a mold temperature of 150° C. and a melt temperature of 1120-1140° C. 4 ref. (E14, T7d; Cu-s)

108-E. (Czech.) Permanent Mold Casting of a Large Aluminum Plate. Jiri Kadlec. Slevarenstvi, v. 8, Nov. 1960, p. 394-396.

Casting into an Fe mold with a special pouring system in which a tilting apparatus brings the mold into various positions during pouring and solidification. Castings produced by this method require little machining. (E12; Al)

109-E. (Czech.) Use of CT Molding Mixtures in the Manufacture of Boiler Fittings. Jan Rous. Slevarenstvi, v. 8, Nov. 1960, p. 396-399.

Casting of large cast iron fittings using economy molding mixtures containing 84.8-88.2% sand, 4-7% clay, 7% waterglass of 36-38° Be, 0.5-1% graphite and 0.2% soda lye. (E11, T6a; CI)

110-E. (Czech.) Manufacture of Shell Molds. Vladimir Vafek. Slevarenstvi, v. 8, Nov. 1960, p. 399-400.

Special blowing equipment is used in a mold making process in which the molding mixture is blown through openings in a plate which follows the outlines of a heated mold. 3 ref. (E19c)

111-E. (Czech.) Further Experiences in the Melting of Cast Iron With CaO_2 Added to the Charge. Josef Simek and Viktor Prachai. Slevarenstvi, v. 8, Nov. 1960, p. 401-402.

Coke, limestone and 0-0.6 kg. CaO_2 are added to the charge of an experimental cupola furnace containing 20 kg. metal to determine the effect of CaO_2 on coke consumption and temperature of melt. (E10a; CI)

112-E. Cast-to-Size Steel Molds Cut Compact Car Costs. Tool and Manufacturing Engineer, v. 46, Jan. 1961, p. 94-95.

Major mold components are produced in cast-to-size form with tensile strength of 100,000 psi. and 15% elongation and used with a new low-pressure Al casting process to produce compact car engine components. (E12, T21; Al)

113-E. Shell Molding. Otto W. Winter. Tool and Manufacturing Engineer, v. 46, Jan. 1961, p. 109-116.

Advantages of shell molding as compared with other precision processes, including investment, permanent mold and die casting and precision forging. Cost factors including tooling, casting size and accuracy are related to quantity of castings produced. 8 ref. (E19c)

114-E. Large Steel Castings for Heavy Duty. Heinz W. Balster. Metal Progress, v. 79, Jan. 1961, p. 89-93.

Basic electric furnaces with capacity over 25 tons and with induction stirring are used for alloy steels. A Cr-Mo-V analysis similar to Type 316 has been widely used for high-temperature service and 13% Cr steel is favored for corrosion resistance. Welding of simple shapes into complex assemblies is common practice. (E-general; ST, AY, SS)

115-E. (Japanese.) Effect of Ca on Al-Mg Alloys. Shigeo Muromachi and Tomoya Minegishi. Light Metals, v. 10, Nov. 1960, p. 394-396.

Oxidation of Mg in molten Al-Mg alloys containing 2.5-10% Mg and gas content and cast structure of the alloy as influenced by the addition of 0.05-0.5% Ca and 0.004% Be. (E25; Al-b, Mg, Ca, Be)

116-E. Die Casting Congress. Metal Industry, v. 97, Dec. 9, 1960, p. 483-484.

Summary of papers on die design, temperature control, solidification and the applications of die castings in automobile manufacture. (E13, T21)

117-E. Designing Castings for Quality and Economy in Production. Commonwealth Engineer, v. 48, Oct. 5, 1960, p. 43-45.

Design of castings taking into account soundness, surface finish and machinability requirements of castings and ease of mold production. (E25, 17-51)

118-E. Production, Application and Economics of S.-g Iron. R. Burleigh and H. Turner. Foundry Trade Journal, v. 109, Dec. 15, 1960, p. 755-762.

Production of spheroidal-graphite cast iron by melting in an electric furnace, treating with Mg, casting and heat treating. The s.-g iron replaces gray iron, steel and malleable iron castings and forgings in iron foundry machinery. (E10r, E25, W19; CI-r, 17-57)

119-E. Where to Use Shell Mold Castings. Materials in Design Engineering, v. 53, Jan. 1961, p. 76-80.

Shell casting of Al, Cu, Mg, gray iron, malleable iron and steel is compared with investment casting and green sand mold casting processes as to cost, tolerances, surface finish, uniformity and post-machining requirements. (E16c; Al, CI, Cu, Mg, ST)

120-E. (Spanish.) Aluminum Castings. Pt. 3. D. Iturrioz. Metalurgia y Electricidad, v. 24, Dec. 1960, p. 67-76.

Solubility of hydrogen in Al and Mg at 660-850° C. as affected by alloying. Effect of water content in air, tools, refractories and molds on hydrogen absorption. Removal of hydrogen by passing Cl_2 and BF_2 through the melt, remelting and stirring. (E25, N16m; Al, Mg, H)

121-E. New Ashworth Die Casting Plant. Machinery, v. 97, Dec. 21, 1960, p. 1436-1437.

Design of a foundry producing Zn and Al pressure and gravity die castings on machines which thermostatically control metal temperatures. (E13, 18-67; Al, Zn)

122-E. (Italian.) Mechanical Strength of Shell Molds at Casting Temperatures. J. Szekeres. La Fonderia Italiana, Oct. 1960, p. 403-406.

Manufacture of shell molds from a sand containing 96.5% Si, 0.5% Fe_2O_3 and 2% Al_2O_3, 2-9% resin and 1-5% graphite. Cold and hot bend strength are measured at 1300° C. and cold and hot compression strength as functions of resin and graphite contents, density and baking time and temperature. (E19c, Q5, Q28, W19g)

123-E. (Russian.) Effect of Hot Blasting on the Burning Process in a Cupola. M. K. Sin. Liteinoe Proizvodstvo, Oct. 1960, p. 4-6.

Effect of hot blasting on the temperature during thermal and metallurgical processes, firing loss of Fe, Si, Mn, pickup of sulphur and efficiency of the cupola. 6 ref. (E10a; CI)

124-E. (Russian.) On the Zone of Burning in Large Cupolas. V. P. Chernobrovkin and A. A. Ananyin. Liteinoe Proizvodstvo, Oct. 1960, p. 8-9.

Experimental measurements of gas components and temperature show that maximum temperature and CO_2 content are found in the peripheral area of the cupola. Most intensive burning and

melting proceeds in this circular area (500 mm. wide) near the tuyeres. 4 ref. (E10a)

125-E. (Russian.) Casting of Large Crankshafts for Diesel Engines. M. G. Kvasman, A. A. Tunik and B. E. Begun. Liteinoe Proizvodstvo, Oct. 1960, p. 13-15.

Defects such as black spots on the casting surface are prevented by adding cryolite in addition to Mg during modification of the cast iron. This method improves mechanical properties and provides high durability in the crankshafts. 6 ref. (E25, W11j; CI)

126-E. (Russian.) Casting Crankshafts for the DB-30 Engine at the Vladimir Tractor Works. N. V. Galperin, V. V. Zvolinskaya, V. S. Parfenov and A. D. Sherman. Liteinoe Proizvodstvo, Oct. 1960, p. 16-17.

Higher quality crankshaft castings are produced when Ce instead of Mg is used for modification of the cast iron. Since the specific gravity of cerium sulphide is much greater than that of magnesium sulphide, distribution of the Ce compound in castings is uniform and black spots on the surface of the crankshafts are eliminated. (E25, T3n; CI)

127-E. (Russian.) New Semiautomatic Coreblowing Maching "ZIL". N. I. Rastimeshin, A. A. Agafonov and A. A. Zamasov. Liteinoe Proizvodstvo, Oct. 1960, p. 26-28.

Advantages of a coreblowing machine with ability to produce 25 kg. complicated cores with high durability in the green state. (E21g)

128-E. (Russian.) Metal Molds With Sand Coating. P. P. Berg and B. Yu. Feigelson. Liteinoe Proizvodstvo, Oct. 1960, p. 32-33.

Production of very precise castings using permanent metal molds coated with sand. (E12)

129-E. (Russian.) Study of Aluminum Crystallization During Continuous Casting With Radioactive Isotopes. V. O. Dobatkin and B. I. Simakovsky. Liteinoe Proizvodstvo, Oct. 1960, p. 34-36.

Effect of movement of the liquid metal during crystallization on the casting structure by introducing Ca^{45} radioactive isotope to the melt during casting of Al ingots 280 mm. diameter. (E25n, C5q, 1-59; Al)

130-E. (Russian.) Sulphur in Surface Layers of Steel Castings. M. I. Balashov. Liteinoe Proizvodstvo, Oct. 1960, p. 36-38.

Concentration of sulphur in the surface area of metal is a result of its contact with the gas phase of the sand mold. Experimental results show that sulphur content and external cracking are a function of SO_2 content in the gas phase. By decreasing sulphur content in the sand-mold mixture, cracks could be eliminated. (E25, E11; ST)

131-E. Production of Large 13% Chromium Steel Castings. F. Maran. Iron & Steel, v. 34, Jan. 1961, p. 7-10.

Castings of 13% Cr steel for H_2O turbines are produced by pouring, heating, annealing and cooling techniques which avoid tears and inclusions. (E-general, W11k; ST, Cr)

132-E. Casting Technology for Titanium, Zirconium and Hafnium. S. S. Ausmus, F. W. Wood and R. A. Beall. U. S. Bureau of Mines, Report of Investigations 5686, 1960, p. 1-31.

Application of centrifugal or spin casting and the skull melting method to casting reactive metals. Evaluation of mold materials, including machined graphite and rammed mold materials. Effects of current and furnace atmosphere on parameters of the casting technique. 11 ref. (E14, C5; Hf-b, Ti-b, Zr-b)

133-E. (German.) The Problem of Cast Iron Assessment and Role of Microstructure in Matrix. Albert Collaud. Giesserei, v. 47, Dec. 15, 1960, p. 719-732.

Correlations between tensile strength, degree of carbon saturation, hardness and modulus of elasticity for a series of cast irons melted in a basic hot blast or an acid cold blast cupola furnace. Quality assessment in terms of degree of maturity. New approach is used to assess elasticity and toughness of matrix in terms of microstructure. (E10, Q27a, Q29n, Q21, 3-71; CI)

134-E. Diecasting. H. K. Barton. Engineers' Digest, v. 21, Dec. 1960, p. 75, 77-126.

Al, Zn, Mg, Cu, Sn and Pb alloys are stamped, pressure diecast, molded, extruded, pressed, sintered and coated according to size, accuracy, complexity and cost requirements. Design of diecasting equipment including cold or hot chamber and shot-sleeve machines, some with automatic metal-feeding. (E13; Al-b, Cu-b, Mg-b, Pb-b, Sn-b, Zn-b)

135-E. Zinc Diecasting of Small Parts--Single Cavity Method Cuts Costs. John H. McDermott. Metalworking Production, v. 104, Nov. 16, 1960, p. 79-81.

Advantages of a single-cavity method with tools which produce finished parts built into the casting machine. Method is most effective when maximum size of the part is 1 1/2 in. and minimum run is 100,000 pieces. Secondary machining operations are eliminated. (E13; Zn)

136-E. Close-Tolerance Light Metal Castings. John Armstrong. Foundry, v. 89, Feb. 1961, p. 58-63.

Production of Mg and Al impellers, wave guides and other castings to tolerances of ±0.002 in. by shell molding, plaster molding and permanent mold processes. (E12, E16; Al, Mg)

137-E. Furan Hot Box Core Binders. Wayne H. Buell. Foundry, v. 89, Feb. 1961, p. 64-68.

Effect of curing time and temperature on tensile strength of resin bonded cores prepared from mixtures of furan resin and dry sand. Application of furan resins. (E21)

138-E. Sound Waves Improve Diecasting Quality. John A. Weber and Earle W. Rearwin. Foundry, v. 89, Feb. 1961, p. 69-71.

Application of ultrasonic and sonic wave length energy during diecasting to improve structure, mechanical properties and surface finish and to reduce rejects. (E13, 1-74)

139-E. Modernized Foundry Builds Business on Conversions. Robert H. Herrmann. Foundry, v. 89, Feb. 1961, p. 72-76.

Molding, melting, shakeout and annealing facilities for production of standard and pearlitic malleable iron castings. (E-general; CI-s)

140-E. Hold That Temper! W. P. Winter. Foundry, v. 89, Feb. 1961, p. 77-79.

Effect of moisture on bulk density, strength, permeability, deformation, toughness and flowability of molding sand. Mechanics of moisture control. (E18r)

141-E. Gating Magnesium Sand Castings. Robert C. Boehm. Foundry, v. 89, Feb. 1961, p. 80-87.

Design considerations for pouring basins, screws, screw bases, runners, risers and in-gates for sand casting Mg alloys. Screening practices. 10 ref. (E22p, E11; Mg-b)

142-E. Unit Simultaneously Performs Cleaning and Core Removal. George W. Powell. Foundry, v. 89, Feb. 1961, p. 134-136.

Simultaneous blast cleaning and core knockout of large pressure castings using a large abrasive separator barrel unit. (E24; 5-61)

143-E. Exothermic Riser Lining Gives Dual Benefits. Foundry, v. 89, Feb. 1961, p. 142.

Moldable exothermic compound which generates heat upon contact with molten metal and maintains high temperatures in the riser during the feeding process aids in casting curved, tapered high alloy steel mandrel and raises yield to 91.5%. (E22q; SS)

144-E. Refractory Mold Coating Aids Casting of Aluminum Gear Housings for Automatic Washers. Modern Metals, v. 16, Jan. 1961, p. 42.

Refractory coating for permanent mold minimizes scrap, guards against shrinkage and allows easy release of completed casting. (E12, W19c; Al)

145-E. Chevrolet Adopts European Casting Process for Corvair Engine. Metal Progress, v. 79, Feb. 1961, p. 84-87.

Adoption of low-pressure casting for producing engine components in this country required some changes over European practice. To meet demands of high production, Chevrolet engineers built heavier machines and added automatic controls for regulating temperature, pressure and mold manipulation. (E12, T21b; Al)

146-E. Meehanite Metal Solves Huge Casting Problem. Robert Austin. Western Metalworking, v. 19, Jan. 1961, p. 32-33.

Techniques employed in the vertical casting of 86,000-lb. Fe slabs. Castings are pit molded with slab cores to facilitate finishing. Knock-out cores are used in the risers. (E-general; Fe)

147-E. Modern Techniques in Melting and Casting. Engineer and Foundryman, v. 26, Nov. 1960, p. 45-46.

Electric furnace melting as a means of eliminating gaseous impurities in Cu castings. Horizontal casting of Cu in open Cu, sand or clay molds. (E10r, E11; Cu)

148-E. Specific-Surface and Grain Structure of Foundry Sands. F. Hofmann. Foundry Trade Journal, v. 110, Jan. 12, 1961, p. 45-47.

Method of finding actual specific surface is described and used in conjunction with sieve analysis to evaluate coefficient of angularity. Determination of the water absorption capacity of sands and its relationship to the actual specific surface. 5 ref. (E19r)

149-E. (Pamphlet.) The Technique of Gating Zinc Die Castings. R. L. Wilcox. May 1960, 43 p. American Smelting and Refining Co., 120 Broadway, New York 5, N. Y.

Gating rectangular, circular, tubular and multiple-cavity dies for production of ornamental automotive parts requiring finishing operations. (E22p, T21a)

150-E. Shell Cores and Sand Coating. A. W. Ulmer. Castings, v. 6, Nov-Dec. 1960, p. 9, 11, 13, 15, 17, 19.

Advantages of shell cores. Factors of grain fineness and distribution, purity, surface condition and clay content as they affect core sands. Cold, warm or hot methods of mixing sands and resins. (E19c)

151-E. Economy With the CO_2 Process. D. J. Cousins. Foundry Trade Journal, v. 110, Jan. 19, 1961, p. 79-80.

Production of CO_2 molding sand by charging reclaimed knockout into a roller-type mill, adding new, damp sand and sodium silicate to reduce lumps, then milling to original grading. (E18s)

152-E. GM Uses Semi-Permanent Molds to Cast Aluminum V-8 Blocks. Iron Age, v. 187, Feb. 16, 1961, p. 108-110.

Al alloy 356, clean scrap and chip metal are melted in gas-fired, reverberatory furnaces, tapped into delivery ladles, cast in semi-permanent molds having urea-sand cores and baked in vertical core ovens. (E12, E21, T21b; Al)

153-E. (French.) Solidification of Ferrous Alloys and of Industrial Gray Castings. John Obrebski. Metallurgie et la Construction Mecanique, v. 92, Dec. 1960, p. 1001-1003, 1005-1006, 1009, 1011.

Graphitization pressure and oxygen equilibria during slow solidification of gray castings. Structure and composition after solidification. (E25n, N8s; Fe-b, CI)

154-E. New Zinc Die Casting Alloy. Precision Metal Molding, v. 19, Feb. 1961, p. 29.

Development of a new Zn alloy containing 0.005-0.020% Mg and 0.005-0.02% Ni in ingot form which has improved castability and can be used for larger, more complex die castings with thinner walls and better surface. (E25p; Zn-b, Mg, Ni)

155-E. Standards in the Nonferrous Foundry. William A. Mader. Standards Engineering, v. 12, Dec-Jan. 1961, p. 8-10.

Sand, die, permanent mold, plastic mold, shell, centrifugal and investment casting of Al-Cu alloys. Dimensional tolerances for casting processes. Minimum section thickness for castings. Static design values (ultimate tensile, yield tensile, compressive yield and shear ultimate strength) for Al casting alloys. (E-general; Al-b, Cu)

156-E. The Permeable Plaster Precision Casting Process. W. A. Reid. Light Metals, v. 24, Jan. 1961, p. 7-9.

Development of plaster molds having a high degree of permeability by incorporating special inert fibrous materials, cement, finely graded sands, or talc, resulting in good surface finish (40 to 125 micro-in. C. L. A.) and closer dimensional tolerances in Al castings. Application of the method to investment and molding processes or with rubber core-boxes. (E16a; Al)

157-E. (Czech.) Centrifugal Casting of Gray Iron Cylinder Linings. Jiri Ptacnik.

Slevarenstvi, v. 8, Dec. 1960, p. 419-427.

Cast iron with approximately 4% C, 2-2.4% Si, 0.6-1.1% Mn, maximum 0.05% S, 0.3-0.9% P, 0.5-2% Ni, 0.5-2% Cu, 0.3-0.5% Mo, 0.15-0.50% V and 0.05-0.10% Ti is poured at 1420° C. into rotating hot molds. Effects of solidification range, kinetic viscosity, thermal conductivity of iron, diffusion of heat in the mold, solidification velocity, suppressed crystallization and complementary pressure on quality of castings. 12 ref. (E14; CI-n)

158-E. (Czech.) The Thermal Field of a Foundry Mold. Stanislav Slovak. Sbornik, v. 6, Jan. 1960, p. 25-32.

Computation of heat flow occurring during the solidification of castings, based on the values for latent heat of crystallization, specific weight of metal near the solidus point, linear solidification speed, heat accumulation in the mold, thermal conductivity, specific heat, temperature of mold surface and initial temperature of mold. 10 ref. (E25n)

159-E. (Czech.) Is Shrinkage of Nodular Cast Iron an Anomaly or the Rule? Josef Pribyl. Sbornik, v. 6, Jan. 1960, p. 51-68.

Volume change of gray, white and nodular cast iron during solidification. Effect of eutectic or hypoeutectic composition and of the carbon equivalent. 10 ref. (E25n; CI)

160-E. (Czech.) Effect of "Olzite" Additions During Ingot Casting on Quality of Deep Drawing Sheet. Josef Teindl and Bohuslav Otta. Sbornik, v. 6, Jan. 1960, p. 69-83.

Effect of 2-6 kg. "Olzite", a mixture of 70% Fe scale, 20% CaF_2 and 10% Na_2CO_3 added to a 6 ton ingot, on deep drawing properties of sheet manufactured from the ingot. Effect of phosphorus and sulphur. 12 ref. (E25q, G4, 17-52; ST, 4-53)

161-E. Sand Control in the Foundry. J. Gerin Sylvia. Current Engineering Practice, v. 3, Dec. 1960, p. 17-20, 28.

Review of structural, green, dry, hot and retained properties of foundry sands as they affect molding operations. (E18r)

162-E. (Czech.) Manufacture of Recuperator Tubing. Ludvik Bohacek. Slevarenstvi, v. 8, Dec. 1960, p. 429-430.

Recuperator tubing with internal and external fins is manufactured from cast iron containing 3.5% Cr and heat resistant steel by casting in green sand molds with bentonite, using cores with 1.1% oil, 1.25% dextrin and 0.4% water. (E11; CI, Cr, SS, SGA-h)

163-E. (Czech.) Technical Measurements Carried Out in a Cupola Furnace. Karel Satar. Slevarenstvi, v. 8, Dec. 1960, p. 435-436.

Measurement of blast quantity, pressure and humidity of gas and melt temperatures. Gas analysis. Automatic furnace control. (E10a)

164-E. (Czech.) Foundry Practice With Al Bronze CSN 423144. Zdenek Gause and Eduard Kohout. Slevarenstvi, v. 8, Dec. 1960, p. 443-446.

Casting of bushings and worm gears in sand molds containing 5.5-6% water and exhibiting a compression strength 500-550 g. per sq. cm. Design of pouring and gating systems. Tensile strength, ductility, hardness and specific weight of castings. (E11, T7; Cu-s, Al, 17-57)

165-E. (Czech.) Manufacture of Castings With Smooth Surfaces. Slevarenstvi, v. 8, Dec. 1960, p. 452-453.

To produce thin-walled gray iron castings of 0.60 kg. average weight, molds are made from a natural sand of a certain particle size. Mixture contains 70% sieved dry old sand, 23% dry new sand and 7% coal powder and has a moisture content of 8-9%. Composition of core mixture. (E11; CI-n)

166-E. (Spanish.) Production of Cast Aluminum Pieces. D. Itturioz. Metalurgia y Electricidad, v. 24, Nov. 1960, p. 93, 95, 97-99, 101, 103, 105-106.

Epoxy application for the production of patterns and pattern plates for Al castings. Preparation of the plastic, method for pattern production and storage of the patterns. Technique of Al casting with epoxy patterns. (E17, E-general, W19j; Al)

167-E. Jumbo Pump Impellers Cast in CO_2 Type Molds. Steel, v. 148, Feb. 20, 1961, p. 75.

Preparation of cores and molds for casting pump impellers composed of high Sn, manganese bronze, using the CO_2 process to produce a firm, hard mold surface. (E21, E19b, E13; Cu-s, Mn, Sn)

168-E. PT Process Licks Casting Shrinkage. Asarco Nonferrous Metals Digest, v. 2, Feb. 1961, p. 7.

Elimination of shrinkage and interconnected porosity in the casting of Al alloys by using a new pressure-tight refining process which can be applied to most standard Al sand and permanent mold casting alloys. (E25, C-general; Al-b)

169-E. (German.) Influence of Die Blackening on Formation of Gray Structure During Die-Casting. Edwin Bakovsky. Giesserei Technik, v. 6, Dec. 1960, p. 353-358.

Die casting tests are made on GG 26 cast iron using blackenings such as graphite-soda water-glass-water mixture, SiC, silicone, Al pigment and SiC at initial die temperatures of 100-520° C. Selection of proper blackening and die temperature to obtain gray microstructure. (E25q, E13; CI-n)

170-E. (German.) Special Operations in Cupola Melting. Pt. 4. Wolf Friedel. Giesserei-Technik, v. 6, Dec. 1960, p. 363.

Melting of cast iron at increased temperature in the cupola furnace with single, intermittent and continuous oxygen additions to blast (up to 23%) or with separate oxygen additions by nozzles directly into furnace. (E10a; CI)

171-E. (German.) Scrap in Gray Iron Die Casting. Causes and Methods of Prevention. Pt. 2. Klaus Herfurth. Giesserei-Technik, v. 6, Dec. 1960, p. 364-367.

Cause and elimination of die casting defects such as white structure, rough surface, sand and slag inclusions, blow holes, dimensional off-size, porosity, cracks, improper microstructure and improper composition. (E25; CI-n)

172-E. (German.) Hollow Sections in Pressure Die Castings. W. Rubisch. Giesserei-Technik, v. 6, Dec. 1960, p. 367-368.

Production and use of plastic cores in pressure die casting of complicated hollow shapes. Core is removed by annealing for 30 min. at 500° C. (E13)

173-E. Vacuum Units Enhance Investment Castings. Steel, v. 148, Feb. 27, 1961, p. 114-115.

Developments in the production of Ni alloy castings include vacuum investment casting, techniques for control of casting grain size and diffusion coatings to improve oxidation resistance. (E15, 1-73, L15; Ni-b)

174-E. Electrospark Forming: New Way to Shape Hard-to-Form Metals. Iron Age, v. 187, Feb. 23, 1961, p. 98-99.

Shaping of Ti, W and stainless steel by capacitor discharge electrospark forming, a new process in which controlled explosions create shock waves of high force which blow intricate contours into the metals in millionths of a second. (E24a; SS, Ti, W)

175-E. Developments Spur Interest in Investment Casting. C. L. Kobrin. Iron Age, v. 187, Feb. 23, 1961, p. 100-101.

New developments in production of Ni alloy castings include a vacuum investment casting process, technique for controlling grain size and pack-type process for diffusion coating. (E15 1-73; Ni-b)

176-E. Risering Magnesium Sand Castings. R. C. Boehm. Foundry, v. 89, Mar. 1961, p. 76-80.

Use of risers to eliminate shrinkage, provide vents, avoid the hydraulic ram effect, indicate when the mold is full and eliminate blows and misruns. Determination of correct riser size, shape and spacing. 20 ref. (E22q, E11; Mg)

177-E. Use of Wetting Agents in the Foundry. W. N. Richards. Foundry, v. 89, Mar. 1961, p. 81-83.

Use of water treated by wetting agents in mulling sand and bentonite molding sands to increase green compression strength, decrease mulling time and improve covering characteristics. (E18)

178-E. Producing High-Conductivity Copper Castings. V. R. Fulthorpe and F. M. Bunbury. Foundry, v. 89, Mar. 1961, p. 84-87.

Control of hydrogen and oxygen content to avoid porosity by melting alloy

under a cover of charcoal or under an oxidizing atmosphere or flux cover with cuprous oxides being eliminated by addition of calcium boride or lithium to the melt. Effect of heat treatment on hardness and electrical conductivity. (E10, Q29n, P15g; Cu, 5)

179-E. (Russian.) Molds for Large Steel Castings. A. V. Lomakin, F. L. Mirsky, N. D. Misochko and A. G. Alexandrov. Liteinoe Proizvodstvo, Nov. 1960, p. 29-31.

Casting of large 35T steel parts for forging machines in the "jacket" type mold, the mold being made in a tight flask (jacket) and assembled from sand-glass cores. Advantages of the process include precise dimensions of castings, decreased metal consumption and reduced production time. (E12, W22; ST)

180-E. (Russian.) Use of Pig Iron in Cupola Melting. V. M. Gorfinkel and L. V. Zhikin. Liteinoe Proizvodstvo, Nov. 1960, p. 31-32.

Improvement of mechanical properties of cast iron by decrease of steel scrap content in the charge and addition of 10% pig iron, keeping constant the sum (C + Si), with additional C in the pig iron making it possible to decrease content of Si and obtain the desired structure. (E25, E10a; CI)

181-E. (Russian.) Casting of Piston Rings From the Cupola and by Duplex Process. D. P. Glukhov. Liteinoe Proizvodstvo, Nov. 1960, p. 33-34.

Suggested change composition, temperature, hot blast and aftercharge for conventional and continuous casting of steel piston rings. Effect of C and Si content on quality of castings, optimum composition being 3.6-3.7% C and 2.4-2.6% Si. Disadvantages of casting by duplex process. (E-general, C5q, T21b, 2-60; ST)

182-E. Technical Control in Steel Foundries in North America. Clyde B. Jenni. Foundry Trade Journal, v. 110, Jan. 26, 1961, p. 101-106.

Continuation of a survey on North American foundry practice including molding, coremaking, sand reclamation and cleaning operations. (E-general)

183-E. Sand and Its Relationship to Efficient Production by CO_2 and Dry Sand Molding Processes. F. A. Butler. Foundry Trade Journal, v. 110, Jan. 26, 1961, p. 113.

Production of castings for the textile industry by the CO_2 process, using sand dried in a drying and cooling plant or sand containing moisture with parting spirit additions to prevent sticking. Methods of overcoming dummy and rough scabbing, swelling and collapse of molds during drying when molding by the dry sand process. (E19)

184-E. The First National Die Casting Congress. Machinery (London), v. 97, Dec. 28, 1960, p. 1475-1486.

Review of papers presented at the Congress, which dealt with the following topics; die design, die construction, metallurgical developments, processes competitive with die casting, casting costs, quality control and vacuum die casting. (E13)

185-E. Die-Making for the Automobile Industry by the Shaw Process. T. Murao. Foundry Trade Journal, v. 110, Feb. 2, 1961, p. 149-152.

Casting of large dies for press tool and die casting operations from heat resisting steel and cast iron. Cr percentage is increased to prevent cracking. Special attention is given to distortion caused by shrinking of plaster with a 1% shrinkage being allowed on castings. (E16a; CI, SS, SGA-h)

186-E. Eliminating Defects in Complicated Castings. W. R. Patterson. Western Metalworking, v. 19, Feb. 1961, p. 28-29.

Control or repair of defects such as cracks, centerline shrinkage and surface imperfections on complex castings such as turbine runners. (E25q)

187-E. (French.) Influence of the Introduction of Filters Into the Casting System for Magnesium Alloys. Jean Bonnetain and Michel Drouzy. Fonderie, Dec. 1960, p. 495-505.

Sand-casting tests with a Mg alloy (ZRE1) containing 3% Zn, 3% rare earth metals and 0.6% Zr, with or without the application of filters. Radiographic and micrographic analysis of structures and solidification phenomena. 5 ref. (E11, E25q; Mg)

188-E. Cracks in Mold Make Better Castings. Steel, v. 148, Mar. 6, 1961, p. 68-69.

Deliberately induced microcracks in a ceramic mold aid in the production of precision castings by eliminating preheating, reducing risering requirements and improving casting surface. (E15, E19)

189-E. (Japanese.) Ultrasonic Casting. Yoshiroh Hori. Ohm, v. 47, Nov. 1960, p. 54-57.

Ultrasonic cavitation and microstirring effects are applied to casting of Sn-Zn alloy, Al, Al-Cu alloy, Al-Si alloy, Al-Mg alloy, Pb dispersed Al alloy to determine effect on amount of casting inclusions and casting soundness and refined grain structure. (E-general, 1-74; Al-b, Sn-b, Cu, Mg, Si)

190-E. Castings on the Move. Foundry Trade Journal, v. 110, Feb. 9, 1961, p. 167-172.

Melting, molding and casting procedures in a foundry producing spheroidal graphite gray iron castings. Design of melting plant, coreshop, sand preparation plant and fettling department. (E-general; CI-n)

191-E. Mold Materials and the Mechanical Properties of Cast Non-Ferrous Alloys. M. R. Seshadri and A. Ramachandran. Foundry Trade Journal, v. 110, Feb. 9, 1961, p. 173-178.

Effect of nonmetallic mold materials such as silica sand, magnesite and SiC, and metallic mold materials such as anodized Al and cast iron on the mechanical properties of cast Al-Cu-Si alloys and Al bronze. 6 ref. (E25, Q-general; Al-b, Cu, Si, Cu-s)

192-E. Good Planning Precludes Snags in Casting Huge Impellers. Iron Age, v. 187, Mar. 9, 1961, p. 88-89.

Sand casting of 10,000 lb. high Sn Mn-bronze impellers using CO_2 molded cores and an annular riser over the heavy plate section. (E11; Cu-s, Mn, Sn)

193-E. (French.) Some SG Cast Irons With Special Reference to Austenitic Irons. Jacques Grilliat and Roger Poirot. Fonderie, Nov. 1960, p. 449-461.

Casting of boiler fittings, cam rings, valve housings, generator and gas turbine stators from ferritic and Ni, Cr and Cu alloyed austenitic SG irons. Data for tensile strength, yield points, elongation, modulus of elasticity, shear and compression strengths. 16 ref. (E11, Q-general; CI-r)

194-E. (German.) Metallic Materials and Ultrasonics. J. Kolb. Radex Rundschau, Dec. 1960, p. 323-331.

Production of ultrasonic frequencies by magnetostrictive and piezo-electric methods. Metallurgical application of high-intensity ultrasonics in degassing and dispersion of liquid metals in grain refinement during solidification of melts, magnetization of metals and surface purification during soldering. Use of ultrasonics in material testing and basic physical research. (E25, K7h, L10f, 1-74)

195-E. Electric Steel Degassing and Furnace Maintenance. Foundry, v. 110, Feb. 16, 1961, p. 207-209.

Vacuum-spray or ladle degassing of melts of 0.30% carbon steel to eliminate porosity and fisheye fracture in the castings. Castings show full tensile ductility without tempering or normalizing. (E25s; CN)

196-E. Hyper-Eutectic Aluminum-Silicon Casting Alloys. S. J. Ashton, J. Muir and W. M. Doyle. Metal Industry, v. 98, Feb. 17, 1961, p. 123-125.

Hyper-eutectic Al-Si alloys having high wear resistance and low coefficient of thermal expansion give satisfactory performance only when the microstructure contains small, uniformly distributed primary Si particles. Addition of phosphorus in small amounts to the melt prevents the formation of large Si particles and thus maintains the satisfactory performance of the alloy. 9 ref. (E25q, 2-60; Al-b, Si, P)

197-E. Influence of the Melting Condition on the Graphitization and the Casting Structure of White Cast Iron. Taira Okamoto and Masao Ibaraki. Imono (Japan Foundrymen's Society, Journal), v. 32, Nov. 1960, p. 772-780.

Graphitization rate and resultant microstructure as a function of temperature and holding time of melt after the addition of ferrosilicon, change in the content of gaseous N and O and of Fe-O being the rate controlling factors. 20 ref. (E25q, N8s; CI-p)

198-E. Chilling Effect of Fins on Castings. Masatoka Sugiyama and Tatsuichi Fukusako. Imono (Japan Foundrymen's Society, Journal), v. 32, Nov. 1960, p. 780-788.

Heat absorption and heat flow from the casting body as achieved by self cooling fins, the thin extended projection of the casting, as a function of fin size, shape, number and spacing and casting size. Application to directional solidification phenomena and influence on cooling rate. Effectiveness in chilling castings of Al, Al bronze, cast iron and yellow brass. 5 ref. (E22s, E25; Al-b, Cu-b, CI)

199-E. Gravity and Pressure Die Casting at the Works of Thomas Ashworth & Co., Ltd., Burnley. R. E. Green. Machinery (London), v. 98, Feb. 22, 1961, p. 439-443.

Examples of Al and Zn castings, the dies in which they are produced and auxiliary operations performed in the factory. Illustrated are an instrument mounting bracket, radar components and switch box for armored vehicles. (E13; Al, Zn)

200-E. (German-French.) Casting of Al Parts for Anodic Oxidation Coating. E. A. Bloch and H. Arbenz. Aluminium Suisse, v. 11, Jan. 1961, p. 34-43.

Solidification interval, shrinkage coefficient, hot cracking tendency, casting properties, oxidation tendency and tensile strength of the alloys GAl-3Mg, GAl-5Mg, GAl-5Zn-Mg, GAl-4Mg-Zn, GAl-2Si-Mn-Mg, GAl-5Si-Mn-Mg. GAl-5Cu-Ti and GAl-10Si-Mn-Mg. Molding and risering practices. Effect of casting defects on the quality of coatings. (E25, L19; Al-b)

201-E. Production Setups Extend Scope of Diecast Aluminum Engines. R. H. Eshelman. Iron Age, v. 187, Mar. 16, 1961, p. 120-122.

Production of six cylinder diecast engine blocks using a special machine with 2000 ton locking pressure. (E13, T21b; Al, 17-57)

202-E. "Cloud Nine"--Permanent Mold Casting of Steel. S. I. Smolensky, N. N. Guglin, G. F. Zasetsky, A. K. Provorny and V. A. Tutev. Modern Casting, v. 39, Feb. 1961, p. 40-43.

Russian technological report on pouring of large steel box-type castings. Test results on the longevity, warping and crack formation of steel molds used for castings as affected by chemical content, annealing, thickness, density and rigidity. Maximum production of 250 castings per mold is achieved through control of test factors. (E12; ST)

203-E. Modernization Slashes Costs, Castings Replace Stampings. John Vanhaver. Modern Castings, v. 39, Feb. 1961, p. 44-47.

Through modernized assembly line techniques and improved control over green sand mold preparation, pattern plate sticking and shakeout, increased efficiency and reduced costs are achieved in the production of semi-precision, thin-walled iron castings. (E15; Fe)

204-E. Lightweight Cellular Metal. L. Polonsky, S. Lipson and H. Markus. Modern Castings, v. 39, Feb. 1961, p. 57-71.

A foundry process for producing cellular Al billets and shaped castings. Before pouring, the molds are filled with soluble granules which are leached from the finished casting. Mechanical characteristics including infiltration efficiency, compression, microstructure and density are determined and industrial applications suggested. 4 ref. (E25q; Al)

205-E. Systematic Approach to Sand Design and Control. G. J. Vingas and A. H. Zrimsek. Modern Castings, v. 39, Feb. 1961, p. 93-109.

Investigation of a foundry sand-clay-water system using bentonite and fireclay to determine the effects of addition techniques and mulling time on green and dry compression and shear strengths, green tensile strength, strength ratios and density. (E18r)

206-E. Aircraft-Missile Steel Castings. S. A. McCarthy. Modern Castings, v. 39, Feb. 1961, p. 110-114.

Analysis of factors of design coordination and procedures, production concessions, riser placement problems, weight control and rejection standards with reference to steel castings for aircraft and missiles. Effect of these factors on stress distribution in application. (E-general, T24; ST, 17-57)

207-E. Hot Core Box Design and Engineering. E. E. Harkness. Modern Castings, v. 39, Feb. 1961, p. 115-120.

Factors of box and core expansion and heat, sand and chemical control as they affect core box design when using binders composed of various combinations of urea, formaldehydefurfural and single stage phenolic resins in shell molding process. (E19c; NM-f45)

208-E. (German.) Effect of Flux Additions During Mold Casting of Rimming Deep-Drawing Steel and Their Influence on Sheet Quality. Josef Teindle and Bohuslav Otta. Neue Hutte, v. 6, Jan. 1961; p. 17-22.

Addition of flux composed of 70% scale, 20% fluorospar and 10% soda during casting of test ingot. Subsequent mechanical testing, deep-drawing testing and chemical investigation of hot rolled sheet to determine mechanical and deep-drawing properties, aging behavior and sulphur segregation. (E25r, G4, 17-52, Q-general; ST-d)

209-E. Minicast Does it Cheaper for Tiny Parts. J. H. Cadieux. Product Engineering, Design Work Sheets, 14th Series, 1961, p. 68-69.

Small parts produced from Al alloys, carbon and stainless steels, Cu alloys and Co alloys by investment casting followed by sizing. Tolerances and surface finish obtained with plastic patterns and lost wax processes. (E15; Al-b, CN, Co-b, Cu-b, SS)

210-E. Practical Observations on Mold Stability as a Factor in Controlling the Soundness of Gray Iron Castings. A. D. Morgan and J. M. Greenhill. British Foundryman, v. 56, Feb. 1961, p. 45-53.

Porosity problems occurring in production of brake drum, large roll, valve body and crank shaft castings. Gaging mold wall movements by weight and dimensional measurements. Relationship between mold rigidity and the incidence of porosity. 8 ref. (E25q; CI-n)

211-E. What to Expect From Vacuum Diecasting. F. C. Bennett. British Foundryman, v. 56, Feb. 1961, p. 54-58.

Fundamental problems involved in pressure die casting under vacuum conditions with elevated molds. Evaluation of advantages of vacuum casting including reduction in injection pressure and porosity, improved surface and less oxidation of injected metal. Vacuum die casting machines. (E13, 1-73)

212-E. Evaluation of Feeding Heads and Feeding Aids for Castings. British Foundryman, v. 56, Feb. 1961, p. 66-90.

Effects of feeder design, pouring temperature, casting shape and use of insulating and exothermic feeding aids on percentage yield and soundness of gray iron, nodular graphite iron, malleable iron, carbon steel, Cu alloy and Al alloy test castings produced in green sand, dry sand or CO_2 processed molds. Design of feeders. 44 ref. (E23, E25; Al-b, CI, CN, Cu-b)

213-E. (Japanese.) Mold for Titanium Casting. Motoyuki Nakamura and Sorchiro Tachibana. Government Industrial Research Institute, Reports, Nagoya, v. 10, Jan. 1961, p. 8-14.

Casting Ti in an expendable graphite mold composed of graphite powder, pitch and rapid drying oil. Effect of mold surface condition and baking conditions on mold contamination. Optimum chemical composition and baking conditions for best expendable graphite mold. 8 ref. (E19, E16; Ti)

214-E. (French.) Serial Production of Cast Iron Piston Rings. Pierre Hemard. Ingenieurs de l'Automobile, v. 34, Dec. 1960, p. 653-658.

Stack casting of piston rings from a melt containing 3.40-3.80% C, 2-3% Si, 0.50-0.80% Mn, 0.20-0.80% P and max. 0.10% S. Molding and machining operations. (E11, T21b; CI, 17-57)

215-E. (French.) Casting of a Massive Bronze Part. Journal d'Informations Techniques des Industries de la Fonderie, Feb. 1961, p. 10-13.

Metal is melted under a flux composed of 50% MnO_2, 25% Na_2CO_3 and 25% quartz, then degassed at 1190-1200° C. by nitrogen, deoxidized by adding 0.5% Zn and 0.15% copper phosphide and sand cast at 1050-1060° C. Location of exothermal inserts and chill plates. Molding and risering. (E13, E25s, E-general, Cu-s)

216-E. (Pamphlet.) Sand and Permanent Mold Casting. Paper from "Federated Aluminum Casting Alloys Handbook". American Smelting and Refining Co., New York, 1960, p. 15-22.

Heating, pouring and degassing methods in sand, permanent mold and shell casting of Al alloys. Effect of moisture, gas absorption, dross content, pouring temperature and solidification phenomenon on crack formation and other aspects of casting quality. (E11, E12, E25; Al-b)

217-E. (Pamphlet.) Die Casting. Paper from "Federated Aluminum Casting Alloys Handbook". American Smelting and Refining Co., New York, 1960, p. 23-26.

Crucible, electric and reverberating furnace melting of Al-Si and Al-Cu-Si eutectic alloys for die castings. Causes of common casting defects and use of fluxes to eliminate dross, gas and foreign matter. (E10, E13; Al-b, Si, Cu)

218-E. Acid-Lined Cold Blast Cupola Performance-Effect of Tuyere Size and Determination of the Optimum Operating. H. J. Leyshon and R. B. Coates. BCIRA Journal (British Cast Iron Research Assoc.), v. 9, Jan. 1961, p. 24-45.

Tuyere ratios from 1:53 to 1:2.6 and blast rates from 1200-2400 cu. ft. per min. were used in a cupola of 29 in. internal diameter. The widely used design melting rate of 0.75 ton per sq. ft. per hr. is satisfactory but this rate may be increased provided that the coke:metal ratio does not necessitate a blast rate in excess of 440 cu. ft. per sq. ft. per min. (E10a)

219-E. Influence of Cold Blast Cupola Practice on Casting Properties and Iron Composition. K. E. L. Nicholas. BCIRA Journal (British Cast Iron Research Assoc.), v. 9, Jan. 1961, p. 46-66.

Effect of tuyere size and blast rate on the properties of hypo-eutectic gray iron produced in the BCIRA experimental cupola operating with acid lining and cold blast. Tuyere diameter has no effect on properties, composition and degree of eutectic nucleation but blast rate exerts a significant influence. (E10a)

220-E. Acid-Lined Cold Blast Cupola Performance--Effect of Tuyere Size and Determination of the Optimum Operating Condition. Pt. 2. Experimental and Operational Methods Used in the Cupola Investigation. H. J. Leyshon and R. B. Coates. BCIRA Journal (British Cast Iron Research Assoc.), v. 9, Jan. 1961, p. 67-94.

Selection and weighing of materials, measurement of blast rate, melting rate and metal temperatures; sampling and analysis of metal and slag and top gases; measurement of top gas temperatures and lining wear. Operational methods. Calculation of heat balances. (E10a)

221-E. Inoculation and Casting Expansion. K. E. L. Nicholas. BCIRA Journal (British Cast Iron Research Assoc.), v. 9, Jan. 1961, p. 103-116.

Inoculation of hypo-eutectic gray cast irons produces a rise in degree of eutectic nucleation and an increase in unsoundness. The characteristic unsoundness of inoculated gray cast irons is due to increased casting solidification expansion which is related to the degree of eutectic nucleation. The effect is most pronounced in light and medium section castings. (E25q)

222-E. De-Sanding of Cylinder-Heads With Molten Caustic Soda. C. S. Johnson and R. Williams. Foundry Trade Journal, v. 110, Mar. 2, 1961, p. 265-268.

Sand remaining on Fe castings after decoring, shakeout or shotblasting is removed by immersion in molten caustic soda at 500° C. (E24; Fe)

223-E. Shell-Molding of Motor-Cycle Cylinders. Lajos Kelemen. Foundry Trade Journal, v. 110, Mar. 2, 1961, p. 275-277.

Casting of MOV 28 quality cast iron in shell molds composed of resin coated sand. Slag formation and gas porosity are eliminated by proper runners and gates, proper casting position and ventilation. (E16c; CI)

224-E. Refinement of Aluminum-21% Silicon Casting. Myron G. Urdea and Yeshwant P. Telang. Metals Engineering Quarterly (American Society for Metals), v. 1, Feb. 1961, p. 54-67.

An effective cycle of melt preparation and modification with a copper-phosphorus brazing alloy rod has been developed. This treatment at 0.03% P level gives a consistently high degree of refinement 15 lb. heats; consequently, the ultimate tensile and yield strength levels of 43,000 and 40,000 psi. respectively, the hardness range of 126-156 Bhn and 0.5-2.0% elongation have been realized in precipitation hardened specimens. 15 ref. (E25q; Al-b, Si)

225-E. Present-Day Foundry Practice. L. C. Barton. Machinery Lloyd (Overseas Edition), v. 33, Feb. 4, 1961, p. 39-44.

Shell molding of ferrous and nonferrous metals including stainless steels, iron and Al with resin bonded, thermo setting sand to produce castings with tolerances to 0.0005 in. Effect of runner form and gate size on scrap rate. (E16c; Al, Fe, SS)

226-E. Cast Titanium by New Method. Iron Age, v. 187, Mar. 23, 1961, p. 85.

Development of Impel casting, a permanent mold technique for casting of Ti which permits production of at least 40 parts per mold. Castings have good surface finish, meet close tolerances and require little or no machining. (E12; Ti)

227-E. Exothermic Risering Effects on Properties of Cast Armor Steel. J. M. Ingraham. Watertown Arsenal Laboratories. U. S. Office of Technical Services, PB 161698, June 1960, 35 p. $1.

The use of moldable exothermic riser sleeves can help solve the problem of feeding castings of complex geometry and increase production. A limited study of the effects of exothermic risering on the physical and mechanical properties of a casting in the riser area demonstrates the value of using such sleeves. (E22q; ST)

228-E. Permanent Molds Lower Titanium Part Expense. Steel, v. 148, Mar. 27, 1961, p. 170.

Permanent mold casting of Ti pump housings, impellors and valve housings by a process in which double melted Ti is impelled into a die cavity. Cores up to 12 in. have been pulled successfully. (E12; Ti)

229-E. (French.) Quality Improvement of Loudspeakers by Die Cast Frames. Harold W. Bredin. Machine Moderne, v. 15, Feb. 1961, p. 49-50.

Die cast frames manufactured from Zamac 3 Zn alloy show higher rigidity and damping power in comparison to mold cast frames. (E13; Zn)

230-E. New Die Foundry in Lancashire. Light Metals, v. 24, Mar. 1961, p. 80-81.

Pressure and gravity die casting of Al and Zn followed by trimming on a hydraulic press. Design of plant. (E13; Al, Zn)

231-E. (French.) Sand Molding for Light Metal Casting. Pt. 1. Charles Roinet. Revue de l'Aluminium, v. 37, Dec. 1960, p. 1434-1442.

Design of models, core blowing and molding processes applied in light metal casting. Various types of flask and core boxes. (E19, E21; EG-a39)

232-E. (Czech.) Investigation of the Metal Flow in Pouring Systems and Molds by Means of Plexiglass Models. Miroslav Bednarik. Slevarenstvi, v. 9, Jan. 1961, p. 2-5.

The flow of water or mercury in transparent models is recorded by motion pictures to obtain information on shape of metal surface during casting, formation of eddies and conditions for the penetration of oxide films into the metal. 10 ref. (E-general, 17-57)

233-E. (Czech.) Use of CaC_2 in the Melting of Gray Cast Iron in the Acid Cupola Furnace. Drahoslav Strasky, Milan Kacirek and Otto Matousek. Slevarenstvi, v. 9, Jan. 1961, p. 8-10.

Technical index for charging a cupola with a metallic charge weighing 350 kg. containing 20% steel scrap, 11-12% coke, 3% limestone and 2-5% CaC_2. Effect of CaC_2 on melt temperature, furnace efficiency, lining wear, slag and waste gas compositions. (E10a, 2-60; CI-n)

234-E. (Czech.) The Bearing Alloy VUK_2. Alois Sosolik. Slevarenstvi, v. 9, Jan. 1961, p. 14-16.

Production of an Al alloy containing 7.5-8.5% Cu, 1-1.6% Fe, 1-1.25% Si, 0.5% Mg, 0.3% Mn and 0.2% Zn showing the phases Al, Al_2Cu+Al and Al_2Cu+Si+Al by melting in a graphite crucible and casting at 720-740° C. into sand molds containing no more than 4% moisture or in dry sand molds. Effect of casting temperature on tensile strength. 10 ref. (E11, M26, Q27, 2-61; Al-b, SGA-c)

235-E. Aluminum Generator Rotors Are Centrifugally Cast. Materials in Design Engineering, v. 53, Mar. 1961, p. 13.

Electric generator rotors produced by centrifugally casting Al around steel

laminations, magnets and binding rivets. (E14, T11q; Al, ST, 7-59, 17-57)

236-E. Investment Foundry Yields Zoom With New Feeding System. Steel, v. 148, Apr. 3, 1961, p. 86-87.

Reduction of the gating system in an investment casting resulting in retention of more heat within the molten metal, thus increasing production and decreasing scrap. 4330 and 5355 A steel investment castings formed by the method are tested for flaws using X-rays and macroetching. (E15, E22p; ST)

237-E. Design and Application of Investment Castings Produced by Centrifugal Methods. I. L. Gwynn. Engineering Materials and Design Conference, Proceedings, Feb. 1960, p. D1-D12.

Production of investment castings by the Picast method, with design consideration for mold and component forms. Application of the method to carbon, low alloy austenitic stainless, spring and toolsteels; age hardenable and case hardenable alloys; Ni, Al, Cr and Cu base alloys; and hard facing, heat and corrosion resistant high-strength, nondistorting and magnetic alloys. Data are given for material properties and applications. (E15; SGA, SGB, ST, Al-b, Cu-b, Ni-b, Cr-b, 17-57)

238-E. (Italian.) System of Casting, Riser and Gating. Fonderia, v. 10, Jan. 1961, p. 27-30.

Rigging practice in the casting of iron and steel. Size of riser and casting and cooling rate influences on technical parameters. (E22)

239-E. Plaster Die Gives Accurate Prototypes for Die Casting. William G. Newton, Jr. Product Engineering, v. 32, Apr. 3, 1961, p. 54-55.

Zn or Al alloy is injected into plaster molds at low pressure to make pre-production guides for die casting. (E13, 3-74, 17-56; Al-b, Zn-b, 17-57)

240-E. Casts Exhaust Port Valves on Automated Shell Mold Line. Robert H. Herrmann. Foundry, v. 89, Apr. 1961, p. 58-61.

Production and quality control procedures for Ni-Cr steel automobile engine exhaust port valves cast in four part, resin-bonded sand molds, including automatic mold-making, gate core and pouring cup, shakeout, degating, assorting and assembly line transportation techniques. (E11, E-general, T21b; SS, 17-57)

241-E. How to Save Brass Foundry Metal. Harry St. John. Foundry, v. 89, Apr. 1961, p. 65-67.

Achievement of minimum metal loss in brass foundry operation through adequate control of metal oxidation and volatilization during casting, reduction of nonproductive metal in castings and quality control of casting soundness. (E25; Cu-n)

242-E. Gating and Risering Investment Castings. Hyman Rosenthal. Foundry, v. 89, Apr. 1961, p. 68-72.

Review of the nomenclature, pattern design and orientation, flask-molding procedures and nesting systems relative to gating and risering of ferrous and nonferrous investment castings. (E22)

243-E. Developments Expected to Broaden Investment Castings Market. Foundry, v. 89, Apr. 1961, p. 170.

Increased utility of investment castings achieved through production developments including control of grain size, improved coring, use of protective coatings and vacuum melting and casting processes. (E15)

244-E. Do Old Theories Apply in New Technique of Gating? Leo E. Carr. Foundry, v. 89, Apr. 1961, p. 81-83.

Procedure used in casting sound 2 1/2 in. steel test cubes from a hollow sprue gating system achieving beneficial blanketing, thermal wedge, end and superheated sprue effects and resulting in reduction of warpage, shrinkage and hot tearing and increase in casting yield. (E22p; ST)

245-E. Overcoming Porosity. Metal Industry, v. 98, Feb. 24, 1961, p. 147-148.

Effect of feeding speeds and cycling rates on the porosity and soundness of Zn and Al pressure die-castings. (E13, 9-68; Al-b, Zn-b)

246-E. (Translation-Brutcher no. 5029.) Hot Cracking of Castings and Welds. A. A. Bochvar. Liteinoe Proizvodstvo, Oct. 1960, p. 47.

First attempt at generalizing the mass of data now available on the capacity of

metals to resist hot (crystallization) cracking in casting and welding. (E-general, K-general, 9-72)

247-E. (Translation-Brutcher no. 4898.) Crystallization of Castings Under the Action of Sonic and Ultrasonic Vibrations in the Liquid Metal. C. F. Balandin. Izvestiya Vuz-Mashinostronie, Apr. 1960, p. 24-31.

Examples of metal cast with the fountain instead of the mold vibrating; nature of effect of vibrations explained on basis of special experiments. Role of fragmented solid phase during crystallization; effect of slow versus high rates of cooling of metal poured through a vibrating funnel. (E25, 1-74)

248-E. (German.) Defects and Their Elimination on Gray Iron Castings. H. Lehmann and P. Lairich. Technik, v. 16, Feb. 1961, p. 83-87.

Elimination of material outgrowth on castings, blow and shrink holes, cracks, surface defects, nonfilled molds (incomplete castings), dimensional off-size, inclusions, improper microstructure and deviation from standards during production of castings. (E25; CI-n)

249-E. "Tailored" Grain Size Gives Needed Properties at Critical Points in Castings. Materials in Design Engineering, v. 53, Apr. 1961, p. 9.

Control of grain size during investment casting permits production of fine grained areas of high-tensile strength and larger grained areas of improved stress-rupture life in the same casting. (E15, E25q)

250-E. Shell Molding Processes Employed by Ford Motor Co., U. S. A. H. C. Grant. Machinery (London), v. 98, Mar. 15, 1961, p. 593-601.

Production and use of shell molds in the casting of various automotive parts. Design and operation of a turn table shell molding installation used to produce the shell molds, cylinder bores and refractory liners for dies. (E16c, T21)

251-E. Effects of Die Finishing. Metal Industry, v. 98, Mar. 24, 1961, p. 231.

High finishes are obtained on Al alloy pressure die castings by using specially finished die cavities. Reduced friction between the injected metal and the die wall reduces required injection pressure so that castings may be made on less powerful machines. (E13; Al-b)

252-E. (Czech.) Cast Austenitic Cr-Mn-N Steel. K. Lobl, A. Sustek and K. Hybek. Strojirenstvi, v. 10, Dec. 1960, p. 907-915.

In a laboratory furnace and an arc furnace various steel melts are prepared containing 0.05-0.17% C, 12.78-14.32% Mn, 0.47-1.16% Si, 0.023-0.045% P, 0.003-0.012% S, 16.18-17.15% Cr, 0.32-1.11% Mo and 0.304-0.352% N. Pouring properties, tendency for pipe formation and heat resistance at 1000-1150° C. on mechanical properties. Embrittlement by holding at 700° C. for 1000 hr. 17 ref. (E23, Q-general, Q26s; SS-e)

253-E. Air Flow in Cupolas. Foundry Trade Journal, v. 110, Mar. 9, 1961, p. 309-311.

Investigation of the effect of coke particle size and shape, air-flow rate and bed packing on the air pressure drop in a bed of coke. (E10a)

254-E. Relative Chilling Powers of Various Mold Materials With Aluminum and Its Alloys as Test Castings. M. R. Seshadri and A. Ramachandran. British Foundryman, v. 54, Mar. 1961, p. 130-137.

Evaluation of the relative chilling power of various mold materials including silica sand, magnesite, silicon carbide, Cu, cast iron and anodized Al. Data concerning grading of the nonmetallic materials and the properties of the various types of molds produced from them are presented in tabled form. Thermal properties. Solidification time and heat diffusivity. 8 ref. (E19; W19g; Al-b, CI, Cu, 17-57)

255-E. Effect of Metal Mold Reaction and Section Thickness on the Properties of Gunmetal Castings. F. Hudson. British Foundryman, v. 54, Mar. 1961, p. 137-146.

Large tensile test bars are cast in five different alloys under conditions promoting a variable degree of metal-mold reaction. After machining the bars are broken on a 1000 ton testing machine. Tabled data include effect of phosphorus and mold moisture contents on mechanical properties. Effect of metal-mold reaction on structure and fractures of test bars. 13 ref. (E19, E25; Cu-b)

256-E. Latest Findings for the Construction and Operation of Hot Blast Cupolas. Siegfried Tunder and L. Hohle. Engineer and Foundryman, v. 26, Jan. 1961, p. 17-28.

A paper covering the following areas: the metallurgy of the hot blast cupola, cupola design, the basic hot blast cupola, the shaking ladle and blast preheaters. Discussion includes instrumentation and charging equipment. (E10a)

257-E. (French.) Metallurgical Study of Electrical Furnaces. Examples of Production Processes. G. Grenier. Journal du Four Electrique, Jan. 1961, p. 27-28.

Casting from the electric furnace. Effect of casting rate and size of ingot on its chemical homogeneity. Quality control by analysis, temperature control and mechanical tests. 16 ref. (E10r)

258-E. American Foundry Technology. Foundry Trade Journal, v. 110, Mar. 16, 1961, p. 331-336.

Abstracts of papers presented to technical societies covering effect of inoculation on the risering of gray iron, materials for automobile engines tested for metal wear and machinability of spheroidal-graphite cast irons. (E-general, 10-54; CI)

259-E. Melting of Cast Iron Swarf in the Cupola. A. S. Bhaduri. Indian & Eastern Engineer, v. 103, Jan. 1961, p. 11, 13-14.

Outline of two methods of recovering cast iron scrap without preliminary preparation. The scrap is fed directly into the cupola at a temperature just above the melting point or charged into the cupola with a low pressure air blast. 7 ref. (E10a; CI)

260-E. (Japanese.) The Effects of Be Addition in Mg and Mg-Zr System Alloys. Riei Ichikawa. Nagoya Institute of Technology, Bulletin, Dec. 1960, p. 316-322.

Influence of small amounts of Be, added as $BeCl_2$ to the melt, on molten metal fluidity and burning, oxidation of the melt and the casting and surface state and casting structure of the alloys. 9 ref. (E25q; Mg-b, Zr, Be)

261-E. Permanent Mold Cast Titanium Slashes Die Casts, Hikes Output. Western Metalworking, v. 19, Apr. 1961, p. 31.

Quantity production of high-strength, corrosion resistant small parts from unalloyed Ti by Impel casting. Molten Ti is "impelled" into permanent mold die cavities to produce such parts as pump housings, impellers, valve bodies, fittings and pump sleeves. (E12, W13d; Ti, 17-57)

262-E. (German.) Some Investigations on Eloxal Cast Alloys and Castings. A. Buckeley. Metall, v. 15, Mar. 1961, p. 211-215.

Macrostructure investigation for evaluating influence of Ti additions (0.02-0.14%) to G-AlMg3 and G-AlMg3 (Cu) alloys on grain refinement for various casting and superheating temperatures. Investigation of brightness and hardness as influenced by Mg and Si. (E25q, M28, Q29n, 2-60; Al-b, Ti, Mg, Si)

263-E. (German.) Effect of Grain-Refining Additions on Grain Size of Solidified Pure Aluminum Melts With Emphasis on Grain Refiners Containing Boron. K. H. Wiedemann. Metall, v. 15, Mar. 1961, p. 221-224.

Addition of varying amounts of Ti and boron to test melts of pure Al at 780° C. with subsequent cooling and macrostructure examination of grain refinement as influenced by Ti and boron content. (E25q, M27, 2-60; Al-a, B, Ti)

264-E. Examining the Causes of Shrinkage Defects in Gray Iron Castings. A. G. Fuller and K. E. L. Nicholas. BCIRA (British Cast Iron Research Assoc.) Journal, v. 9, Mar. 1961, p. 173-184.

Effect of soft molds, unsuitable chemical composition, incorrect pouring temperature and the degree of eutectic nucleation on shrinkage. (E25n; CI-n)

265-E. Graphite Injection Through the Tuyeres of a Cold Blast Cupola. H. J. Leyshon, R. B. Coates and K. E. L. Nicholas. BCIRA (British Cast Iron Research Assoc.) Journal, v. 9, Mar. 1961, p. 189-198.

Injections of powdered graphite through cupola tuyeres, using compressed air as the carrier gas, are used to increase carbon pickup in the castings, thereby reducing chill and shrinkage. 8 ref. (E25)

266-E. Factors Influencing the Inoculation of Cast Iron. J. V. Dawson. BCIRA (British Cast Iron Research Assoc.) Journal, v. 9, Mar. 1961, p. 199-236.

Effect of ferro-silicon, Al, Zr, Mg, Ce, Ca, B, graphite, calcium silicide and SMZ alloy additions on physical properties and grain size of gray and nodular irons with emphasis on depth of chill. 8 ref. (E25q, 2-60; CI-n, CI-r)

267-E. Practical Notes on Ram-Off Defects. A. A. Timmins and A. D. Morgan. BCIRA (British Cast Iron Research Assoc.) Journal, v. 9, Mar. 1961, p. 237-243.

Causes of ram-off defects in castings are explained in terms of pattern, molding machine, molding box or sand practice. (E25)

268-E. Hot Tears in Steel Castings. Michael A. Notte. Castings, v. 7, Feb. 1961, p. 17, 20, 23.

Effect of design of heading and gating, liquid shrinkage and solid contraction, coremaking and molding practice, chilling and impurities on the formation of hot tears in steel castings. Design considerations for reducing high or unequal cool stresses in castings. 4 ref. (E-general, E25, 3-66, 3-69, 9-71; ST)

269-E. Viscous Shear as an Agent for Grain Refinement in Cast Metal. F. A. Crossley, R. D. Fisher and A. G. Metcalfe. Metallurgical Society of AIME, Transactions, v. 221, Apr. 1961, p. 419-420.

Grain refinement in cast Al alloys by solidfying under conditions of rotational acceleration produced mechanically or by magnetic stirring. Effect of the related viscous shear in the liquid on nucleation mechanisms. 4 ref. (E25q, N2; Al-b)

270-E. Boeing Uses Advanced Techniques in Sand Casting Turbine Engine Parts. K. B. Rhodie. Modern Metals, v. 17, Apr. 1961, p. 40, 43.

Olivine molding sand and CO_2 coring process used in manufacture of gas turbine castings. Melting in induction furnace. Physical properties determined for olivine. (E11, E18r, W11m)

271-E. Titanium Casting Technology. S. L. Ausmus, F. W. Wood and R. A. Beall. Metal Industry, v. 98, Mar. 31, 1961, p. 243-245.

Equipment and techniques used in spin casting of Ti alloy, Hf and Zircaloy. Grain structure and surface finish of the castings. Physical and mechanical properties, corrosion resistance and surface finish of extrusions made from the cast billets. (E14; Hf, Ti-b, Zr-b)

272-E. Magnesium Alloys Can Be Investment Cast. Kenneth Herrick and Harry Matthieson. Precision Metal Molding, v. 19, Apr. 1961, p. 43-45.

Data are given for dimensional, flatness and concentricity tolerances attainable with Mg investment castings. Tables show the correct rod for joining the castings by inert arc welding. (E15, 17-55, K1d; Mg-b)

273-E. Cerium Sulphide Cores. H. Kirtchik. Precision Metal Molding, v. 19, Apr. 1961, p. 46-47.

Development of a new core material which can be used up to 2000° C. and will permit designers to specify small diameter holes in investment castings. Cores are produced by pressing, sintering and swaging to size. (E15, E21)

274-E. Nickel Carbonyl Mold Making Process. Henry Lefer. Precision Metal Molding, v. 19, Apr. 1961, p. 48-50.

Production of pure Ni permanent molds, core boxes and patterns of great complexity with excellent physical properties by a process depending on the decomposition by heat of Ni carbonyl gas to Ni and carbon monoxide. (E19)

275-E. (Dutch.) Design of Castings. Alrik Ostberg. Gjuteriet, Feb. 1961, p. 15.

Risering, design of cast parts and pouring systems, application of chill plates. Practical examples. (E22, E23)

276-E. Titanium Casting Technology. S. L. Ausmus, F. W. Wood and R. A. Beall. Metal Industry, v. 98, Apr. 7, 1961, p. 271-273.

Effect of arc current, furnace pressure, alloy composition, ladle diameter, casting size and electrode on yield of metal, heat distribution, metal temperatures and melting rates of Ti alloys. (E25; Ti-b)

277-E. (French.) Metallurgical Blast Cupola. R. Doat, H. Doutreloux and H. de Rycker. Fonderie Belge, v. 31, Jan. 1961, p. 3-11.

Observations during industrial production of thermochemical processes at the tuyeres level and in the reducing zone of a 10 ton per hr. hot blast M. B. C. cupola furnace. (E10a, D11)

278-E. (Japanese.) Effects of Inoculation on the Solidification Process in Hypoeutectic Cast Iron. Osamu Fujita and Kiyoshi Kubo. Imono (Japan Foundrymen's Society, Journal), v. 33, Jan. 1961, p. 3-12.

The process of solidification and graphite formation at a given slow rate of cooling is investigated for samples innoculated with Ca-Si. Cooling curves are determined and microstructures formed during various stages of solidification are examined microscopically. 9 ref. (E25n, E25q, M-general, N8s, 2-60; CI, Ca, Si)

279-E. (Japanese.) Effects of Superheating and Inoculation on the Annealing Characteristics and the Casting Structure of a Malleable Iron. Taira Okamoto and Masao Tbaraki. Imono (Japan Foundrymen's Society, Journal), v. 33, Jan. 1961, p. 13-17.

Grain refinement and reduction of oxide and impurity content in the microstructure of 2.76° C. malleable Fe by inoculation with ferrosilicon and superheating at 1550° C. Effect of silica content on annealing characteristics. 6 ref. (E25q, M27, 2-60; CI, Si)

280-E. Development and Improvement of Gating and Risering for Ductile Iron. H. Otey Meriwether, Jr. Iron Worker, v. 25, Spring, 1961, p. 32-33.

Outline of a gating and risering system now in use. Formulas are given for the calculation of pouring time, effective sprue height, area of choke, runner size, ingate area and riser and riser connection size. (E22; CI-r)

281-E. Steel Castings. Charles W. Briggs. Foundry, v. 89, May 1961, p. 120-123.

Production of steel castings with improved melting, pouring, cleaning and inspection techniques. Modern coremaking and molding methods. (E-general; ST)

282-E. Aluminum Castings. Floyd A. Lewis. Foundry, v. 89, May 1961, p. 124-129.

Production of pressure tight, high-tensile Al castings through improved alloy compositions and advances in production methods and quality control. (E-general; Al-b)

283-E. Malleable Iron Castings. Hans J. Heine. Foundry, v. 89, May 1961, p. 130-135.

Improved melting, alloying and heat treating techniques for higher tensile strength, fatigue strength, wear resistance, corrosion resistance and machinability. (E-general; CI-s)

284-E. Brass and Bronze Castings. Richard A. Flinn. Foundry, v. 89, May 1961, p. 136-139.

Modern alloying and casting methods for use with Cu-base alloys having high-tensile strength, electrical conductivity, thermal conductivity, corrosion resistance, abrasion resistance, machinability and weldability. 4 ref. (E-general; Cu-b)

285-E. Magnesium Castings. Robert C. Boehm. Foundry, v. 89, May 1961, p. 148-151.

Alloying and fluxing for production of sand castings and die castings with good corrosion resistance, damping capacity and mechanical properties. Protective coatings. (E11, E13; Mg)

286-E. Quality Comes First at Boeing Airplane Co. Foundry. Jack C. Miske. Foundry, v. 89, May 1961, p. 194-200.

Sand casting of Al alloy aircraft parts in olivine sand molds. X-ray and penetrant inspection. (E11, T24; Al-b)

287-E. Gating and Risering Investment Castings. Hyman Rosenthal. Foundry, v. 89, May 1961, p. 220-228.

Experiments and actual jobs with Armco iron, 1020, 1095, 4140 alloy and stainless steels determine feeding distance as related to mold temperature, pouring temperature and freezing range. 9 ref. (E22, E15; Fe-a, SS)

288-E. Sand Moldability and Mold Quality. H. W. Dietert, A. L. Graham and T. H. Hanna. Foundry, v. 89, May 1961, p. 238-248.

Control of molding sand using tests to determine rammability, mold hardness, mold wall creep, permeability, wall voids, lift, density and penetration. (E18)

289-E. Diecasting at AC Spark Plug Division. Robert H. Herrmann. Foundry, v. 89, May 1961, p. 264-266.

Production of oil filter bodies, fuel pump parts and instrument panels in Zn, Al and Mg. (E13, T21b; Al, Mg, Zn)

290-E. (French.) Lost-Wax Castings Up to 45 Kg. Produced in Ceramic Shells. Laurence W. Collins, Jr. Machine Moderne, v. 55, Mar. 1961, p. 45-47.

Production of molds by lost-wax process by forming shells of alternate layers of refractory ceramic material. (E15)

291-E. (Italian.) Shell Molding. Italian Experiences With the Process. Angelo Azzolini. Fonderia Italiana, v. 10, Jan. 1961, p. 11-20.

Principles of the process. Sources of defects and remedies. (To be continued.) (E16c)

292-E. (Italian.) Carbon Dioxide Process. J. L. Leach and G. Haley. Fonderia Italiana, v. 10, Jan. 1961, p. 21-24.

Role of gassing time, gas pressure, granularity of the sand and quantity of bonding agents in the process of sand hardening by CO_2. (E19)

293-E. (French.) Risering of Sand Castings. Practical Rules of Calculating Risers. Michel Jeancolas. Fonderie, v. 181, Feb. 1961, p. 43-56.

Manner of solidification of ferrous and nonferrous alloys. Calculation of number, size, neck and zone of action of risers. 22 ref. (E11, E22q)

294-E. Investment Casting Molds. Metal Industry, v. 98, Mar. 1961, p. 210.

Fluidization technique for rapid investment of molds using a particle bed of alumina and silica fluidized by a porous refractory brick diffuse plate and a controlled fluid input. (E15, E19)

295-E. Centrifugal Casting. J. B. McIntyre. Foundry Trade Journal, v. 110, Apr. 13, 1961, p. 459-470.

Steel, bronze, Pb, Sn, Au, Pt, Ni, Cu, Fe and Sb are used in castings produced by horizontal and vertical centrifugal casting methods. Developments and operations of the technique outlined. Cr, Mo, Fe, stainless steel and carbon steel are used in molds. 17 ref. (E14; Au, Cu, Fe, Ni, Pb, Pt, ST)

296-E. (Japanese.) Burning of Silica Sand During Steel Casting. Tomoharu Yoshikawa. Railway Engineering Research Journal (Japan), v. 17, Nov. 1960, p. 455-463.

Sand burning reactions are studied for green, dry and permeable sand molds with analysis of the thermodynamics of the process, microstructure and FeO concentration of the burnt surface of the casting, slag layer formation and the effects of the fluidity of the melt, mold permeability and use of mold wash. (E11, E25, 9-71; ST)

297-E. High-Volume Aluminum Sand Castings. V. A. Williams. Production, v. 47, May 1961, p. 47-49.

Production line sand casting of Al to produce automotive engine timing chain covers. Stabilization is by heat treatment. (E11, T21b; Al)

298-E. Tailored Alloy Help to Solve Investment Casting Problems. R. H. Eshelman. Iron Age, v. 187, May 11, 1961, p. 114-115.

Examples show how the chemistry of an alloy and heat treatment procedures may be altered to permit successful investment casting. (E15)

299-E. Production of Sound Grey Iron Castings. I. C. H. Hughes. Foundry Trade Journal, v. 110, Apr. 20, 1961, p. 491-497.

Survey of research covering directional solidification, inoculation and feeding techniques for controlling shrinkage, graphite cell structure and other aspects of soundness of gray iron castings. 7 ref. (E25; CI-n)

300-E. Gravity Diecasting in a General Foundry. D. Redfern and I. E. Brown. British Foundryman, v. 54, Apr. 1961, p. 189-192.

Casting temperature, pouring arrangements, casting properties and heat treatment techniques used in gravity diecasting of Al alloy cylinder and crankcase

castings for compressors and exhaustors. (E13; Al-b)

301-E. Gating Zinc Die Castings. Ralph Wilcox. Precision Metal Molding, v. 19, May 1961, p. 40-41.

Effect of the location, size and shape of the gate through which molten Zn alloy is injected into a die casting upon the soundness and surface finish of the casting. (E22p, E13; Zn)

302-E. How Die Casting Affects Tooling Costs. C. F. Hannon. Precision Metal Molding, v. 19, May 1961, p. 43-44.

Effect of gating on porosity and finish of Al and Zn base alloys die cast in air-hardened steel dies. (E13, E22p; Al, Zn)

303-E. Cupola Melting Process. Technical Information Service, National Research Council (Canada), Dec. 1959, p. 1-7.

Cupola furnace design and operation technology with attention to fuel requirements, heat and slag control, use of hot blasts and charging practice. (E10a)

304-E. Foundrymen Quick to Adopt New Ductile Iron Test. Modern Castings, v. 39, Mar. 1961, p. 37-39.

Development of a standard test coupon for microscopic examination of graphite configuration and structure of ductile Fe castings. (E25q, M21, 1-54; CI-r)

305-E. New Concept Reduces Casting Cleaning Costs. Elmer Kreger. Modern Castings, v. 39, Mar. 1961, p. 51-53.

Innerbore gates and risers, replacing multiple headers, are used to produce sound, clean steel castings with high metal yield. The new rigging technique is applied to circular castings which are symmetrical about a central axis such as combination drums and sprockets, jaw clutches, bevel gears and drum laggings. (E22, T7)

306-E. New Sand Mix Doubles Core Production. Modern Castings, v. 39, Mar. 1961, p. 54-56.

A sand mix having a urea formaldehyde resin as the binder is used for shell cores in permanent mold casting of 356 Al alloy cylinder heads. Complete collapsibility at 1350° F. and consequent easy clean-out is attributed to the mixture. (E12, E18, E21; T21b, Al-b)

307-E. Hypereutectic Aluminum-Silicon Casting Alloys Phosphorous Refinement. F. L. Arnold and J. S. Prestley. Modern Castings, v. 39, Mar. 1961, p. 61-69.

Optimum conditions and limitations of the phosphorous refinement process are investigated for a 16% Si casting alloy using a commercial nucleant containing 20% red phosphorous and a 15% P-Cu alloy as inoculants with permanent mold and sand casting. Solidification phenomena and structural transformations are examined metallographically. (E25; Al-b, Si)

308-E. Feeding Distance of Bars in Investment Molds. H. Present and H. Rosenthal. Modern Castings, v. 39, Mar. 1961, p. 70-72.

The influence of mold temperature, pouring temperature and carbon content of the alloy in the feeding range in ceramic molds is investigated for 1020 and 1095 steel and Amco Fe cast at 1200-2000° F. (E15, 2-60, 2-61; CN)

309-E. Magnesium-Base Alloys Investment Cast Properties. K. Herrick. Modern Castings, v. 39, Mar. 1961, p. 111-120.

Investigation of mechanical properties and soundness of AZ92A, AZ91C, AZ218A and AM1--A alloys to determine castability for use with the investment casting process. Average grain size and massive compound ratings are determined as a function of section size, investment mold temperature and metal pouring temperatures. Tensile properties are compared to those of shell castings and castability classifications are made in terms of microshrinkage tendencies. (E15, E25p, Q27; Mg-b)

310-E. The Carbon Dioxide Process. G. D. Haley and J. L. Leach. Modern Castings, v. 39, Mar. 1961, p. 121-124.

Investigation of the effect of gassing time and pressure, grain fineness of the sand and the amount of binder on the CO_2 molding process. Data are given for tensile and compressive strength of molds and cores with a proposal for a standard method of testing. (E18, E19)

311-E. (French.) Pressure Casting. Hiram K. Barton. Metallurgie et la Construction Mecanique, v. 93, Feb. 1961, p. 99-101, 103, 105, 107-108.

Pressure casting of Zn, light and ferrous alloys. Characteristics of the alloys at room and elevated temperatures. Casting methods and properties of the castings. (E13; Fe-b, Zn, EG-a39)

312-E. (Japanese.) Decrease of Residual Stress by Self-Chilling Fins in Casting. Toshiro Owadano. Imono (Japan Foundrymen's Society, Journal), v. 33, Feb. 1961, p. 43-48.

Chill casting experiments with a 2.36% C, 2.53% Si, Fe alloy and a Silumin alloy. Variance of chilling effects on solidification and transformation periods and on residual stress is attributed to the difference in the thermal conductivity of the castings. 5 ref. (E22r, E25n, Q25h; Al-b, Fe-b)

313-E. (Swedish.) Design of Castings. Pt. 2. Alrik Ostberg. Gjuteriet, v. 51, Mar. 1961, p. 37-46.

Directions for adequate feeding, chilling, choice of fillet radii and outer radii and design of wall intersections. 7 ref. (E22)

314-E. Grain Refinement by Vibration. J. L. Walker. Journal of Metals, v. 13, May 1961, p. 379.

Subsonic vibration during solidification of metal ingots and casting effects thermal gradients, supercooling constituents and nucleation and can thus be applied to control grain size. 6 ref. (E25q)

315-E. (French.) Sand Casting of Light Alloys. Charles Roinet. Revue de l'Aluminium, v. 38, Jan. 1961, p. 113-122.

Sand casting of unalloyed Al and Al-Cu, Al-Si, Al-Mg and Al-Zn alloys. Influence of additions on corrosion properties. Melting techniques. Use of deoxidizing, degassing and refining fluxes. (E11; Al-b)

316-E. Forgeable Refractories With Micro-Grain Structure. Australasian Manufacturer, v. 46, Apr. 8, 1961, p. 54-56.

A combination of electron-beam processing and critical composition control reduces the grain size of cast W and Mo ingots to improve ductility and workability. Same technique is applied to alloys of Cb and Ta (90%) with W (10%). (E25q; Cb-b, Mo, Ta-b, W)

317-E. Production of Blackheart Malleable. Foundry Trade Journal, v. 110, Apr. 27, 1961, p. 523-533.

Molding, casting and annealing operations in production of malleable iron castings. Mechanical and physical properties as affected by composition. Manufacture of pearlitic malleable. (E-general; CI-s)

318-E. Cheaper Titanium Castings. Materials in Design Engineering, v. 53, May 1961, p. 9.

Process of Impel casting, in which a double melted Ti electrode is melted under vacuum and pushed into a steel die cavity, permits mass production of Ti impellers, valve bodies, fittings and pump housings and sleeves. (E13; Ti)

319-E. (Czech.) Die Casting. Slevarenstvi, v. 9, Feb. 1961, p. 60-62.

Effect of velocity of metal flow on surface quality and porosity. Formation of drops as a function of casting pressure, plunger velocity and shape of castings, factors which in their turn influence the flow velocity. Casting time depends on weight, density, cross section of gate and flow velocity. (E13)

320-E. (Czech.) Centrifugal Casting of Pressure Tubing. Jiri Neumann. Slevarenstvi, v. 9, Feb. 1961, p. 67-70.

Centrifugal casting in mold made from a synthetic sand mixture containing 6% of a binder and 4-5% of moisture and having a compression strength of 600-700 g. per sq. cm. and permeability of 250-300 units. The cast iron used contains 3.20-3.60% C, 1.8-2.4% Si, 0.6-0.8% Mn, 0.5-0.8% P and 0.06-0.1% S and is poured into the rotating mold at a temperature of 1290-1310° C. (E14; CI)

321-E. (Czech.) Quantitative and Qualitative Control of the Cupola Operation. Karel Jiranek. Slevarenstvi, v. 9, Feb. 1961, p. 70-72.

A charge composed of coke, raw iron, cast iron scrap, steel scrap, ferromanganese and limestone is processed in a cupola with forehearth of an ID of 850 mm. It is blown from six tuyeres of 120 mm.

diameter and six tuyeres of 50 mm. diameter. Metal temperature, C, Mn, Si, P, S and Cr contents as functions of the operation time. 3 ref. (E10a)

322-E. (Czech.) Manufacture of Large Kaplan Turbine Blades. Josef Ernst. Slevarenstvi, v. 9, Feb. 1961, p. 73.

A 6000 kg. blade is cast from CSN 422905 cast iron in a fire clay mold, dried by gas burners for 12 hr. at 400-450° C., allowed to stay for 12 hr. without heating and then held at 600-650° C. for 24 hr. The casting is heat treated. (E11, T7h; CI)

323-E. (French.) Application of Zirconium and Olivine Sand to Casting Steel and Cast Iron. Michel Jeancolas and Xavier Virolle. Fonderie, no. 182, Mar. 1961, p. 112-121.

Natural characteristics, physical and chemical properties and behavior of the sands during casting. (E18r)

324-E. Some Operational Details of a Large Electric Melting Shop. W. S. Walker and T. H. Harris. Iron and Steel Institute, Journal, v. 198, May 1961, p. 5-12.

Carbon steel and steel alloys containing C, S, P, Mn, Si, Cr and Fe are melted in an electric arc furnace. Data describe the slag process and the working procedure. (E10r; AY, CN)

325-E. Production of Sound Grey-Iron Castings. I. C. H. Hughes. Foundry Trade Journal, v. 110, May 4, 1961, p. 563-568.

Porosity, shrinkage and eutectic cell formation in gray-iron castings as affected by Si, Ti, C, P, S and Mn content, pouring temperature and cooling rate. 13 ref. (E25q; CI-n)

326-E. (Portuguese.) Melting Techniques and Their Effect on Copper Castings. Isaac Berezin. Boletim da Associacao Brasileira de Metais, v. 17, no. 62, 1961, p. 81-97.

The effect of hydrogen and oxygen absorption on the quality of castings is studied on test pieces cast from a Cu melt that was obtained without any protective addition or with charcoal or phosphor copper additions. Macrostructures and microstructures. Variation of the electrical conductivity with the P, Si, Fe, As, Be, Al, Ni, Mg, Sn, Zn, Ca, Cd and Ag contents. 9 ref. (E25, E10, P15g; Cu)

327-E. Investment-Cast Waveguide Components. Electronics, Oct. 7, 1960, p. 68-70.

Lost-wax casting of microwave waveguide components. (E15, T1)

328-E. How AC Spark Plug Die Casts Magnesium. S. L. Strong. Modern Metals, v. 17, May 1961, p. 48, 50, 52.

Melting and vacuum casting techniques. (E-general, 1-73; Mg)

329-E. (Japanese.) Influence of Temperature and Humidity on Friability of Mold Surface. Arao Kita and Tsuneyuki Okakura. Imono (Japan Foundrymen's Society, Journal), v. 33, Mar. 1961, p. 171-178.

Surface stability index and hardness of molds from sand mixes containing bentonite, fire clay, silica sand and up to 4% moisture after drying at 100-600° C. (E18)

330-E. (Japanese.) Measurement of Back Pressure Cavity Surface of Molds. Kazuro Suzuki and Hiroshi Yamaoka. Imono (Japan Foundrymen's Society, Journal), v. 33, Mar. 1961, p. 179-182.

Manometric measurement of back pressure from gas generated during pouring of molten alloy in a shell mold at 1570° C. Relation of back pressure to blow hole and cavity formation in castings. (E25)

331-E. (Japanese.) The Alloying Limit of Nitrogen in High Cr-Fe Alloys and in 20% Chromium Steels and Some Related Notes. Masazo Okamoto and Takeshi Naito. Japan Institute of Metals, Journal, v. 25, Feb. 1961, p. 120-124.

Effect of 0.1-1.0% nitrogen additions on fluidity, ingot soundness and porosity, microstructure, crystallization temperature and mechanical properties. Determination of maximum alloying limit of nitrogen in Fe-Cr-N alloys as a function of composition, particularly the content of minor components such as Ni and C and as a result of phase transformations. 11 ref. (E25, Q-general, 2-60; Fe-b, Cr, N)

332-E. Some Experiences With the CO_2 Process in the Production of Copper-Base Alloy Castings. G. W. Brown and C. B. Searles. British Foundryman, v. 54, May 1961, p. 205-208.

Effect of silicate content, gassing time and rammed density on the handling and knockout performance, compression strength and permeability

number of CO_2 molds for gunmetal castings. Silicate variation of silicate viscosity with temperature. 3 ref. (E19, E11; Cu-s)

333-E. The Fluidities of Some Cast Stainless Steels and Ni-Resist Cast Irons. A. M. Patton. British Foundryman, v. 54, May 1961, p. 208-211.

Determination of the effect of pouring temperature and superheat on the fluidity and casting quality of Ni-resist I and II, and on 18-8, 18-10, 13 Cr and Si steels, using a spiral run. 3 ref. (E25p; CI-q, SS)

334-E. Problem Castings and Some Success in Using Denseners. F. C. Baselow. British Foundryman, v. 54, May 1961, p. 211-215.

Pilot plant studies of the reduction of porosity in gray and malleable iron castings caused by slow cooling and variance in freezing by placing denseners in the mold. A mechanism is proposed for the origin of the gas, causing mold blowing in close proximity to the denseners. (E25, 9-68; CI-s)

335-E. Pattern-Flow Moulding at Soho and Tame Bridge Foundries. A. J. Shore. British Foundryman, v. 54, May 1961, p. 225-238.

Production of medium-sized gray iron castings utilizing the principle of pattern flow in green sand molding. Review of the steps in development from traditional loose pattern molding to flow production. 3 ref. (E17, E19a, E11; CI-n)

336-E. Developments at the Works of Hills Precision Die Castings, Ltd. Machinery (London), v. 98, May 17, 1961, p. 1151-1153.

Production of Zn alloy, Al alloy and Pb castings by die or gravity casting, using unit-sized dies. (E11, E12, E13, W19n; Zn-b, Al-b, Pb)

337-E. Semipermanent Mold Process Makes Aluminum Engine Castings. Automation, v. 8, June 1961, p. 86-88.

Coremaking, molding, casting and finishing operations in mass production of Al cylinder heads and blocks. (E12, E-general, L-general, T21b; Al-b, 17-57)

338-E. A New Concept of Mechanized Castings Production. Robert H. Herrmann. Foundry, v. 89, June 1961, p. 62-65.

Assembly line techniques for mass production of sand castings for automobile engine blocks including scheduling, molding, sprues and core handling. (E11, E-general, T21b)

339-E. What Causes Pinhole Porosity in Gray Iron? Ernest Haack. Foundry, v. 89, June 1961, p. 80-83.

Porosity in gray iron castings as related to oxidized shot-like particle, gas and graphite film formation and iron-mold compatibility. Effect of Al addition of Al on graphitization and microstructural homogeneity. 6 ref. (E25, N8s, 9-68; CI-n)

340-E. Gating Shell Mold Castings. P. J. Ahern and F. C. Quigley. Foundry, v. 89, June 1961, p. 84-87.

General principles governing the gating of green sand castings are applied to shell molding with modifications dependent on pouring arrangements and number of casting cavities. (E19, E22)

341-E. Carbon Sand Minimizes Penetration. Angelo Paoli. Foundry, v. 89, June 1961, p. 170-171.

Carbon sand, a molding material with a high carbon content, is used for reducing penetration and sand expansion defects on heavy gray iron castings. Comparative thermal expansion values are given for carbon and silica sands. (E-general, E18; CI, NM-f45, 17-57)

342-E. Composite Molds Developed for Shaw Process. Foundry, v. 89, June 1961, p. 176-181.

A microcrazed, reclaimable ceramic facing is used with silica sand backup material for mass production of Shaw process molds for metal casting. (E19)

343-E. Effect of Bismuth Mould Wash on Soundness, Structure and Properties of Grey Iron Castings. M. J. Clifford. BCIRA Journal (British Cast Iron Research Assoc.), v. 9, May 1961, p. 377-381.

Comparison of the effects of Te and Bi mold washes on the local unsoundness in gray iron castings shows that the Bi is equally effective and has less undesirable side effects. (E25q; CI-n)

344-E. Importance of Process Control in Producing Dross-Free Nodular Iron Castings. R. Barton and A. G. Fuller. BCIRA Journal (British Cast Iron Research Assoc.), v. 9, May 1961, p. 406-418.

Production of dross-free nodular Fe castings is achieved by careful control of the treatment process with Ni-Mg alloy, Mg-Si alloy and Mg ingot at 1390-1600° C. Recommendations are made for controlling residual Mg content, carbon equivalent value and casting temperature. Effect of desulphurization on incidence of dross defects. (E25; CI-r)

345-E. (French.) Casting of Vats for the Meat Packing Industry in A-G3 T. Journal d'Informations des Industries de la Fonderie, no. 124, Mar. 1961, p. 1-3.

Chill casting of large vats of 22 mm. wall thickness from A-G3 T steel, a corrosion resistant alloy containing 4% Be. (E22r, T29p; AY, 17-57)

346-E. Calculating Risers for Steel Castings. F. J. Drake. Castings, v. 7, Mar. 1961, p. 15, 17.

Position, shape and size of risers for sand casting of steel are determined in relation to casting surface area, volume and freezing rate. 6 ref. (E22q; ST)

347-E. Recent Developments in Die Casting by the Alumasc Low-Pressure Process. R. E. Green. Machinery (London), v. 98, Apr. 26, 1961, p. 953-958.

Equipment, layout and operation of die casting foundry for the production of Al alloy automotive castings by a low-pressure process. Design and operation of induction furnaces and dies. (E13, 3-74, T21; Al-b, 5-61, 17-57)

348-E. Developments in the Pressure Die Casting of Steel. V. M. Belov and S. A. Kazennov. Machinery (London), v. 98, Apr. 26, 1961, p. 958-963.

Design and operation of the die and induction furnace. Effects of injfection pressure, plunger speed, vacuum method and gate depth to casting thickness ratio on mechanical properties of castings. (E13, Q-general; ST, 5-61)

349-E. Sound Waves Improve Diecasting Quality. Australasian Manufacturer, v. 46, May 6, 1961, p. 54-59.

Vibration techniques are used to improve density, microstructure and mechanical properties of die cast Al and Zn alloys. Vibration breaks up and refines the dendritic structure during solidification, allowing the remaining molten metal to completely fill the spaces between adjacent arms of crystals. (E25q, E13; Al-b, Zn-b)

350-E. (Spanish.) Casting in Sand Molds Containing Plastics. Pt. 2. D. Iturrioz. Metalurgia y Electricidad, v. 25, Mar. 1961, p. 77-85.

Permeability and thermal conductivity of molds containing plastic binders. Effect of mold composition on the quality of toolsteel, Alnico brass and mild steel castings. (E11; Al-b, CN, Cu-n, Ni-b, TS)

351-E. Casting High Integrity Steel. Modern Castings, v. 39, Apr. 1961, p. 40-44.

High integrity casting process for producing uniform, reliable, high-strength castings suitable for aircraft and missile applications. Three-stage heat treatment is used to produce ultra-high strength. (E-general, J-general, T24; ST, 5)

352-E. Melting Practise for Aluminum Die and Permanent Mold Casting. Donald Colwell. Modern Castings, v. 39, Apr. 1961, p. 50-54.

Alloy composition, chemical activity of Al and melt agitation and moisture content as they affect melting practice. 28 ref. (E10, E12, E13; Al-b)

353-E. Cast Steel Nonmetallic Macroinclusions Sources and Prevention. R. A. Flinn, W. B. Pierce and L. H. VanVlack. Modern Castings, v. 39, Apr. 1961, p. 57-61.

Research indicates that use of a whirl gate trapping system and alumina or magnesia refractories eliminates the type of macroinclusions composed of corundum crystals in a glassy silicate groundmass. (E25q; ST)

354-E. Refractories as Sources of Macroinclusions. L. H. VanVlack, J. E. Brokloff and R. A. Flinn. Modern Castings, v. 39, Apr. 1961, p.62-71.

Evaluation of four principal types of refractories, silica, fireclay, alumina

and magnesia, for their stability in the presence of molten steel. Effect of metal composition, contact time and temperature on the molten metal-refractory reaction. (E25q; ST)

355-E. Copper-Base Casting Alloys. R. A. Flinn and H. Kunsmann. Modern Castings, v. 39, Apr. 1961, p. 72-84.

Investigation of the castability of Ca-base alloys 80-10-10, 85-5-5-5, 88-8-0-4, Al bronze, Mn bronze, silicon brass and nickel silver. Using a test bar, the variation in density, leakage, microstructure and mechanical properties is measured as a function of position in the bar. Solidification patterns as shown by cooling curves and drainout experiments. (E25p; Cu-b)

356-E. Heavy White Iron Section Casting and Annealing. R. W. Heine, T. W. Mueller and J. W. Widmeyer. Modern Castings, v. 39, Apr. 1961, p. 85-92.

Casting heavy sections in white iron and annealing them to malleable iron. Chemical analyses of Fe and additions to the melt for casting heavy sections such as white iron with no mottle spots on a fractured surface. Time-temperature requirements for annealing sections to produce malleablized iron. Use of Ce for prevention of mottling. 5 ref. (E25; CI-p)

357-E. Permanent Mold Design. John Wall. Modern Castings, v. 39, Apr. 1961, p. 103-104.

Advantages of the permanent mold process. Gating and risering design, usage of mold coatings and shrinkage factors. Automotive applications of the process. (E12)

358-E. (Italian.) Suggestions for the Melting of Copper-Chromium Alloys. Fonderia, v. 10, Apr. 1961, p. 137.

Crucible melting of Cu-0.9% Cr alloys with surface protection of the melt by coal powder, glass or a mixture of Na and Ca fluorides and rapid heating and deoxidation with Cu-Mn, Li or Zn. Castings are poured at 1120-1130° C. with subsequent heat treatment. (E10p, E25; Cu-b, Cr)

359-E. (French.) Melting of Copper Alloys. Journal d'Informations Techniques des Industries de la Fonderie, no. 125, Apr. 1961, p. 3-5.

The structure resulting after solidification is investigated by the casting of test pieces in refractory molds. The piece is allowed to cool to 600° C. and then water quenched. The fracture allows conclusions on grain size, oxidation, impurities and gas absorption. (E10, M27c, R1h, 9-51; Cu-b, 5)

360-E. Hills New Die-Casting Foundry. Foundry Trade Journal, v. 110, May 11, 1961, p. 605-608.

Pressure die casting, machining, polishing and plating facilities are described, including equipment for the manufacture of Al alloy castings and for plating with Cu, Ni, Cr, brass, Au and Ag. (E13, L17, 1-53; Al-b)

361-E. (Italian.) Some Unusual Materials Used in Forming and Casting. Fonderia, v. 10, Mar. 1961, p. 111-114.

Sillimanite, mullite, forsterite, olivine, glauconite and exothermic materials as addition agents to sand for casting light alloys (Zn, Al, Mg, Cu and Ni). (E18p, E11, NM-f45; Zn, Al, Mg, Cu, Ni)

362-E. Changes Speed Casting Process. Steel, v. 148, June 19, 1961, p. 106-107.

A composite mold has a low cost sand type backing with a special ceramic facing. Reduced burnoff cycle time required may permit mass production of precision castings by the Shaw process. (E15, E19)

363-E. Vacuum Die Casting--A New Evaluation. Modern Castings, v. 39, June 1961, p. 56-58.

Problems encountered when applying vacuum to pressure die casting. Advantages such as reduced pressure, porosity, oxidation and improved surface. Design problems in equipment including vacuum pumps, molds and hot and cold chamber machines. (E13, 1-73)

364-E. Solidification of Gray Iron. H. D. Merchant and J. F. Wallace. Modern Castings, v. 39, June 1961, p. 63-72.

Mold wall movement, carbon equivalence, solidification behavior and cooling curves as influenced by inoculation. 24 ref. (E25n; CI-n)

365-E. Cast Metals and Cast Shapes. J. B. Caine. Modern Castings, v. 39, June 1961, p. 73-79.

Specifications for castings having improved fatigue life, greater load carrying ability and reduced stress concentrations due to modifications in design. 6 ref. (E-general, 17-51)

366-E. Inoculation Influence on Gray Iron Structure at Various Carbon Equivalences. H. D. Merchant, L. I. Toriello and J. F. Wallace. Modern Castings, v. 39, May 1961, p. 109-116.

Comparison of eutectic cell size, graphitic structure, matrix and hardness in inoculated and uninoculated hypo and hypereutectic gray irons. 10 ref. (E25q; CI-n)

367-E. (Spanish.) Hot Cracking of Cast Steel. Kurt Beckius, Meton C. Flemings and Howard F. Taylor. Instituto del Hierro y del Acero, v. 14, Jan. 1961, p. 10-26.

Carbon steel containing 0.25-0.51% carbon is cast into tensile samples at a casting temperature of 1600-1704° C. to study the effects of composition, casting temperature and compression strength of sand on hot cracking, pipe and microstructure. 10 ref. (E25, 2-60, 2-61, 9-72; CN)

368-E. Reclaimable Composite Molds Automate Casting Lines. Iron Age, v. 187, June 15, 1961, p. 108-109.

Combined development of a reclaimable ceramic-faced sand mold and a more rapid bakeout process permits precision casting at mass production costs. (E15, W19g)

369-E. (Dutch.) New Developments in the Foundry Industry. W. M. Hogendorn. Polytechnisch Tijdschrift, v. 16, Mar. 10, 1961, p. 181b-182b.

Review of new ferritic and nodular irons including casting technology and solidification phenomena, chemical reactions between mold and metal surface and gas absorption. Survey of applications including in cast water pipe and hydraulic clutch wheels for ships. (E-general, T-general, 17-57; CI-r, 10-54)

370-E. New System for Producing Bath Castings. Harvey Berman. Mechanical Handling, v. 48, May 1961, p. 280-286.

Study of a high-speed jolt molding system which combines three systems to produce raw castings for today's baths; melting of metal; preparation of the mold and pouring; sand conditioning. (E19, E-general, 1-52)

371-E. Slip Casting of Metal Powders and Metal-Ceramic Combinations. Henry H. Hausner and Arnold R. Poster. Paper from "Powder Metallurgy". Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 461-506.

Factors found to influence the stability of the slip and of the resulting casting are: liquid-to-metal ratio, type and amount of binders and deflocculants, particle morphology, oxide content of the powder and agitation speed and time and stability of the slip with time. Examples of the effects of a number of these variables are given using slips made with stainless steel, Mo and W powders. 48 ref. (E16; Mo, SS, W, 6)

372-E. Freeze Casting Titanium Carbide. E. M. Grala. Paper from "Powder Metallurgy". Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 507-524.

Method of casting full-size cermet turbine blades from TiC. An extremely thick slip of TiC is prepared by mixing TiC powder with a small amount of binder. The slip is then cast into a mold by vibration, centrifuged and frozen to retain the shape of the mold. The casting is then dried in an absorbent sand and vacuum sintered. The prepared porous TiC turbine blades are of good appearance and free of flaws. (E16, T7h; Ti, 6, 14-68)

373-E. What's New in Malleable? Foundry Trade Journal, v. 110, May 1961, p. 655-660.

Summary of proceedings at Birmingham University Conference, Apr. 27 and 28. Topics include mechanism of graphitization including growth of temper-carbon nodules, mechanical and physical properties of blackheart and pearlitic malleable iron as a function of composition, heat treatment and quenching, and quality control in production. (E25n; CI-s)

374-E. (Spanish.) Molds Containing Plastic Binders. Pt. 1. D. Iturrioz. Metallurgia y Electricidad, v. 25, Feb. 1961, p. 75-85.

Review of analysis of sands and resin used in shell molding. Strength of mold and of the outer crust of solidified metal as a function of the time elapsed after

pouring. (E19c, W19g; NM-d34, NM-f45)

375-E. Surface Fine-Structure of Castings. W. Patterson and P. Schneider. Forschungsberichte des Landes Nordrhein-Westfalen. no. 962, 1961, p. 3-4.

Test casting of GAlSi 12 alloy and cast iron in molds of varying sand conditions. Surface quality of castings as influenced by molding sand, casting temperature and material properties such as surface tension using a mechanical and a pneumatic surface measuring device. (E25q; Al-b, Si, CI)

376-E. Which Core Process in the Non-Ferrous Foundry? C. E. Coulter. Current Engineering Practice, v. 3, Mar. 1961, p. 31-32.

Use of oil-sand, phenolic resin, CO_2 and baked urea cores in brass, Al and Mg foundry practice. Choice of core is influenced by cost, finish required, size of the casting and the dimensional accuracy specified. (E-general; Al, Cu-n, Mg)

377-E. Gating Zinc Die Castings. Ralph Wilcox. Precision Metal Molding, v. 19, June 1961, p. 39-41.

Design and application of several types of gate and runner systems with specific use in die casting circular or tubular Zn automobile parts. (E22p, E13, T21; Zn, 17-57)

378-E. Criteria for Using Investment Castings. Precision Metal Molding, v. 19, June 1961, p. 69-71.

Investment casting of a variety of shapes from Al, Co, Cu, Be, Cu or Mg alloys, carbon steels, stainless steels and other alloys. Design criteria are given for size, dimensional tolerances and surface finish of the castings. (E15, 17-51; Al, Cu-b, Co, Mg-b, Be, ST)

379-E. (Spanish.) Aluminum Castings. Pt. 4. D. Iturrioz. Metalurgia y Electricidad, v. 25, Jan. 1961, p. 173-182.

Effects of melt temperature, holding time, inoculation with Ti and B compounds, solidification velocity and overheating on grain size, mechanical properties and tightness of Al alloy castings. (E25, M27c, Q-general; Al-b)

380-E. Casting 10,000-lb. Pump Impellers. Western Machinery and Steel World, v. 52, June 1961, p. 52.

Casting of high silicon-manganese-bronze pump impellers using a special cope with arbor fabricated from steel H-sections and pipe. Metal is bottom poured at 1850° F. (E-general; Cu-s, Mn, Sn)

381-E. Advanced Foundry Techniques Can Save Money in Production of Large Marine Castings. Western Machinery and Steel World, v. 52, June 1961, p. 53-54.

Prevention of defects in large castings may be accomplished by studying design contours to determine solidification centers, use of feeding heads or chills and employing various methods of mold collapse. (E25)

382-E. Risering Shell Mold Castings. P. J. Ahearn and F. C. Quigley. Foundry, v. 89, July 1961, p. 65-67.

Comparison of data on solidification time versus volume surface area ratio for Al, nodular iron, gun metal and steel castings poured in sand or shell molds. Suggested risering procedures for various solidification rates. 8 ref. (E22q, E16c; Al, Cu-b, CI-r, ST)

383-E. Casting Small Parts of Refractory Metals. A. R. C. Westwood. Foundry, v. 89, July 1961, p. 68-71.

Development of a method specifically for casting of Ti parts. A solid Ti block is melted by a tungsten arc until the molten pool is of sufficient diameter after which the underside of the block is melted and the melt falls into a mold mounted directly beneath. 5 ref. (E10r, E-general; Ti)

384-E. Use of Chills in Casting Steel. Thomas E. Rieger. Foundry, v. 89, July 1961, p. 100, 102.

Use of chills to control solidification in steel castings. Data are given for composition, size, shape, location and type. (E16; ST)

385-E. Large Work Simplified With CO_2 Cores. William M. Flint. Foundry, v. 89, July 1961, p. 117, 118, 120.

Ball, socket and gland castings for a steel ball joint assembly are produced to close dimensional accuracy by the CO_2 process. (E21; ST)

386-E. A New Type of Lightweight Cellular Material. L. Polonsky. Pitman-Dunn

Laboratories Group (Frankford Arsenal). U. S. Office of Technical Services, PB 161770, Apr. 1960, 66 p. $1.75.

Experimental foundry process for the casting of Al-base cellular metal with a void volume of up to 70%. Process consists of preparing a refractory mold, filling the mold with soluble granules which correspond to the size and shape of the pores desired in the metal and then infiltrating the molten metal into this soluble aggregate. After leaching with a suitable solvent the metal has a void structure of interconnecting cells which correspond to the shape and size of the soluble aggregate. (E16; Al)

387-E. Facets of Pressure Die Design. W. Goode. Metal Industry, v. 98, June 16, 1961, p. 471-475.

Examination of problems encountered in designing and pressure die casting of gearbox extension die. Precision and absence of distortion of the product is achieved by special methods. (E13, T21c)

388-E. (Russian.) Intensification of the Melting Process During Delivery of Oxygen Into the Hearth of a Cupola Furnace. I. S. Matveenko and I. A. Zotkin. Izvestiya VUZ--Chernaya Metallurgiya, Feb. 1961, p. 133-137.

Investigation of a new method of blowing oxygen into the hearth of a cupola furnace for melting Fe. Influence on output, maximum temperature time, metal losses by burning, reduction action on the Fe, ferric oxide content in the slag and refractories deterioration. 9 ref. (E10a; Fe)

389-E. Wetting Agents in the Foundry. Australasian Manufacturer, v. 46, May 20, 1961, p. 90-93.

Controlling moisture content of molding sand with surface active agents which allow the use of less water. Effect of moisture content on flowability, workability, moldability, green strength, cohesion and adhesion. (E18r)

390-E. (Russian.) Production of Cast Iron-Magnesium Alloy in a Cupola Furnace. S. F. Gorbunov and M. M. Levitan. Liteinoe Proizvodstvo, Mar. 1961, p. 1-4.

Development of a method for melting cast iron-Mg alloys for casting machine parts for automobiles, tractors, etc., to replace malleable cast iron, some steels and pearlite cast iron of high strength and wear resistance. Instructions for preparation of a Fe-Si-Mg alloy by using liquid Fe-Si. (E10a, E-general, T21, T3n; CI, Mg)

391-E. (Russian.) Technology of Centrifugally Casting a Sleeve. A. A. Svarika. Liteinoe Proizvodstvo, Mar. 1961, p. 8-9.

Centrifugal casting of lead-bronze and brass sleeves, mold handling methods, optimum melt temperature, formula for turning speed of mold during casting, mold treatment after solidifcation. (E14, E-general, T7; Cu-n, Cu-s, Pb)

392-E. (Russian.) Drying Cores by Burners With Infrared Radiation. A. M. Levin and O. N. Bryukhanov. Liteinoe Proizvodstvo, Mar. 1961, p. 10.

Small cores made of a sand, loam and dextrine mixture and containing 8.5% moisture are dryed with infrared radiation delivered by ceramic plates which are heated to 900° C. by gas burners. (E21, W19g)

393-E. (Russian.) Scale Formation and Decarburization of Investment Castings. V. N. Ivanov and A. V. Baranov. Liteinoe Proizvodstvo, Mar. 1961, p. 19-21.

Methods and equipment for investigating scale formation and depth and speed of decarburization of investment castings in neutral atmosphere, low melt temperature and different cooling media. (E25, 1-52; 5-62, 9-52)

394-E. (Russian.) Process of Gas Formation in Dry Foundry Molds and Cores. A. F. Spasskii and A. A. Ryzhikov. Liteinoe Proizvodstvo, Mar. 1961, p. 22-24.

Development of formulas for theoretical calculation of the quantity of gas formed during filling of foundry molds with metal taking in consideration the thermo-physical properties of the metal, foundry sand for the mold and core and physical-chemical properties of the binder. Experiments show that calculations which make use of the formulas are correct. 7 ref. (E-general)

395-E. (Japanese.) Effect of Deoxidation and Desulphurization on the Nodular Graphite Formation in Cast Iron. Hiromu Tanimura and Shinjiro Wakuri. Imono (Japan Foundrymen's Society, Journal), v. 33, May 1961, p. 327-335.

Cast iron melts prepared from scrap, charcoal and FeSi and melted under reducing slag containing CaC_2 are inoculated with CaF_2, MgF_2 and CaSi mixtures to determine the effectiveness of the inoculants in producing nodular graphite formation as a function of oxidation and desulphurization phenomena. Nodular graphite formation is related to supercooling mechanisms as a function of oxygen and sulphur contents. 9 ref. (E25g, D11n, D11r, 2-60; CI-r, AD, 17-57)

396-E. (Japanese.) Study of Castings Solidified Under Impact and Pressure. Masataka Sugiyama. Imono (Japan Foundrymen's Society, Journal), v. 33, May 1961, p. 347-354.

Mechanical properties, porosity and microstructures determined for pure Al and Al and Cu-base alloys cast in shell and sand molds with pressure and impact applied during solidification. Effect of impact and pressure on solidification mode. 7 ref. (E25n, M27, N12, P10, Q-general, 3-68, 3-74; Al-b, Cu-b)

397-E. (Japanese.) A Study on the Centerline Shrinkage and Mechanical Properties of Steel Castings. Satoru Okazoe and Kyozo Yahagi. Imono (Japan Foundrymen's Society, Journal), v. 33, May 1961, p. 355-362.

Investigation of the lateral distribution of centerline shrinkage and related mechanical properties of cast plate, bar and hollow cylinder carbon steel specimens. Data are given for tensile and fatigue strength as a function of casting soundness and specimen dimensions. 4 ref. (E25, P10c, Q-general; CN-g, 5)

398-E. Practical Foundry Testing. E. Heap. Castings, v. 7, May 1961, p. 9, 11, 13, 15.

Sand testing, including moisture and permeability, compressive, shear and tensile strength, deformation and hardness. Metal tests include temperature measurement and chemical composition and physical properties. Tests on furnace and ladle lining materials. (E18r, E-general, 1-54)

399-E. Effect of Tuyere Size on the Performance of a Cold Blast Cupola. H. J. Leyshon, R. B. Coates and K. E. L. Nicholas. Iron & Steel, v. 34, July 1961, p. 344-348.

Experiments on cupola performance using a wide range of blast velocities and operating with 2, 4, 6 and 9 in. diameter tuyeres. Cupola performance is assessed in terms of melting rate, metal temperature and metal quality as indicated by chemical composition and casting properties. (To be continued.) (E10a, W18d)

400-E. Works of Hills Precision Die Castings, Ltd. R. E. Green. Machinery (London), v. 98, June 28, 1961, p. 1485-1492.

Layout and operations in a pressure die casting plant including Zn and Al foundries and machine, polishing, plating and assembly shops. Method of production and quality control. (E13, G17, L10, L17, L25g, 1-52; Al, Zn, 5-61)

401-E. (Russian.) Excavator Cable Drum Cast in Chill Molds. A. V. Kochetkov. Liteinoe Proizvodstvo, Dec. 1960, p. 9-10.

Chilling method and sand technology for casting Fe drums in upright mold assembly. Effect of technique on mechanical properties of castings. (E22r, E18, T28h; Fe)

402-E. (Russian.) Processes at the Metal and Mold Boundary. M. N. Bogdanovski and V. I. Repkina. Liteinoe Proizvodstvo, Dec. 1960, p. 30-32.

Investigation of chemical, mechanical and thermal processes on the mold-metal interface for obtaining metal surfaces free from burned-on sand, to improve appearance and machinability and to lower production costs of Fe and steel castings. Studies of macroscopical and microscopical samples showing formation of quartz grains, fayalite and tridinite. Equilibrium diagram of SiO_2-FeO from 1200 to 2000° C. (E25, M-general; Fe)

403-E. (Translation-Brutcher no. 5044.) Segregation in Centrifugal Steel Castings. N. N. Reutov. Liteinoe Proizvodstvo, Jan. 1960, p. 35-36.

Previously abstracted from original. See item 263-E, 1960. (E14, E23, E25q; ST)

404-E. (Translation-Brutcher no. 5137.) Electroslag Remelting of Roller Bearing

Steel for Improved Quality. Pt. 2. I. Petram and I. Kasik. Hutnicke Listy, v. 15, Nov. 1960, p. 842-851.

Previously abstracted from original. See item 89-E, 1961. (E10, E25; ST)

405-E. (Translation-Brutcher no. 5075.) Electroslag Remelting of Roller Bearing Steel for Improved Quality. Pt. 1. I. Petram and I. Kasik. Hutnicke Listy, v. 15, Nov. 1960, p. 839-842.

Previously abstracted from original. See item 89-E, 1961. (E10r; ST)

406-E. (Japanese.) Back Pressure of Shell Molds for Steel Castings. Kazuro Suzuki and Hiroshi Yamaoka. Imono, (Japan Foundrymen's Society, Journal), v. 33, Apr. 1961, p. 253-259.

Low-carbon steel is cast in shell molds having different contents of phenolic resin binder and with different backup materials to determine conditions for occurrence of blowholes and in particular, factors causing back pressure. Investigations are made of gas generation from heated phenols as a function of phenol content, effect of variation in thickness of the molds and grain size of the sand and influence of the nature of the backup material on back pressure. (E16c, 3-74, 9-68; CN-g)

407-E. (Japanese.) Study of Adsorption Phenomena of Spheriodal Graphite Using Radioisotopes. Hiromu Tanimura, Kimio Matsuda and Shinjiro Wakuri. Imono (Japan Foundrymen's Society, Journal), v. 33, Apr. 1961, p. 260-265.

The mechanism of nodular graphite formation in cast iron, in terms of adsorption of nodulizing agents on graphite nodules, is investigated by adding $Ca^{45}Si$ and metallic Ce^{141} to molten Ni-1.87% C. alloys with resultant structures being examined by autoradiography and metallographic methods. The agents are not absorbed on the graphite nodules and are enriched in the eutectic structures formed between the nodules. 10 ref. (E25q, 1-59; Ni-b, C)

408-E. (Japanese.) Inoculation of Vacuum-Metal Iron. Masuteru Maruyama. Imono (Japan Foundrymen's Society, Journal), v. 33, Apr. 1961, p. 266-271.

Investigation of the role of deoxidation and desulphurization mechanisms in spheroidal graphite formation in cast iron. Comparison of effects of Fe-Si and Ca-Si inoculants as spheroidizing agent. (E25q, D9r, 1-73, D11; CI, AD, 17-57)

409-E. (Japanese.) Flow and Solidification of Aluminium in a Modified Channel. Goro Ohira and Mahito Koizumi. Imono (Japan Foundrymen's Society, Journal), v. 33, Apr. 1961, p. 277-281.

Pure Al and 1.6% Si-Al alloy are cast from 700-750° C. into a straight narrow channel attached to a small well to investigate relations between distance of flow and temperature variations in the running metal. Solidification phenomena are observed as influenced by the chilling action of the lower temperature metal on the metal of higher temperature. (E25r, E25p, 2-61, E22; Al-b, Si)

410-E. Which Aluminum Casting Process? W. R. Butler and S. L. Fahnestock. Modern Metals, v. 17, June 1961, p. 42, 44, 46.

Evaluation of advantages and limitations of sand, plaster mold, permanent mold and die casting of Al and Al alloys. (E-general; Al)

411-E. New Casting Procedure Perfected for Titanium. Modern Metals, v. 17, June 1961, p. 54.

Ti castings up to 148 lb. with dimensions of 72 x 36 x 24 in. are produced by permanent mold casting process called Impel casting. Process relies on fluidity of Ti in production of high-strength, accurate, intricate and stable parts such as impellers. (E12; Ti)

412-E. Vacuum Process Produces Super Purity Die Castings That Can Be Anodized. Modern Metals, v. 17, June 1961, p. 58, 60.

Al die castings of 99.99% purity are produced in a furnace which melts, degasses and holds the metal which is subsequently automatically siphoned into an injection chamber of a die casting machine. Applications. (E13, 1-73, 1-52; Al, 5-61, 17-57)

413-E. What's Needed to Make Vacuum Die Casting Work Properly. Earle Rearwin. Modern Metals, v. 17, June 1961, p. 60, 62, 63.

Experimentation with Al and other metals to determine factors required for successful vacuum operation. Results indicate vacuum must be present during entire casting cycle. Additional conditions are outlined. (E13, 1-73; Al)

414-E. Low Pressure Casting Process Produces Integral Wheel-Brake Drum Assembly. F. H. LeJeune. Modern Metals, v. 17, June 1961, p. 64, 66.

Nonporous wheel hub and drum are produced by submerging an Fe liner in a 1400° F. bath of 99.5% Al until an Fe-Al alloy of 0.008-0.001 in. thickness is formed on the surface of the Fe liner. The liner is removed from the bath and placed in the mold which is then filled with Al alloy at about 1400° F. (E12, 3-74, T21c; Al-b, Fe)

415-E. Measurement of Epoxy-Resin Mixes. M. Callaghan. Foundry Trade Journal, v. 111, July 6, 1961, p. 9-13.

Method for quantitative measurement of various constituents used in production of epoxy-resin patterns involves estimating weight of gross quantity, estimating quantity of each constituent and estimating amount of acceleration. (E17)

416-E. Control of Product Quality. Frank Nixon. Foundry Trade Journal, v. 111, July 6, 1961, p. 15-19.

Specification and inspection of specified standards; causes and elimination of nonconformance and economy of operation in control of foundry product quality. 7 ref. (E25, S22)

417-E. Plastic Resins Seal Castings to Take High Pressures. Iron Age, v. 188, July 20, 1961, p. 98-99.

Sealing of Al, Mg and other metal castings using plastics such as diallylphthalate polyester. The process is applicable to parts such as filter housings, valves and casings, cylinder liners and aircraft fuel control systems. (E25n, L26p; Al, Mg, 5)

418-E. CO_2 Process and Die-Casting in Brazil. D. C. Nevin. Foundry Trade Journal, v. 110, June 29, 1961, p. 821-830.

Preparation of sand molds and cores and their use in CO_2 gravity and pressure die casting of a variety of parts used in the production and distribution of gas and electrical power. (E-general, W11)

419-E. Gating Permanent Mold Aluminum Alloy Castings. George Bier. Foundry, v. 89, Aug. 1961, p. 38-41.

Description of types of permanent mold gating systems; proper gating design. 6 ref. (E22p; Al-b, 5)

420-E. Casting Ingot Molds and Stools. R. C. Harrell. Foundry, v. 89, Aug. 1961, p. 42-47.

Mold and pattern equipment, sand preparation, sand ramming, pattern removal, coremaking, stool making, preparation for pouring and pouring operation, shakeout, chipping and cleaning and chemistry of hot metal. (E-general, W19c, W19e)

421-E. Handling and Control of Metal for Aluminum Diecastings. F. William Foss. Foundry, v. 89, Aug. 1961, p. 56-59.

Ingot specifications, metal handling, melting technique, melt agitation, fluxing and maintenance of correct metal temperature. (E-general, A5a, S22; Al, 5-61)

422-E. Controlled Cooling of Castings. Foundry, v. 89, Aug. 1961, p. 96-97, 99-100.

Ductile iron foundry line provides for automatic production and handling of tractor and implement castings. Layout consists of a variable speed mold conveyor and traveling transfer bridges all operated by a programming console. Castings are cooled while still in the mold. (E-general, 1-52)

423-E. British Foundry Conference. M. M. Hallett. Foundry, v. 89, Aug. 1961, p. 124, 126, 129-132.

Topics discussed at the annual conference of the Institute of British Foundrymen at Cheltenham, May 15-18, 1961 include metal feeding techniques, high phosphorous iron, mold stability, structure and properties of gunmetals, plant maintenance problems and Fe foundry planning, melting, heat treating cast irons, impact testing of cast iron, influence of trace elements, permanent molding, die casting machines, vacuum die casting, vacuum investment casting, shell molding Cu-base alloys and chilling. (E-general)

424-E. Investment Casters Study Metal Solidification. Wallace D. Huskonen. Foundry, v. 89, Aug. 1961, p. 156, 158-159.

Fundamentals of melting and solidification of metals, gating and risering of investment castings, cause and prevention of hot tearing in investment castings, heat transfer and metal-mold reactions. (E25n, E10, E22; 5-62, 9-71)

425-E. (Czech.) Refining of Aluminum Alloys. Vladimir Malik. Slevarenstvi, v. 9, May 1961, p. 170-171.

Removal of Al_2O_3 from molten Al-Si, Al-Cu and Al-Mg alloys by addition of AlSiL 680, 713, 750 or ALMAG salt mixtures containing lime, soda, potash, chlorides, fluorides, hexachlorethane, cryolite, sodium sulphide and borax previous to modification and inoculation. 16 ref. (E25, 9-69; Al-b, Si, Cu, Mg, AD-n, 17-57)

426-E. (Czech.) Use of Calcium Carbide in Cupolas of the TMA Foundry, Hodonin, Czechoslovakia. Josef Lampard. Slevarenstvi, v. 9, May 1961, p. 175.

Operation of a 7.5 ton cupola furnace with forehearth. A metallic charge composed of 55% pig iron, 10% ingot mold scrap, 5% cast iron scrap, 6% steel scrap and 20% returns is melted with a quantity of CaC_2 amounting to 1.9% of the metallic charge. Development of a greater slag quantity showing the tendency to adhere on the tuyeres, increased wear of the lining and formation of slag residues in the cupola are observed as a function of CaC_2 content. (E10a, E25, 2-60; CI, AD-n, 17-57)

427-E. (Czech.) Metal Penetrations in Steel Castings and How to Avoid Them. Leo Rotter. Slevarenstvi, v. 9, May 1961, p. 175-178.

Metal penetration is eliminated by using mold and core mixtures containing additions of MgO, Cr_2O_3, CaO and FeO showing high thermal conductivity. 5 ref. (E18a, E25, 9-69; ST)

428-E. (Czech.) Alcohol Hardening of Molds and Cores. Drahomir Suchomel. Slevarenstvi, v. 9, May 1961, p. 179-180.

Hardening of molds and cores containing waterglass by spraying or painting with, or immersion in, methanol or ethyl alcohol of high concentration. By addition of 10% OB resin to the alcohol 15 times higher hardness is obtained. After hardening, the excess alcohol is removed by drying at 20-200° C. or by burning. (E18, E19, E21)

429-E. (Czech.) Use of CaC_2 in Cupola Charges of the Foundry "N.p. Prerovske Strojirny," Prerov, Czechoslovakia. Alois Soslik. Slevarenstiv, v. 9, May 1961, p. 184-185.

CaC_2 is added to a cupola charge in quantities of 0.1-1% of the metallic charge to study the effect on slag composition, temperature and Fe composition. (E10a, E25q; CI, AD-n, 17-57)

430-E. (Czech.) Difficulties in the Manufacture of Heavy Steel Castings With Bentonite Molding Mixtures. Vaclav Lupac and Vaclav Kyba. Slevarenstvi, v. 9, May 1961, p. 186-188.

Elimination of metal penetrations in green sand casting by selection of optimum mold composition, facing with dextrin or sulphite solutions and by using special molding mixtures in heat exposed sections of the mold; for example, a mixture of crushed magnesite bricks, bentonite, dextrin, clay and soda. (E19, E-general; ST, NM-f45, 17-57)

431-E. Special Heating Requirements in Production of Precision Investment Castings. Edward M. Broad. Industrial Heating, v. 28, July 1961, p. 1278-1282, 1284.

Plant layout and operations for melting, curing the investment molds, investment casting and heat treating of the finished castings. Design of furnace. (E15, E-general, J-general, W18, W27, 17-51; 5)

432-E. (French.) Foundry Oxidation Loss for Copper Alloys. Influence of Charge Composition and Melting Conditions. P. J. Le Thomas and D. Arnaud. Revue de Metallurgie, v. 58, May 1961, p. 437-445.

Using shaped foundry ingots reduces oxidation losses while the quality and uniformity of the product are greatly improved. Handling and storage of the ingots are facilitated and melting time is shortened. 7 ref. (E10; Cu-b)

433-E. Inserts in Light-Metal Castings. Russell H. Garner. Machine Design, v. 33, Aug. 3, 1961, p. 97-98.

Design parameter for combining several types of inserts (shafts, bearings and sleeves) with light metal castings. Inserts are composed of mild steel, toolsteel, Cu, brass, stainless steel and Al alloy and can be plated with Ni, Cr or Cu. (E-general, Ni, Cr, Cu-b, Al, ST, 7-59)

434-E. Desulfurization by Calcium Inoculation Improves Properties of Cast Steel. D. A. Colling and P. J. Ahearn. Watertown Arsenal (WAL TR 311/45). U. S. Office of Technical Services, PB 171384, Jan. 1961, 23 p.

Mechanical properties of high-strength steels can be increased by new methods of lowering the sulphur content to between 0.001-0.002% through inoculation of Ca (Ca-Mn-Si) under conditions of high slag basicity. Broken tensile bars of 4325 and 4340 steels that were desulphurized show improved ductility and toughness over normal sulphur steels at the same strength levels. (E25q, D11n, Q-general, 2-60; ST)

435-E. Core Production in Hot Boxes at the Renault Works. P. Fasson. British Foundryman, v. 54, July 1961, p. 309-319.

Definition and evaluation of the hot box core production process. Specification of sands bound by hot box hardenable binders. Technology of the process including filling and heating the boxes, stripping the core and mass production units. Use of hot box coring in the production of other cores and mold parts. (E21)

436-E. The Effect of Running Conditions on the Reproductibility of Melting Results in Cupolas. F. Neumann and W. Patterson. British Foundryman, v. 54, July 1961, p. 320-331.

Factors affecting reproducibility of melting results are examined and remedies suggested. Influence of blast volume and coke charge on melting results. Optimum running conditions with particular attention to Fe temperature. Influence of coke condition and coke properties relative to the running of the cupola. 25 ref. (E10a)

437-E. Progress at International Combustion Ltd. Foundry Trade Journal, v. 110, June 22, 1961, p. 789-797.

Foundry layout, equipment and operations at Derby, England. New installations include a mechanical cupola charging-plant, coreshop and mold-drying ovens, an electric furnace and a castings cooling conveyor. (E-general, 1-52)

438-E. New Zinc Die Casting Techniques Produce More Efficient Parts at Less Cost. Asarco Digest, v. 3, no. 1, p. 15.

Al timer set shaft and gear used in kitchen ranges and gear and pinion combinations are produced as one part by Zn die casting. Assembly of parts and misalignment rejects are eliminated. (E13, T7; Zn)

439-E. Accent on Bigness--Continuously Cast Copper Cakes. Asarco Digest, v. 3, no. 1, p. 17-19.

Method of casting Cu cakes up to 25 ft. long and 36 in. wide and weighing 17,000 lb. using a "bottomless" water-cooled graphite mold. Molten Cu is poured continuously into the mold cavity, cooled rapidly so that it solidifies as it passes through the mold and emerges from the orifice as a smooth, dense Cu cake. (E16; Cu)

440-E. (French.) Casting of White Iron Pump Housings. Journal d' Informations Techniques des Industries de la Fonderie, May 1961, p. 1-3.

Casting of housings weighing 750 kg. with a Brinell hardness of 420-460 and water tightness at a pressure of 2 kg. per cm.^{2}. Design of pouring system and risers and use of chills in molding. A cast iron containing 3.45-3.50% C, 0.60-0.70% Si and 0.45-0.50% Mn is recommended. (E-general; CI-p)

441-E. (English.) Vacuum Degassing of Steel. Tatsuo Tejima. Institute of Physical and Chemical Research Japan, Scientific Papers, v. 55, Mar. 1, p. 52-55.

Investigation of the degassing phenomenon in vacuum casting of steel using a high-speed camera. Utilization of a specially designed nozzle-stopper to facilitate degassing. (25s, 1-73, 1-52; ST)

442-E. Cast Pearlitic Malleable Gets an Ordnance Break. Steel, v. 149, July 31, 1961, p. 62.

Production of 81 mm. mortar and artillery shell bodies from cast pearlitic malleable Fe by the shell core process. Yield strenghts are controlled from 50,000-100,000 psi. by varying the annealing process. Ultrasonic testing. (E16c, Q23b, 2-64, S13g, T2j; CI, 17-57)

443-E. (French.) Defects in Cast Steel. R. A. Boustred. Fonderie Belge, v. 31, Apr. 1961, p. 97-105.

Effects of size and distribution of sand particles, binders used, degree of baking of cores, pouring systems, moisture and permeability, hydrogen absorbed by the metal, deoxidation, design of part, ramming of molds, casting temperature and sand and metal composition on the formation of blowholes, pinholes, shrinkage cavities, sand penetration, hot cracking and misruns. (E-general, E25, 9-67, 9-68, 9-72)

444-E. Reducing Metal Losses in a Brass Foundry. H. St. John. Foundry Trade Journal, v. 111, July 13, 1961, p. 45-46.

Methods for reducing metal losses in all production stages of brass and bronze foundry practice. Reclamation of metal from discarded molds, reducing casting rejects, better gating procedures and use of die trimming instead of grinding. (E24h, E26, E22p; Cu-n, Cu-s, 5)

445-E. (Japanese.) Study on Aluminum Alloy Sheet Ingot. Pt. 3. Relation Between the Structure and Continuous Casting Conditions. Tojiro Kobayashi and Hisao Otsuji. Light Metals, v. 11, May 1961, p. 151-157.

Effect of the height of molten metal in the mold and of casting speed on microstructure, uniformity, segregation and impurity distribution in semicontinuous cast Al ingots. (E25q, C5q, M27, 9-69; Al, 5-59)

446-E. (Japanese.) Reactions Between Aluminum Alloys and Fire Bricks. Tomonobu Kanno, Torazo Uehara, Gohei Marukawa, Masaro Saito, Shigehi Mizuno and Homei Kato. Light Metals, v. 11, Mar. 1961, p. 107-124.

Specimens of pure Al, Silumin (Al-12% Si), Lautal (Al-3% Cu-9% Si) and Hydronalumin (Al-4% Mg) are heated in Carborondum, Al_2O_3, MgO and SiC to determine the nature of hard spots, due to nonmetallic inclusions, formed by aluminum oxides reaction with the fire brick during casting. (E25, 9-69; Al-b, RM-h, 17-57)

447-E. Neutron-Moderation Gages Water in Foundry Sand. Harvey A. Burley and Milton J. Diamond. Nucleonics, v. 19, Aug. 1961, p. 45-47.

Measurement of moisture in foundry sand by a 2-curie Pu-Be fast neutron source and thermal neutron detectors result in increased uniformity in foundry sand, reduced scrap loss and casting cleanup and fabrication of more complicated castings such as crankshafts. 4 ref. (E18, 1-54, 1-59)

448-E. Castings--And Some Inspection Problems in Relation to Design and Planning for Machining. D. E. Mallet. Quality Engineer, v. 25, May-June 1961, p. 81-82.

Core design, foundry practice, pattern equipment and intraplant liaison as factors in quality control of castings. (E-general, E21g, E11, 1-52)

449-E. (Italian.) Molding With Shaw's Process. J. Lubalin and R. Cristiensen. Fonderia Italiana, v. 10, May 1961, p. 161-168.

Applications of the Shaw process in making flexible, heat and crack resistant investment molds. Standards of quality and precision can be maintained, as for aerospace and chemical industries. Other applications include the production of tools, dies and other castings which are usually machined. (E15)

450-E. (Italian.) Production of Tight Castings at High Pressure With Copper Alloys. E. Brunhuber. Fonderia Italiana, v. 10, May 1961, p. 179-180.

Casting with Cu alloys and silicon bronze is discussed in terms of the effects of the alloying elements on microporosity developed during solidification. (E25n, 9-68; Cu-b, Sn-b)

451-E. (Russian.) Losses of Metal During Melting of Iron Shavings in Cupolas. K. T. Butzel'. Izvestiya VUZ--Chernaya Metallurgiya, Dec. 1960, p. 124-127.

Effect of the form of the charge and the method of charging on metal loss, oxygen consumption, slag composition and temperatures in the

cupola are investigated for cupola melting of burdens composed of briquettes and shavings. (E10a)

452-E. (German.) Modern Electroplating. Heinz Gerlach. Maschinenbau, v. 10, Apr. 1961, p. 136-140.

Applications of electroplating in corrosion protection and improvement of wear resistance, electrical contact resistance and reflectivity. Survey of modern processes including cathodic deposition and galvanoplastic techniques (electroplating of nonconductive surfaces). (L17, L25h, 10-54)

453-E. (Book.) Engineered Castings. Glenn J. Cook. 1961. 257 p. McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 36, N. Y. $8.50.

Survey of design, material specifications, production and applications of castings. Topics include sand and permanent mold, investment and die castings; and cleaning, inspecting and testing of gray, malleable and ductile iron, steel, brass, bronze and Al, Mg, and Co alloy castings. (E-general, 10-54; Al-b, Cu-b, Co-b, Mg-b, CI, ST)

454-E. Development of "As-Cast" Grain Refiner for Cast Steel. G. K. Turnbull, G. W. Form and J. F. Wallace. Journal of Steel Castings Research, no. 22, July 1961, p. 14-18.

As inoculants applied to molten low-carbon steel, titanium carbide and vanadium boron are particularly effective while Cb and Ti are suitable solute additions to interrupt grain growth. Mechanical properties are determined for those castings in which appreciable grain refinement of the as-cast structure obtained. Improvement in strength is generally accompanied by a loss in ductility. (E25q, Q-general, 2-60; AD-p35)

455-E. (Italian.) Phosphorus in Gray Cast Iron. Fonderia, v. 10, June 1961, p. 271, 273.

Influence of phosphorus in excess of 0.03% on castability, wear resistance, hardness, tensile stress resistance, flexibility and workability of gray cast iron. Relationship between the percentage of phosphorus, temperature and castability of cast iron. (E25p, Q-general, 2-60, 2-61; CI-n, P)

456-E. Centrifugal Casting of Thin-Walled Magnesium Parts. Warren C. Smith. Metal Progress, v. 80, Aug. 1961, p. 101-102.

For complex shapes difficult to produce, the centrifugal process is providing sound Mg castings that are often metallurgically superior to those produced by other casting methods. (E14; Mg)

457-E. (Italian.) Controlled Directional Solidification of 100-Ton Steel Casting. Pietro Tavolotti and Giuseppe Jaccarino. Fonderia Italiana, v. 10, June 1961, p. 191-199.

Methods for controlling cooling of steel castings in order to achieve a compact casting of high quality and tonnage. Economic considerations. (E25n; ST, 5)

458-E. Gravity Diecasting in Aluminium Bronze. R. W. Firth. Engineering Material and Design, v. 4, Aug. 1961, p. 526-529.

BS 1400 AB1-C and AB2-C alloys are economically used in production of aluminum bronze gravity diecasting. Die design and manufacture are discussed as a function of mechanical properties and material cost. (E13, 1-52, 17-51; Cu-s, Al)

459-E. Behavior of Clay-Bonded Sands in a Foundry. W. B. Parkes. BCIRA Journal (British Cast Iron Research Assoc.), v. 9, July 1961, p. 461-498.

Importance of milling time and value of disintegrators. Methods for controlling moisture content. Use of green strength and shatter index to indicate the ability of the sand to deform is explained in relation to molding and stripping properties. Patterns of mold hardness distribution obtained with different molding methods. Castings defects caused by sand washing, gas and expansion. (E18, E19; 5, 9)

460-E. Influence of Chromium Content on Chill and Mottle Formation. J. W. Boyes. BCIRA Journal (British Cast Iron Research Assoc.), v. 9, July 1961, p. 499-505.

Effect of 0.01-0.06% Cr on depths of chill and total chill plus mottle in two sizes of chill test casting is measured in both uninoculated and inoculated irons. (E22r, 2-60; Fe-b, Cr)

461-E. Chilling Mechanism of Chromium on Cast Iron. W. Oldfield. BCIRA Journal (British Cast Iron Research Assoc.), v. 9, July 1961, p. 506-518.

Effect of 0.015-1.019% Cr on the chilling tendency of cast iron is studied in terms of two equilibrium freezing temperatures. The two eutectic temperatures are ascertained from cooling curves obtained from continuous temperature measurements taken in the centers of bars of different diometers cast simultaneously. 6 ref. (E22r, 2-61, S16b; CI, Cr)

462-E. Dimensional Accuracy and Soundness of Grey Iron Castings Produced in Green Sand Molds. K. E. L. Nicholas and W. R. Roberts. BCIRA Journal (British Cast Iron Research Assoc.), v. 9, July 1961, p. 519-536.

Effect of mold wall movement on shrinkage defects as influenced by variations in molding sand moisture content and additions of clay (3-7%), coal dust (2-6%), hydrated lime (0.025-1%), pelleted pitch (2-3%) and wood flour (1%). 15 ref. (E25, 2-60, E19a; CI-n, 5, 9-67)

463-E. Gating Zinc Die Castings. Ralph Wilcox. Precision Metal Molding, v. 19, July 1961, p. 42-43.

Arrangement of cavities in the die block. Cooling considerations. Effects of turbulence in the runner system and gate runner direction on surface finish. Commercial applications of multiple cavity arrangements and the unit die system. Advantages and disadvantages of the unit die system. (E22p; Zn, 5-61)

464-E. Mechanized Foundry for Repetition Castings. Iron & Steel, v. 34, Aug. 1961, p. 368-370.

Increased production of castings weighing a continuous mold conveyor having variable speed control to carry molds through coring up, closing, casting, cooling and knock-out operations. Melting facility is increased by modifying existing cupolas. (E-general, E11, 1-52)

465-E. Effect of Tuyere Size on the Performance of a Cold Blast Cupola. H. J. Leyshon, R. B. Coates and Kel Nicholas. Iron & Steel, v. 34, Aug. 1961, p. 390-395.

Under certain conditions variation of tuyere ratio does not affect cupola performance and tuyere size does not affect metal composition and temperature. Increase of the blast rate at a constant coke charge-metal ratio increases melting rate and metal temperature, decreases latent heat of stack gases and decreases FeO content in slag. 11 ref. (E10a; Fe)

466-E. High Output Expected at Automated Bronze Foundry. Steel, v. 149, July 24, 1961, p. 92.

Use of conveyors to carry mold and core sand from storage silos and hoppers to the molding stations and a carbon arc and induction furnace to produce the molten bronze. Sand and cores are automatically separated from castings. (E-general, 18-74; Cu-s)

467-E. (Spanish.) Problems of Solidification and Crystallization in Steel Ingot Casting. Bernhard Matuschka. Instituto del Hierro y del Acero, v. 14, Jan.-Mar. 1961, p. 253-262.

Solidification and crystallization in Fe and sand molds are studied by filling the mold with liquid steel and pouring out the part that has not yet solidified after 1-20 min. of spontaneous cooling. Sulphur segregation is studied on Baumann prints. Formation of blowholes in molds of various shapes. (E25n, E11; ST, 9-68)

468-E. Making Super-Alloy Blades by Vacuum Casting. David Fishlock. Metalworking Production, v. 105, Aug. 2, 1961, p. 49-53.

Investment casting of turbine wheel blades composed of Vacumelt G64, a complex Ni-base alloy with 11% Cr, 4% W, 2.8% Mo, 2% Cb, 6% Al and 0.03% B which is melted in carbon-arc vacuum furnaces. Furnace design and construction, arc-melting cycle and quality control by fluorescent dip and X-ray techniques. (E15, 1-73, T7h, W18s; Ni-b, Cr, W, Mo, Cb, Al, B)

469-E. New Model, New Methods at Volkswagen. Anderson Ashburn. Metalworking Production, v. 105, Aug. 2, 1961, p. 54-56.

Techniques and equipment used for die casting and maching of

Mg crankcases and shell-mold casting of cast iron cylinders on continuous lines. (E13, E16c, G17, 1-52, T21; Mg, CI)

470-E. Synthetic Resin Bonded Shell Cores in Present and Future Foundry Practice. W. C. Capehart. Current Engineering Practice, v. 3, May 1961, p. 8-15.

Production of shell cores. Resin and sand selection and coating procedures. Sand or mix additives; core box design and construction materials; and core box heating. Shell core production problems including sticking, false void, thin walls, peel back, low strength and nonuniform production. (E21)

471-E. Eaton Gray Iron Castings by the Permanent Mold Process. George R. Frye. Current Engineering Practice, v. 3, May 1961, p. 16-17.

Casting of modified gray iron into permanent air-cooled cast iron molds. Application of soot to the mold surface separates molten iron from the Fe of the mold and serves as an insulator. Effect of soot coating thickness on cooling rate and microstructure. (E12, M27; CI)

472-E. On Stickiness of Molding and Core Sand Mixtures. Douglas C. Williams. Current Engineering Practice, v. 3, May 1961, p. 38-39.

Elimination of sand mixture sticking to pattern and core box surfaces by placing all water used in the preparation of the sand mixture into the nonstoichiometric immobilized condition of silica gel. (E18p, E18r)

473-E. Some Aspects of Solidification of Simple Shaped Castings. M. R. Seshadri and A. Ramachandran. Current Engineering Practice, v. 3, May 1961, p. 40-44.

Effect of size and shape on solidification time of Al, Al-Si and Al-Cu castings. 4 ref. (E25n, 3-73; Al-b, Si, Cu, 5)

474-E. More Efficient Cupola Melting. Union Carbide Metals Review, v. 4, Summer 1961, p. 16-18.

Installation of two water-cooled hot blast units used to cast gray iron and ductile iron frames and housings for motors and generators. Design and construction of units. Strength of castings. (E10a, Q27a, W18d; CI)

475-E. (Translation-Brutcher no. 5125.) Computer for Calculating the Temperature Distribution in Cupolas. L. M. Marienbakh and A. M. Shapiro. Liteinoe Proizvodstvo, Sept. 1960, p. 25-28.

Previously abstracted. See item 728-E, 1960. (E10a; CI)

476-E. (Translation-Brutcher no. 5197.) Inoculation of Magnesium Cast Iron. A. V. Chornovol. Dopovidi Akademii Nauk Ukrainskoi RSR, Feb. 1961, p. 183-187.

Study of efficiency of additions of calcium silicide as against ferrosilicon for suppression of chill in Mg-treated cast irons, the latter being known to solidify with formation of eutectic cementite and to show a marked propensity to chill formation. Cooling curves of Mg cast irons uninoculated and inoculated with FeSi or CaSi, respectively. (E25q; CI)

477-E. Productive Materials--Key to Die Casting Efficiency Gains. H. E. Eriksen. Production, v. 48, Aug. 1961, p. 70-77.

Die casting of automobile engine blocks, torque converters and transmission castings from Al alloys and scrap. Design and operation of the die casting machines and the trim presses. Methods of reducing amount of Al used in the components produced. (E13, 1-52, T21; Al-b)

478-E. The Gating of Aluminium Die Castings. H. K. Barton. Machinery (London), v. 99, July 26, 1961, p. 209-216.

Gating arrangements which cause early sealing of cacity vents. Adverse effects of cold runners, effect of ribs on metal flow in the cavity and comparison of thin with heavy gating. (E22p; Al, 5-61)

479-E. Carbon Sand Provides On-The-Job Economy. Jack Elliott. Modern Castings, v. 40, Aug. 1961, p. 31-33.

Advantages of carbon sand for coremaking operations during casting of gray iron, brass and bronze to produce machine tool components, jigs, fixtures and dies. (E21, E-general; CI, Cu-n, Cu-s, NM-f45)

480-E. Green Sand Properties. A. B. Draper and H. A. Knappenberger. Modern Castings, v. 40, Aug. 1961, p. 49-55.

Green compression strength and permeability of synthetically-bonded green sand as affected by median grain size. 7 ref. (E18r, 2-59)

481-E. Structural Uranium Alloy Melting, Casting and Heat Treating Techniques. G. D. Chandley and D. G. Fleck. Modern Castings, v. 40, Aug. 1961, p. 56-64.

Vacuum and inert gas melting, molding, chemical analysis and inspection and vacuum heat treating of uranium alloy high-strength castings. Physical metallurgy. 4 ref. (E-general, J-general, 1-73, S11, S13; U-b, 5)

482-E. (German.) Investigation of Gas Porosity in Steel Cast in Green Sand and Means of Control. H. Uhlitzsch, L. Rietz and G. Wycisk. Technik, v. 16, June 1961, p. 435-440.

Occurrence of various types of gas holes in green steel castings as influenced by casting rate and time, molding sand materials, moisture content of refractory and melting technology (deoxidation). Reduction of failures by close control of process parameters and materials. (E11, E19a, E25q; ST, 9-68)

483-E. Die-Casting Defects--Some Causes--Some Remedies. T. P. Barbicane. Machinery, v. 67, Aug. 1961, p. 102-110.

Effect of flow of material in the die cavity on surface finish and solidity of Zn and Al die castings. Means of finishing and lubricating die surfaces for elimination of surface markings which weaken castings. Methods of soldering and repairing of cracked and eroded surfaces. (E13, 9-71; Al-b, Zn-b)

484-E. (Russian.) Fundamentals of Designing Runner Systems for Die Casting. V. M. Plyatski. Liteinoe Proizvodstvo, Jan. 1961, p. 6-12.

X-ray investigations of 65 variations of gating systems show the influence of gating design on metal turbulence, air inclusions and casting properties. Formulas for determination of filling time and recommendations for gating selection. (E22p, 17-51, E13)

485-E. (Russian.) Study of Processes in a Cupola Using Partial Substitution of Natural Gas for Foundry Coke. G. I. Kletskin, N. L. Sobol, V. E. Dyakonov, V. D. Rabinovich and Van Zhu-Yao. Liteinoe Proizvodstvo, Jan. 1961, p. 19-25.

Design of a cupola to obtain optimal efficiency by using a combination of gas and coke with special devices to insure safe distribution of air and gas. Analysis of stock gases and thermobalance of both fuels. Controlling of bed heights by changes in gas-air ratio. (E10a, W18d, 17-51)

486-E. (Russian.) Nonmetallic Inclusions in Malleable Cast Iron. P. N. Bidulya, G. Yu. Shulte, B. H. Pelikh, A. A. Mladova, A. A. Sherstyuk and L. S. Miroshnichenko. Liteinoe Proizvodstvo, Jan. 1961, p. 25-27.

Malleable cast iron having a sulphur content of up to 0.2% is inoculated with 0.005-0.06% Al to increase number and decrease size of nonmetallic inclusions. Optimum inoculation, relative to C + Si content, decreases annealing time and improves physical and mechanical properties. 13 ref. (E25q; CI, 9-69)

487-E. (Russian.) Process of Filling the Die Mold Cavity and Estimation of the Cross Section of the Ingate for Die Casting. Chzhu-Sen-Yuan. Liteinoe Proizvodstvo, Jan. 1961, p. 30-33.

Formulas are developed on the basis of empirical and theoretical investigations. Filling time, velocity of metal, temperatures on the die metal boundaries and pressure. 9 ref. (E13)

488-E. (Russian.) Raising Resistance of Chills. V. V. Gusev. Liteinoe Proizvodstvo, Jan. 1961, p. 43-48. (From Giessereiwesen Giessereitagung, May 1958, Pt. 1.)

Chills for glass molds, steel, cast iron and centrifugal castings. Influence of various alloys, inoculants and heat treatment on prevention of cracks and growth of chills. (E22r, 2-60, 2-64; ST, CI, 5-65)

489-E. (French.) Casting in Sand Cement. Jean le Borgne and Marcel Jaumain. Fonderie, v. 185, June 1961, p. 209-219.

Casting of steels in molds fabricated of different types of cement.

Basic mold pieces are constructed of conventional cement and finer cements containing silica and zircon sand are used as contact surfaces for the molten steel. Various cast pieces are described and their method of casting given. (E18, E11, 1-53, 17-57)

490-E. (French.) Oxidation Losses in the Founding of Copper Alloys. Pierre Julien le Thomas and Dominique Arnaud. Fonderie, v. 185, June 1961, p. 220-228.

Oxidation losses in founding of Cu alloys are discussed as functions of charge composition and melting conditions. The influence of various additives on oxidation. (E25, 2-60; Cu-b, AD-r)

491-E. Biggest Steel Castings Poured at CSF. Canadian Metalworking, v. 24, Aug. 1961, p. 57.

Technological considerations in the production of 12 300,000-lb. castings, 32 ft. long, 14 ft. wide and 38 in. thick by Canadian Steel Foundries Ltd., Montreal. Castings are used to make steel rolling mills. (E-general; ST)

492-E. Explains New Way to Gate Steel Castings. T. Finlay. Canadian Metalworking, v. 24, Aug. 1961, p. 62-64.

Experimental method and results in fin gating mild, stainless and manganese steel castings. (E22p; CN, SS, AY, 5)

493-E. Aluminum Castings for Anodic Oxidation. E. A. Bloch. Foundry Trade Journal, v. 111, Aug. 1961, p. 161-165.

Production of Al castings for subsequent decorative anodic oxidation. Relationship between reflectivity and Mg content. Defects due to melting and casting errors and means of prevention. Principles of gating and feeding. (E-general, L19, P17a; Al-b, Mg, 5, 9)

494-E. Cast-Iron Kitchenware. Foundry Trade Journal, v. 111, Aug. 10, 1961, p. 167-170.

Production processes at a mechanized foundry and enameling plant. Enamel preparation and spraying, firing in a continuous roller hearth furnace and drying. (E-general, L27, T10a; CI, 17-57)

495-E. Composite Mold Development Promises High Production of Precision Castings. Industrial Heating, v. 28, Aug. 1961, p. 1556-1560, 1562.

Technique for the production of a composite mold constructed of an easily reclaimable ceramic facing and a chomatte-type sand backing. Application of this mold technique in the automatic mass production of precision metal castings. (E15, 1-52, 17-57)

496-E. (Book.) Foundry Moulding Sands of India. Jatinder Mohan, R. M. Krishnan, B. R. Nijhawan, P. K. Gupte and B. V. Somayajulu. 1961. 180 p. Council of Scientific & Industrial Research, New Delhi, India.

Testing foundry molding sands including natural, crude silica, high silica and zircon for fineness, size distribution, mineral constituents, moisture, permeability, compressive strength, shear strength, air set strength, shatter index, hardness, flowability, bulk density and fusion point. Bonding clay is tested for pH value, specific gravity, swelling index and chemical and bonding properties. (E18r, 1-53, 17-57, NM-f45)

497-E. Slip Casting--Economical for Refractory Metals. Western Metalworking, v. 19, Aug. 1961, p. 30-31.

Powder metallurgy consolidation of high melting point, reactive and other difficult-to-cast or form metals by casting as a slurry in absorbent molds with subsequent sintering. Intricate shapes involving re-entrant angles, inside and outside threads and solid and hollow parts are produced from Cb, Ta, W, Cr, Si, their alloys and other metals. (E16b, H-general; EG-d37, Ta-b, Cb-b, W-b, Cb-b, Si-b, Cr-b)

498-E. Nodular Iron Foundry. Jack C. Miske. Foundry, v. 89, Sept. 1961, p. 62-67.

Review of melting, molding, inoculation and heat treatment techniques for a foundry producing nodular iron. Design and layout of equipment including basic cupola, sand system and molding lines. (E-general; CI-r)

499-E. Converting From Natural Sand to Synthetic Sand. Andre Herrault and Harry Heron. Foundry, v. 89, Sept. 1961, p. 68-70.

Description of conversion procedures at 2, 4, 50 and 100% rates used in a

foundry casting Al and Cu alloys. Data given for green strength, moisture content and permeability of the resulting sand mixtures. (E18)

500-E. Risering Permanent Mold Aluminum Alloy Castings. George A. Bier. Foundry, v. 89, Sept. 1961, p. 71-73.
Discussion of riser, ingate and nozzle relationships required to compensate for solidification contraction and allow for proper venting during casting. A redesigned gating system is illustrated. (E22q, E12; Al-b)

501-E. Army Buys Newly Developed Pearlitic Malleable 81-mm Shell. Foundry, v. 89, Sept. 1961, p. 104-106, 109.
Sand casting, continuous heat treating and ultrasonic inspection are used to meet specifications for artillery and mortar shells made with malleable iron. (E11, T2j; CI-s, 17-57)

502-E. Diecasting Offers Improved Rotor Assembly Method. Delbert Ritzhaupt. Foundry, v. 89, Sept. 1961, p. 136, 139-140.
Die casting of Al rotors as solid units using a hydraulic press with an ejection ram. Press casts metal at 1300° F. under a pressure of 22 tons to bind the laminations together. (E13, T7h; Al, 17-57)

503-E. Conversion to Casting Cuts Costs 54%. Wallace D. Huskonen. Foundry, v. 89, Sept. 1961, p. 146-148.
Production of cast gray iron gas-oil burner heads using shell cores and green sand molds. (E11, E16c, E19, W13a; CI-n, 17-57)

504-E. High Green Strength Can Offer Advantages. Harry W. Dietert. Foundry, v. 89, Sept. 1961, p. 167, 170.
Data from creep tests are used to show the relationship between sand green strength, mold creep and casting weight increases. (E18r, E19a)

505-E. The Pressure Die Casting Industry in the U.S.A. B. Trautmann. Metall, v. 15, Aug. 1961, p. 757-760.
Survey of current status of Zn, Al, Mg and brass die casting with respect to production, casting machinery and melting equipment. Review of developments in the past ten years and predictions for future development. (E13, 10-54; Al, Zn, Mg, Cu-n)

506-E. Design Clues for Investment Casting. A. A. Knapp. Design Engineering, v. 7, Aug. 1961, p. 45-47.
Technological parameters of the investment casting process and its advantages are reviewed with evaluation of surface finish and dimensional tolerances obtainable in the as-cast condition. (E15)

507-E. New Mold Methods Stir Interest in Reactive-Metal Casting. Iron Age, v. 188, Sept. 7, 1961, p. 102-103.
Machined graphite molds are combined with rammed graphite cores for casting reactive metals into impellers and other complex shapes. Unalloyed Mo, Cb and W are cast experimentally by the process. (E16c, E19; Mo, Cb, W)

508-E. (Italian.) Employment of New Synthetic Resins and Traditional Equipment in Making Precise Cores. M. Jacques Roth. Fonderia, v. 10, July 1961, p. 279-288.
Technique for forming cores with formic-phenolic resins as sand binding elements instead of traditional oils or silicate and CO_2. Preservation, finishing, weight and economic considerations. (E21g, E18n, 1-52; NM-d)

509-E. (Italian.) New Tests for Controlling Sand Mixtures for Shell Molding. Fonderia, v. 10, July 1961, p. 289-294.
Determination of the point of fusion, permeability, tensile strength, heat, flexion and transversal resistance of sand mixtures and specimens by using special apparatus and techniques. (E18r, 1-53)

510-E. Measuring Moisture Content of Foundry Sand. H. A. Burley, A. D. Block and M. J. Diamond. Metal Industry, v. 99, Aug. 18, 1961, p. 122-124.
Description and operation of a moisture gage which measures average moisture content of 3200 lb. batch of sand to an accuracy of ± 0.05% at the 3% level in less than 1 min. (E18r, 1-53)

511-E. Production of Die Cast-Iron Bar. J. Cumberland. Glass Technology, v. 2, June 1961, p. 114-116.
Static and continuous die casting of medium phosphorus gray iron or nickel-chromium alloyed iron. Bars are discussed emphasizing applications of cast iron in the glass bottle industry. (E13; CI, P, Ni, Cr, 4-55)

512-E. Design Clues for Investment Casting. A. A. Knapp. Design Engineering, v. 7, Sept. 1961, p. 51-53.

Summary of tolerances and shrinkage allowances for precision investment casting of tubes, shapes, bars and sections. Data are given for flatness, straightness, concentricity, roundness, hole positioning and length for the metal castings, wax patterns and cores. Minimum wall thicknesses are suggested for bronzes, brasses and Cu-Be alloys. (E15, 17-55; Cu-b)

513-E. The Theory and Practice of Sandslinging. R. Kennedy. British Foundryman, v. 54, Aug. 1961, p. 338-345.

Review of function of the ramming head, the quantity and quality of the sand that is processed and the effect of varying the speed with which the head moves over the mold. Parameters of operation and applications of technique. (E18, 1-52, 17-57)

514-E. The Use of Oxygen in Cupolas. J. V. Harding and J. A. Charles. British Foundryman, v. 54, Aug. 1961, p. 365-370.

Routine use of oxygen enrichment to increase metal temperatures, increase carburization, decrease Si loss, lower sulphur content and economize on coke consumption. Comparison with similar effects of hot blast and evaluation of use of other industrial gases in steelmaking. 25 ref. (E10a, 1-52, 17-57)

515-E. Aluminium in Practice. Aluminium Courier, no. 54, June 1961, p. 24-25.

Pressure die casting of Al industrial components. Equipment and design guides. Reduction of machining time, economic considerations, porosity and shrinkage. (E13, 1-52; Al, 5-61, 9)

516-E. Vienna Congress Papers. Pt. 2. R. Rinesch, P. Neudecker and J. Eibl. Foundry Trade Journal, v. 111, Aug. 17, 1961, p. 197-203.

Summaries of 14 papers presented at the International Foundry Congress covering the L-D process for steel castings, production of thin-walled molds, phosphorus embrittlement in steel castings, flowability of molding sands, gas blowing and injection processes, ultrasonic flaw detection, solidification of steel castings, development of eutectic cells, production of S-g. iron, use of sodium silicate-bonded molding sands, magnetic properties of cast steel and desulphurization of carbon steel. (E-general, D11n, P16, Q26s, S13g; ST, 5)

517-E. Mould Materials. J. H. Edgington. Glass Technology, v. 2, June 1961, p. 116-120.

Foundry techniques including heat treatment for processing ferrous and nonferrous alloys, ductile iron and stainless steels to achieve desirable microstructural and physical properties for applications in glassmaking. (E-general, M27, Q-general, T29a, 2-60, 2-64)

518-E. Gate Sizes in Aluminum Die-Casting Design. John Lapin and Richard V. Stumph. Product Engineerging (Design Digest Issue), v. 32, Sept. 4, 1961, p. 164-166.

Wall thickness versus casting filling time; casting weight versus gate area; length of the casting (distance of gate to farthest extremity) versus gate velocity. (E13, E22p; Al)

519-E. Casting the Volga Cylinder Block. Metal Industry, v. 99, Aug. 11, 1961, p. 105.

Techniques and materials for pressure die casting of Al alloy cyclinder blocks. (E13, 3-74, T21b; Al-b)

520-E. (Spanish.) Centrifugal Casting of Gray Cast Iron and SG-Iron. Heinrich A. Nipper. Instituto del Hierro y del Acero, v. 14, Apr. 1961, p. 323-341.

Comparison of solidification, segregation and phase transformation processes in sand molds and permanent molds. Microstructure of centrifugal castings as influenced by Fe composition, thermal conductivity of molds and cooling methods. Casting defects and their causes. (E-general; CI)

521-E. Cast Steel Bells Ring True. Modern Castings, v. 40, Sept. 1961, p. 50-52.

Survey of coremaking, mold making, pouring and cleaning techniques for casting steel bells. (E-general, T9r; ST, 17-57)

522-E. Fin Gating--New Cost-Cutting Steel Technique. T. Finlay. Modern Castings, v. 40, Sept. 1961, p. 53-55.

Production of long, thin-section stainless and mild steel castings using a fin gating system to assure cleaner metal in the mold cavity. Designs are given for gating systems producing flanges, valves and gear blanks. (E22p; ST)

523-E. Olivine Wins Scandinavian Approval. G. S. Schaller. Modern Castings, v. 40, Sept. 1961, p. 56-59.

Applications of olivine sand in foundries casting gray iron, alloy and stainless steels and manganese steel. (E11; CI, ST, NM-f45, 17-57)

524-E. Precision in the Foundry. A. Short. Modern Castings, v. 40, Sept. 1961, p. 69-81.

Methods of improving dimensional accuracy, surface finish, definition of detail and metallurgical soundness during sand casting, die casting, shell molding, investment casting and other processes applicable to Mg and Al alloys, Fe and steel. (E-general, 17-51; Al-b, Mg-b, Fe, ST)

525-E. Solidification of Steel Castings and Ingots. M. C. Flemings, R. V. Barone, S. Z. Uram and H. F. Taylor. Modern Castings, v. 40, Sept. 1961, p. 82-95.

Methods for obtaining directional solidification in cast steel and effects of solidification variables on structure, segregation and mechanical properties. Experiments on plate-like and cylindrical 4330 and 4340 steel castings frozen under a variety of thermal gradients in different types of molds. 29 ref. (E25n, D9, M27, Q-general; ST)

526-E. Horizon Requirements for Castings. S. R. Carpenter. Modern Castings, v. 40, Sept. 1961, p. 96-101.

Comparison of steel, Ti, Zr, Mo, Ta, Be and Cb castings to forgings in terms of costs and the designs required to restrict chronic defects in castings for aircraft applications. (E-general, T24, 17-51, 17-53; ST, Ti, Zr, Mo, Ta, Be, Cb, 17-57)

527-E. Magnesium-Silver-Didymium-Zirconium Casting Alloy QE22A. D. J. Whitehead. Modern Castings, v. 40, Sept. 1961, p. 102-116.

Mechanical and physical properties and castability ratings are given for a 2.2% Di-2.5% Ag-0.6% Zr casting alloy based on Mg which combines high yield strength at 20° C. with good tensile properties at up to 316° C. The alloy also has good fatigue characteristics and resists stress corrosion. 11 ref. (E25p, A-general, P-general, Q-general, R-general, 2-60; Mg-b, Ag, Zr, EG-g)

528-E. Aluminum Bronze Hard Spots. Norman A. Birch. Modern Castings, v. 40, Sept. 1961, p. 117-124.

Review of causes, effects and control methods for hard spots, unalloyed metallic inclusions of almost diamond hardness which appear in aluminum bronze castings. Data are given for microstructure and chemical composition of several spots and for their effect on mechanical properties and casting serviceability. (E25, Q-general, 9-69; Cu-s, Al, 5)

529-E. CO_2 Process Improvements. D. A. Taylor. Modern Castings, v. 40, Sept. 1961, p. 125-132.

Summary of methods for facilitating core removal, improving surface finish and reducing the amount of new silica sand required. Effects of clay and water content on the properties of the silicate bonds. (E19)

530-E. British Steel Castings Research Assoc. Foundry Trade Journal, v. 111, Aug. 3, 1961, p. 127-132.

Review of papers covering Apr. 1, 1960-Mar. 31, 1961, and Annual General Meeting Proceedings. Topics include casting technology and mold practice, physical chemistry relations, solidification phenomena and structure control and microstructure, physical and mechanical properties as affected by composition and inclusion content. (E-general, D11, P-general, Q-general, 2-60, 3-69)

531-E. Vienna Congress Papers. Pt. 1. Foundry Trade Journal, v. 111, Aug. 3, 1961, p. 133-138.

Summaries of papers presented at the International Foundry Congress, June 19-24, 1961, include microscopic examination of microstructure, melting techniques, rigging, mechanical properties of cast piston rings, thermal analysis of Al and the effect of slag on properties of cast iron. (E-general, D11n, M21, Q-general, 11-63, 17-57; CI, Al, 5)

532-E. (Italian.) New Casting Procedure for Titanium, Hafnium and Zirconium. Alluminio Nuova Metallurgia, v. 30, June 1961, p. 312-316.

Centrifugal casting of Ti, Hf and Zr using an arc furnace in which the metal to be fused functions as the electrode. Use of graphite molds is discussed with regard to their physical properties and costs. (E14, E10r; Ti, Hf, Zr)

533-E. Costs Cut in Precision Casting Process. Materials in Design Engineering, v. 54, Aug. 1961, p. 13.

Review of techniques for production of a composite mold consisting of sand backing with a special ceramic facing as a substitute for the solid ceramic mold previously used to produce castings by the Shaw process. Details of mold production. (E15, E19, 17-51)

534-E. Hollow Castings and Vessels--A Suggested Novel Method of Production. R. H. T. Dixon and J. E. White. Foundry Trade Journal, v. 111, Sept. 7, 1961, p. 281-283.

Successful extension of the principles of centrifugal casting to two-plane spinning in order to produce hollow spherical shapes. (E14)

535-E. A Microscopic Study of Rammed Sand Surfaces. T. B. Caine, E. H. King and J. S. Schumacher. Journal of Steel Castings Research, no. 21, Apr. 1961, p. 1-9.

Testing procedure includes determination of sand surface density by observation and by weighing sample; study of erosion by liquid metal (Hg); and establishment of the relation between density, green permeability, green compression strength and green hardness. (E18r)

536-E. Die Casting From a Technical Viewpoint. Richard Stenberg. Society of Automotive Engineers, no. 389C, 1961, 3 p.

Parameters for design and production of Al alloy castings for automotive applications including heat treatment, Shaw Process and casting control by composition analysis and testing by X-ray and water pressure. (E-general, 1-52, T21; Al-b, 5-61)

537-E. Versatility of the Aluminum Sand Casting Process. A. H. Hinton. Society of Automotive Engineers, no. 389D, 1961, 3 p.

The use of synthetically bonded foundry sand, epoxy resin patterns, additional core supports and CO_2 type cores, and the exploration of increased chill and proper directional solidification all affecting the yield strength, tensile strength and elongation of the casting. (E-general, 1-52, Q-general; Al, 5-60)

538-E. Five Malleable Castings Cut Costs. Materials in Design Engineering, v. 54, Sept. 1961, p. 123.

Winning designs in the Malleable Founders Society design contest. Designs are shown for a gear rack, gear and shaft unit, equalizer bar, mounting bracket and cultivater front arm. (E-general, 17-51, 17-57; CI-s)

539-E. (Russian.) Inoculation of Cast Steel. N. S. Kreshchanovsky. Liteinoe Proizvodstvo, Feb. 1961, p. 1-8.

Formulas for determination of optimum amount of inoculant based on the relationship between surface tension and crystalline grain growth and the influence of B, Mg, Ca and Ce on physical and mechanical properties of the steel. Study of surface tension at fluid-gas boundaries and of chemical activity in processes of deoxidation and desulphurization. 19 ref. (E25q, N16, P-general, Q-general; ST, B, Mg, Ca, Ce)

540-E. (Russian.) Gating for Ductile Iron Castings. I. A. Shapranov and A. A. Tetman. Liteinoe Proizvodstvo, Feb. 1961, p. 13-16.

Experiments with ductile iron, gray iron and steel castings to derive formulas for calculation of gating systems for ductile iron. Velocity, fluidity and inclusions are determining factors. 13 ref. (E22p, 1-52; CI, ST)

541-E. (Russian.) Influence of Deoxidation and Solidification Conditions of Steel in Mold on Development of Hot Tears in Castings. N. A. Trubitzyn. Liteinoe Prozvodstvo, Feb. 1961, p. 17-19.

Experiments with steel deoxidizers including Al, Ti and silicomanganese to determine the role of preshrinkage, expansion, recrystallization and nonmetallic inclusions in the development of hot tears. 6 ref. (E25, D11r, 9-72; ST, AD-r, 17-57)

542-E. (Russian.) Analysis of Preshrinkage Expansion and Volume of Shrinkage Cavities in Cast Irons. N. G. Girshovich. Liteinoe Proizvodstvo, Feb. 1961, p. 27-31.
Influence of mold wall resistance, dendritic growth, graphite separation and solidification phenomena on shrinkage. 8 ref. (E25n, E25q; CI, 9-67)

543-E. (Russian.) Solubility of Magnesium in Cast Iron. M. A. Essen and F. I. Tavadze. Liteinoe Proizvodstvo, Feb. 1961, p. 31-34.
Influencing factors include content of C and Si, pressure, temperature and time. Nodularization by Mg, Zn and Ca, spheroidization and graphitization as related to Mg content. 9 ref. (E25q, N8, P12e, 2-60, 2-61, 2-67; CI, Mg)

544-E. (Russian.) Technological Problems in Production of Ductile Iron. B. P. Pavlov. Liteinoe Proizvodstvo, Feb. 1961, p. 37-38.
Treatment of Fe with Mg welded on steel rod in a mixing ladle, inserted and held under the surface. Mass production. (E25q, 1-52; CI-r)

545-E. (Translation-Brutcher no. 5147.) Cupola Melting Process Accelerated by the Injection of Oxygen Into the Hearth. I. S. Matveenko and I. A. Zotkin. Izvestiya VUZ--Chernaya Metallurgiya, Feb. 1961, p. 133-137.
Previously abstracted. See item 388-E. (E10a; Fe)

546-E. Lost Wax Casting. L. C. Barton. Machinery Lloyd (Overseas Edition), v. 33, Aug. 1961, p. 57-51.
Investment casting of light metal and steel alloys and Stellite with attention to the Misco Mono Shell process. Preparation of wax patterns and ceramic molds including use of vitreous grits in the Glascast process. Review of process parameters such as temperature control effects on surface quality of castings. (E15, 10-54; EG-a39, ST)

547-E. New Mold Making Development Speeds Precision Casting Results. Industrial Gas, v. 40, Aug. 1961, p. 10-13.
Reclaimable ceramic-faced sand molds made automatically in application of the Shaw process for mass production. Design advantages include strippability, thermal shock resistance, dimensional stability, gas-free molds and soundness. (E15, W19g, 1-52, 17-51)

548-E. Factors Influencing Molding Sand Properties. Willis H. Lawrence. Foundry, v. 89, Oct. 1961, p. 61-67.
Determination of green, dried and high temperature properties of silica sand-bentonite-water compositions from data based on the amount and distribution of each phase. 5 ref. (E18r, E19, 2-60, 2-61; NM-f45)

549-E. Mixing and Molding Foundry Green Sand. Richard W. Heine. Foundry, v. 89, Oct. 1961, p. 68-75.
Behavior of molding sand during squeeze and jolt molding as affected by changes which occur in the sand during mixing. The latter include agglomeration, attrition, lumping, aeration and mechanical properties. 4 ref. (E18r, E19a; NM-f45)

550-E. Be Your Own Sand Detective. Joseph S. Schumacher. Foundry, v. 89, Oct. 1961, p. 76-81.
Method of green sand evaluation based on physical properties, screen analysis and effective clay content as determined by a green shear test, carbon requirements for effective peel and response to ramming. 4 ref. (E18r; NM-f45)

551-E. How Materials Affect Oil Bonded and Shell Cores. E. C. Zuppann. Foundry, v. 89, Oct. 1961, p. 82-87.
Results of jolt overhang and jolt sag tests on sands containing cereal binders show the effects of the amount of additive characteristics, sand grain size and the interrelationships of the core mix materials on sand properties. (E21, 2-59, 2-60; NM-f45)

552-E. How to Use CO_2 Process and Furan Cores. Robert J. Mulligan. Foundry, v. 89, Oct. 1961, p. 88-93.
Gassing methods for use with the CO_2 process. Uses of furan binders in the hot corebox, conventional dielectric oven baking and core-oil and furan combinations. Comparison of various core and mold making methods. (E-general; NM-f45)

553-E. Gating and Risering Permanent Mold Gray Iron Castings. Foundry, v. 89, Oct. 1961, p. 120-121, 124, 126.

Description of flat, round and flash mold cavity feeding systems. Risering requirements are shown to be minor. 7 ref. (E22; CI-n)

554-E. (Russian.) Heat Exchange Between Castings and Molds. K. L. Sheptunov. Tsvetnye Metally, June 1961, p. 72-76.

Formulas for determination of temperature exchange between melted metal and sand, concrete, graphite or cast iron molds at the contact surfaces or at any distance from contact surface for any given time. 8 ref. (E25)

555-E. (Japanese.) The Effects of Inoculation With Ferrosilicon on the Graphite Form of Vacuum-Melted Iron. Masuteru Maruyama. Imono (Japan Foundrymen's Society, Journal), v. 33, June 1961, p. 412-420.

Nucleation and formation of flake or spheroidal graphite during solidification of molten Fe as dependent on changes in surface tension between the Fe and graphite as a function of temperature, amount and grain size of the Fe-Si addition, Si segregation and the O and S contents of the melt. 28 ref. (E25q, 2-60, 2-61; CI)

556-E. Air Flow in Cupolas. Castings, v. 7, July 1961, p. 23, 27, 29.

Investigation of air pressure drop in coke bed as affected by coke particle size and shape, air flow rate and bed packing. (E10a, 1-52; RM-j43)

557-E. The Use of Oxygen in the Cupola. E. Heap. Castings, v. 7, July 1961, p. 31, 33, 35.

Effect on metal temperature and melting rates of oxygen enrichment of the blast and oxygen injection in the furnace well. (E10a, 1-52)

558-E. (Italian.) Useful News for Die Draftsman and Die Foundryman of Small Zinc Castings. Fonderia, v. 10, Aug. 1961, p. 324.

Die casting of small mechanical parts using single and multiple dies and automatic machines, producing 300 pieces per min. with close tolerances. (E13, 1-52, 18-54; Zn)

559-E. (Italian.) New Automatic Plants for Molding. Hans Bergmann. Fonderia, v. 10, Aug. 1961, p. 327-335.

Coremaking with automatic equipment including molding machine, squeezers, jolters and conveyers in a line adaptable to the casting of malleable and gray iron. (E21q, 1-52; CI-n, CI-S)

560-E. (Italian.) Aluminum Casting for Chilled and Die Castings. Fonderia, v. 10, Aug. 1961, p. 341-345.

Die and chill casting of Al, Al-Si and 356 Al alloy using three different furnaces for heating and rapid melting of the charge. Temperature control, Si modification by Na and grain refining of Ti, B, Zr, Be, Na and P. (E-general, 1-52; Al, 5-61, 5-66)

561-E. (Japanese.) High Temperature Properties of Molding Sands as Affecting Surface Defects of Casting. Takeo Banno and Kazuyoshi Noritomi. Imono (Japan Foundrymen's Society, Journal), v. 33, July 1961, p. 475-496.

Hot compression strength, stress deformation and ductility of foundry sands are related to the occurrence of scabbing and rat tail defects in Meehanite sand castings. 24 ref. (E11, E18r, 2-61, 9-71; CI)

562-E. Vienna Congress Papers. Pt. 3. Foundry Trade Journal, Aug. 31, 1961, p. 257-262.

Summary of papers presented at the 1961 International Foundry Congress. Topics include hot tearing of cast steel, effect of core properties on casting gas holes, pouring time for steel cast in green sand molds, vacuum melting and inoculated cast iron structure, foundry statistical methods, low-pressure die casting, slab-mold service life and blowhole prevention. (E-general, 1-52, 11-63; ST, CI)

563-E. (German.) Technology of Casting of Ship Parts. Karl Weber. Freiberger Forschungshefte, no. B 59, 1961, p. 132-153.

Review of molding, casting, annealing at 950° C. and testing procedures in the fabrication of heavy parts from cast open-hearth or electric steel. Chemical composition and mechanical properties are determined. (E-general, J23, Q-general, S11, T22; ST, 5)

564-E. (German.) Theoretical Analysis of Heat Flow in Steel Castings. Karl Weber.

Freiberger Forschungshefte, no. B 59, 1961, p. 154-167.

Data and equations are given for the mathematical expression and analysis of temperature distribution, heat flow and other solidification phenomena. (E25)

565-E. Aluminum Casting at Central Foundry Division General Motors Corporation. John Lapin. Society of Automotive Engineers, 389B, 1961, 15 p.

Comparison of four processes used in the production of automotive components: sand molding, semipermanent mold, permanent mold and die casting. (E-general, T21b, T21c; Al-b)

566-E. Italian Equipment to Produce Volga Engine. Light Metals, v. 24, Sept. 1961, p. 256.

Pressure die casting of Al alloy cylinder blocks for automobile engines in Gorkii City Works. Alloying elements include Si, Mg, Mn and Fe. Specifications are given with technological parameters for design and semi-automatic operation of the machine. (E13, 1-52; Al-b, Si, Mg, Mn, Fe)

567-E. (Dutch.) Double Turbine Wheel Cast by the Precision Investment Casting Method. Gjuteriet, v. 16, Jan. 31, 1961, p. 29.

Alloy steel containing 0.18% C, 13% Cr and 1% Ni is melted in a medium-frequency furnace and heated above melting temperature. After adequate heat treatment of the material, a tensile strength of 80-85 kg. per sq. mm., yield strength of 60 kg. per sq. mm., elongation of 16% and a notch impact strength of 6 kg. per sq. cm. are measured. (E15, J-general, Q-general, 1-52; ST)

568-E. What Metal Shall I Use...for Die Castings? Metal Progress, v. 80, Oct. 1961, p. 97.

Of the major die casting alloys those of Al are strongest and have the highest thermal and electrical conductivity. Mg alloys are lightest; Zn alloys are toughest and have the lowest melting point. Cu alloys are strong and corrosion resistant, but are relatively difficult to cast. (E13; Al-b, Zn-b, Cu-b, Mg-b, Co-b, 17-52)

569-E. (Dutch.) Comparison of a 2-Ton Per Hr. Cold Blast Cupola With a Low-Frequency Induction Furnace. H. A. Baron van Raders. Polytechnisch Tijdschrift, v. 16, Feb. 1961, p. 108a-114a.

Technical indexes and melting economics are compared for processing of Holland I type and Holland II type raw iron, hematite iron, converter iron, cast iron scrap, steel scrap, rail steel and toolsteel. (E10; CI)

570-E. The CTIF-Ulmer Hot-Blast Cupola. British Foundryman, v. 54, Sept. 1961, p. 382-387.

Cast iron melting using a cupola equipped with a double-shell recupertor of 30% efficiency acting on all flue gases to maintain hot blasts of 300-400° C. Equipment design and operating principles for pilot and production furnaces. (E10a, 1-52; CI)

571-E. Developments in Melting Practices, Refractories and Metal. G. Littler. British Foundryman, v. 54, Sept. 1961, p. 388-391.

Composition, metallurgical properties and industrial applications of spheroidal graphite irons and refractory concretes for use in foundry equipment. Use of oxygen in melting operations including openhearth, electric arc and cupola furnaces and the Kaldo, Rotor and L-D processes. (E-general, E10, Q-general, 2-62; ST, RM-h40, 17-57)

572-E. Core Assembly. B. Bird. British Foundryman, v. 54, Sept. 1961, p. 392-394.

Casting of complex or unwieldy forms using series of sand cores assembled in the molding box to make the desired structure. Application of a core assembly mold to casting of a steel kaplan hub weighing over 7 tons. (E21, E22, E11; ST)

573-E. The Efficient Operation of Oil-Fired Tilting Furnaces. A. L. Sharp and C. Docherty. British Foundryman, v. 54, Sept. 1961, p. 394-399.

Metal losses in Cu and Ni foundries are reduced by supercharge preheating methods including melting under charcoal or degassing with nitrogen. Flame and metal corrosion resistance is determined for SiC, alumina, sillimanite dry ramming and castable concrete refractory bricks. (E10, E25, W18c; EG-d37, NM-f43, 17-57)

574-E. Precision in the Foundry. A. Short. British Foundryman, v. 54, Sept. 1961, p. 400-409.

Process developments in sand, die, investment, shell mold and CO_2 casting methods for obtaining dimensional accuracy and desired surface finish in Fe, steel and Mg and Al alloys. (E-general, 10-54; Fe, ST, Mg-b, Al-b)

575-E. Controlled Cooling of Ductile Iron Castings. Australasian Manufacturer, v. 46, Sept. 9, 1961, p. 62, 65-66.

Properties usually obtained through a separate anneal are realized by delaying shakeout. (E25, J2, 1-52; CI-r)

576-E. Metal Choice. Precision Metal Molding, v. 19, Oct. 1961, p. 43-54.

Castings and extrusion of bronze, nickel-brass, Al, Cu, Zn, beryllium copper, Mg, stainless steel, Ti and cobalt-brass alloys for applications utilizing the mechanical and physical properties of the materials. (E-general, F22, 17-57; Al, Be-b, Co-b, Cu, Cu-b, Mg, Ni-b, SS, Ti)

577-E. Mass Production Shell-Moulding. Foundry Trade Journal, v. 111, Sept. 14, 1961, p. 315-321.

Foundry plant layout, equipment, pattern and flow production, component design and development and process control for nonferrous castings including Ni-Ag, LM 8 (WP) Al and Zn-base alloys and Monel metal. (E15c, 1-52; Ni-b, Al-b, Zn-b)

578-E. Fully Mechanized Shell Moulding. Iron & Steel, v. 34, Oct. 1, 1961, p. 480-481.

Achieving a high production rate for shell molding and core making with a polyram machine consisting of a 12-ft. circular table, carrying six standard manipulator units mounted radially at 60° intervals. (E19c, E21, 1-52)

579-E. Improvement of Gating and Feeding for Ductile Iron. H. Otey Meriwether. Foundry Trade Journal, v. 111, Sept. 26, 1961, p. 359-361.

Formulas and calculations with reference to practical variables, such as shrinkage and slag, involved in the gating and risering of ductile iron. (E22, 1-52; CI-r)

580-E. Plastic Inserts Reduce Corebox Wear. Modern Castings, v. 40, Oct. 1961, p. 50-51.

Epoxy resin inserts, used in place of Fe or steel inserts in coreboxes to reduce wear by sand, are being produced at low cost in multiple cavity molds and require curing times of only 7 hr. (E21g, 1-52; NM-d)

581-E. Dust and Vapor Control for Shell Molding Operations. Elijah B. Henby. Modern Castings, v. 40, Oct. 1961, p. 65-67.

Description of hazardous compounds, their origin and general toxic effects during molding, curing, gluing and core-making operations. Recommendations for types of dust collectors best suited for shell mold exhaust systems. (E-general, A8a, 1-52)

582-E. Tilt Pouring Permanent Mold Castings. G. W. Stahl. Modern Castings, v. 40, Oct. 1961, p. 68-70.

Comparison of casting soundness, appearance, production rates and relative costs of castings and molds when using the tilt pouring technique or simple vertical gating. (E22, E23, 1-52)

583-E. Aluminum Pattern Castings. W. E. Sicha. Modern Castings, v. 40, Oct. 1961, p. 71-74.

Control of warpage, porosity and surface smoothness during sand casting of Al alloy patterns and coreboxes. Pressure casting techniques for matchplates using plaster molds. Determination of optimum pattern alloy compositions with emphasis on a 7% Cu, 5% Si, 0.15% Ti alloy. (E17, E21, E25; Al-b, Cu, Si, Ti)

584-E. Specialty Melting as a Service Function in a Research Laboratory. W. F. Moore. Modern Castings, v. 40, Oct. 1961, p. 75-85.

Description of vacuum induction melting, consumable and inert electrode arc melting, atomic hydrogen melting and zone melting techniques and equipment applications to melting of various metals and oxides. Requirements for crucible materials. (E10, 1-53)

585-E. Molding and Core Sand High Temperature Strength Testing. R. W. Heine, J. S. Schumacher and E. H. King. Modern Castings, v. 40, Oct. 1961, p. 96-102.

Test method using a dilatometer to show how compressive strength changes with time of exposure to elevated temperatures. Effect of clay content and type and moisture content are investigated with the technique. 21 ref. (E18r, 2-60, 2-62)

586-E. How Much Superheat Is Lost in the Runner? J. W. Hlinka, V. Paschkis and F. S. Puhr. Modern Castings, v. 40, Oct. 1961, p. 119-126.

Heat loss in the runner as affected by runner length and perimeter, flow rate, critical design characteristic, mold material and specific heat of the metal. (E22, E25, 1-52)

587-E. How Coremaking Puts Precision Into New Cast Iron Engine. Iron Age, v. 188, Oct. 19, 1961, p. 142-144.

Precision casting of Fe to produce thin-walled automobile engine components. Urea-formaldehyde binder is added to the foundry core sand mixture and metal core boxes are preheated to produce accurate, hard cores. High-pressure molding techniques are used to make hard molds of similar accuracy. (E13, E18, E21, 1-52, 3-74; CI)

588-E. Non-Ferrous Metal Melting. Machinery Lloyd (Overseas Edition), v. 33, Sept. 30, 1961, p. 45.

Rapid melting of phosphor bronze and leaded gunmetal in a specially designed furnace to minimize oxidation, gas pickup and metal losses. (E10, 1-52; EG-a38, Cu-b, Pb)

589-E. (French.) Gases in Cast Metals. Georges Blanc. Fonderie, no. 186, July-Aug. 1961, p. 251-271.

Investigation of sources and effects of gases absorbed by the metal in liquid or solid state. Effects of the C, Si and Mn content in steel and of the Ni, Sn and Al content in Cu on the solubility of N or H. Oxygen solubility in eutectic cast iron as a function of the melt temperature. Gas solubility in solid Cu and Fe at various temperatures. 121 ref. (E25q, P12e, 2-60, 2-61, 3-69; ST, Cu, Al, C, Mn, Ni, Sn, EG-n, EG-p, Eg-q)

590-E. (French.) How to Interpret Sand Tests. Journal d'Informations Techniques des Industries de la Fonderie, no. 128, July-Aug. 1961, p. 11-14.

Distribution of particle sizes in new and recovered sand. Permeability and compressive strength of the same sand as functions of the water content. (E18, 1-53)

591-E. (French.) Prevention of Metal Penetration on the Surface of Cores Used in Bronze Casting. Journal d'Informations Techniques des Industries de la Fonderie, no. 128, July-Aug. 1961, p. 23.

A 0.5 to 1 mm. thick asbestos foil is fastened to the core surface using a thin wire of steel or brass, or the foil is glued to the core with a dextrin or potato starch solution. Green sand molds may be protected in this way in places exposed to erosion and metal penetration. (E21g, 1-52)

592-E. (French.) How to Order and Inspect Gravity Cast Light Metals. Fernand Dabel. Fonderie Belge, v. 31, June 1961, p. 150-161.

Process operations for sand permanent mold and die casting of light metals with related machining, straightening and welding techniques for reworking castings. Determination of tensile and yield strength, elongation and Brinell hardness; microscopic examination of surface defects, porosity, inclusions and pipe. (E-general, E25q, Q-general, 9; EG-a39)

593-E. Casting Titanium Shapes. R. G. Hardy. Metal Industry, v. 99, Sept. 15, 1961, p. 202-206.

Technological parameters for furnace design, melting procedures, mold materials, molding, gating and risering of Ti alloys. Comparison of Ti castings with steel sand castings on the basis of machinability and applications, especially in aircraft and corrosion resistance. (E-general, G17k, R-general, T24s, 1-52; Ti-b, ST, 5, 17-57)

594-E. Automatic Shell Molding. Metal Industry, v. 99, Sept. 15, 1961, p. 207-208.

Mold and coremaking for the same component at the same time by a unit which carries out all processes in the production of a casting except closing the molds and pouring them. Uniformity is achieved by precise temperature control of pattern equipment and accurately timed investments. (E-general, E16c, 1-52)

595-E. (French.) Molding and Casting a 5500 Kg. Anvil. Ivan Lamoureux. Fonderie Belge, v. 31, July-Aug. 1961, p. 185-188.

Sand casting of an anvil from cupola melted cast iron containing 3.05% carbon, 2.20% graphite, 0.75% Si, 0.70% Mn, 0.075% phosphorus and 0.118% sulphur. Determination of density, tensile strength, ductility, Brinell hardness and machinability. (E11, G17k, P-general, Q-general; CI-r)

596-E. (Italian.) New Light Alloys for Die Castings. Fonderia, v. 10, Sept. 1961, p. 360.

Aging and die casting of 364 Al alloy. Alloy is corrosion resistant and offers good castability. Effect of temperature and of Cr, Be, Fe and Mg content on tensile strength, elongation and ductility. Linear-dimensional tolerances of castings. (E13, Q-general, R-general, 2-60, 2-61, 17-52, 17-55, 17-57; Al-b, Be, Cr, Fe, Mg)

597-E. Induction Slot Furnaces and Their Employment in the Foundry. Fonderia, v. 10, Sept. 1961, p. 379-396.

Comparison of induction slot furnace with arc and crucible melting furnace; their use, application and characteristics. Techniques for melting Fe, Al, Cu, brass, Al alloys, bronzes and steels. (E10, 1-52; Fe, ST, Al, Al-b, Cu, Cu-b)

598-E. (Italian.) Quality Control in Castings by Fluorescent Magnetic Particles. Fonderia, v. 10, Sept. 1961, p. 397-403.

Cast iron castings are magnetized and inspected for defects by fluorescent magnetic particles. (E25q, S13, 1-52; CI)

599-E. Melting Aluminium Bronze and Hardener Alloys. Metal Industry, v. 99, Sept. 22, 1961, p. 222-225, 232.

Oil-fired furnaces are used for the production of billets and ingots of Al bronzes; electric high-frequency furnaces are used for high melting point, rich and hardener alloys, either Cu or Al-base. (E10)

600-E. Die-Cast Magnesium Saw. Metal Industry, v. 99, Sept. 8, 1961, p. 187-188.

Production of light weight chain-saw components using an automatic pressure die casting unit. Induction and gas-fired melting furnaces are used, giving an hourly throughput of about 1200 lb. per hr. (E13, E10, T6n, 1-52; Mg)

601-E. BICTA Annual Conference Proceedings. Foundry Trade Journal, v. 111, Oct. 5, 1961, p. 422-432.

Discussion of papers presented at the Third Annual Conference of the British Investment Casters' Technical Assoc., London, England, 1961. Topics covered include casting quality control, foundry record keeping and accounting, vacuum melting and alloy development for gas turbine rotor blading. Alloys cited are EPE10, Nimonic 80A, 90 and 105, G74, G55, G64 and G67, nickel alloys and BS 3146. (E-general, E15, T7h, 11-63, 17-57; Ni-b)

602-E. (Pamphlet-French.) Inverse Chill. Centre Technique des Industries de la Fonderie, 12, Ave. Raphael, Paris 16^{e}, France, July 1961, 61 p.

Experimental casting of Fe containing 2.66-3.40% C, 0-2.77% Si, 0-1.0% Mn, 0-0.22% S, 0-0.35% Cr, 0-1.5% Ni and 0-1.97% P. The inverse chill phenomenon is thought to be influenced by the S:Mn ratio, the shape of castings and a cooling rate that varies in different parts of the casting. 26 ref. (E25n, 1-53; CI)

603-E. Aspects of South African Foundry Technology. A. V. Kulkarni, B. J. Lombard and J. L. Handley. Foundry Trade Journal, v. 111, Sept. 28, 1961, p. 377-381.

Papers presented at the third annual conference of the South African branch, Institute of British Foundrymen, discuss cupola practice including patching, charging, tapping and total-carbon control and the CO_2 process for mold and coremaking. (E10a, E19, E21, 1-52, 10-54)

604-E. Sculptor Uses New Foundry Technique. Foundry Trade Journal, v. 111, Sept. 28, 1961, p. 389-390.

Styrocell, an expanded polystyrene, is used to make a foundry pattern, set into a molding box and packed with sand. When molten LM-6 Al-Si alloy is poured in, the plastic melts and volatilizes, its place being taken by the Al which then solidifies into the required shape. (E16)

605-E. Melting Costs in Crucible Furnaces. R. Ogilvy. Castings, v. 7, Aug. 1961, p. 11, 13, 15, 17, 19-20.

Labor, fuel, wasted metal due to overheating, crucible life, furnace linings, pattern design and reclamation of scrap and swarf are considered as they affect costs. (E-general, E10p, 17-53)

606-E. (Italian.) Foundry Materials for Molders and Core Makers. Duilio Magri. Fonderia Italiana, v. 10, Aug. 1961, p. 341-343.

Effect of humidity, grain size, shape and distribution, pressure and Ca, Mg and Fe_2O_3 impurities on permeability of Si and alumina molds. (E18r, 2-59, 2-66, 3-69, 3-74; NM-f45, 17-57)

607-E. (Russian.) Use of Pressure Crystallization in Casting Magnesium Alloys. A. V. Kurdumov and I. A. Shestyrev. Izvestiya VUZ--Tsvetnaya Metallurgiya, Mar. 1961, p. 125-128.

Reduction of porosity in Mg alloys crystallized under pressures of 3-5 atm. and determination of the optimum temperature of alloy prior to pouring; prevention of Mg combustion by pressure and by a layer of powdered sulphur. (E16, P10m, S18s, 2-61, 3-74; Mg-b)

608-E. (French.) Solidification of Steel Ingots in a Mold With Water Cooled Bottom. P. Ravizza and V. Giacomazzi. Revue de Metallurgie, v. 58, Aug. 1961, p. 655-660.

Effect of bottom cooling on pipe and top discard, segregation and structure homogeneity of ingots cast in water cooled molds is studied by removal of nonsolid metal from the mold at various times during cooling. 14 ref. (E25n; 5-59, 9-67, 9-69)

609-E. Precision Casting of Aluminum. Morris Bean and Lawson Marsh. Society of Automotive Engineers, 389A, 1961, 4 p.

Comparison of the molding techniques involved in precision casting of Al with less specialized classes of castings such as sand casting, freezing casting, CO_2 molding, etc. Special consideration is given to cast components of ordinary size with overall dimensions of 6 in. to 12 ft. or more, made from permanent and nonpermanent molds. (E-general; Al)

610-E. Grain Refinement of Steel Ingots by Solidification in a Moving Electromagnetic Field. Frederick C. Langenberg, Guenter Pestel and C. Richard Honeycutt. Metallurgical Society of AIME, Transactions, v. 221, Oct. 1961, p. 993-1001.

Solidification during electromagnetic stirring is tested for altering the as-cast grain structure of ingots 410, 310 and 302 stainless and S-816 alloy conditions for optimum grain refinement are analyzed and an empirical design constant presented with evaluation of the effect of the grain refinement on hot workability. (E25, D9p, 1-69, M27, Q23q; SS)

611-E. (Italian.) Casting of Copper-Chromium Alloy Heated With Lithium Is Fused With Copper Serpentine. Angelo Azzolini. Fonderia Italiana, v. 10, Sept. 1961, p. 368-374.

Casting and controlled cooling of Cu-Cr alloy castings having 0.05% Li. Determination of hardness, heat of solidification, conductivity, diffusion coefficient and structure in subsequent fusing with serpentine. (E25, K-general; Cu-b, Cr, Li)

612-E. Induction Furnace Produces Cast Iron for Valve Bodies. Metal Progress, v. 80, Nov. 1961, p. 9.

Cupola metal is duplexed in an induction furnace before being poured. This treatment is needed because cupola iron ordinarily has about 3.50% C and 2.50% Si. About 5% low-carbon steel is added to the Fe to dilute and so reduce the C and Si contents. (E10, 1-52, 2-60, T7b; CI)

SECTION F

PRIMARY MECHANICAL WORKING

1-F. This Is Split Die Forging. Materials in Design Engineering, v. 52, Nov. 1960, p. 130-131.

Mechanical properties and tolerances of split die forged aircraft components. Applicability of die forging to alloy steels, superalloys, high-strength steels, stainless steels and other alloys. (F22n, T24; AY, SS, ST, SGB-a, SGA-h, 17-55)

2-F. (Polish.) Graphical Definition of Cold Rolling-Mill Efficiency. Wilhelm Gorecki. Hutnik, v. 27, July-Aug. 1960, p. 286-295.

Rolling mill efficiency dependent on steel strip dimensions, weight of material, rolling rate and metal losses during trimming using nomographic representation. 3 ref. (F23, 1-52, 1-67; ST)

3-F. (German.) Drawing Equipment Used in Processing and Manufacture of Thin-Walled Tubing From Steel and Nonferrous Metals. Wilhelm Pottner. Industrie-Anzeiger, v. 82, Nov. 1, 1960, p. 1473-1475.

Cross section reductions to 50% in one drawing are achieved during tube-making with modified drawing tools, using special lubricants, after heat treatment and pickling. (F26r, 2-64; ST)

4-F. The Manufacture and Inspection of Seamless Steel Tubes. G. S. Marshall. Quality Engineer, v. 24, Sept-Oct. 1960, p. 142-151.

Survey of fabrication and heat treating techniques; spark and steeloscope testing. (F26, S10d; ST)

5-F. Fillet-Rolling Diesel-Engine Crankshafts. Walter Egger. Machinery, v. 67, Nov. 1960, p. 127-130.

Fillet rolling of forged 4145 steel and shell-molded, cast modular-Fe crankshafts. (F23, T21b; CI-r, ST, 4-51, 5)

6-F. (German.) New Hot Extrusion Processes. Draht, v. 11, Oct. 1960, p. 645-648.

Production of a high strength core with corrosion resistant coating by co-extrusion. Use of transverse extrusion, a process wherein the flow of material is deflected by 90° during extrusion to obtain a more uniform distribution of mechanical properties in the product. (F24)

7-F. (German.) Cold Rolling. Manfred Muller. Fertigungstechnik und Betrieb, v. 10, Oct. 1960, p. 582-588.

Relationship of cold rollability to degree of elongation. Flow of material during cold rolling of a thread on CrV steel. (F23, 1-67; ST, Cr, V)

8-F. (German.) Tolerances for Hammer Forgings. Robert Meier. Fertigungstechnik und Betrieb, v. 10, Oct. 1960, p. 591-592.

Specifications for seamless steel rings and seamless bushings produced by hammer forging. (F22, T7d; ST)

9-F. Rolling of Beryllium Sheet Takes Special Technique. B. H. Hessler. Iron Age, v. 186, Dec. 1, 1960, p. 136-138.

Be slabs are machined, inspected, clad with mild steel and formed into sheet by a cross rolling method at 1400-1500° F. (F23, L22; Be, CN, 4-53)

10-F. Controlling Copper Rod and Wire Mill Scrap and Losses. John A. Bell.

Wire and Wire Products, v. 35, Nov. 1960, p. 1522-1525.

Electrolytic and chemical recovery of Cu from mill scale, pickling solution, rolling scrap and wire drawing compounds during hot rolling of Cu bar to 19-26 gage wire. 4 ref. (F23, 1-66, A11d; Cu, 4-61)

11-F. Ring Rolled Sintered Moly. A. J. Moser. Fansteel Metallurgy, Oct. 1960, p. 1.

A sintered hollow Mo preform is heated to 2400° F. and rolled directly without prior forging by a standard ring rolling machine. Rings ranging from 9 in. O. D. to 14 in. O. D. with wall thickness from 5/8 in. to 3/8 in. are rolled. (F23, 1-66; Mo, 6-72)

12-F. (German.) Working Forces in Breaking-Down Pass Rolling. Gustav Zouhar. Freiberger Forschungshefte, no. B52, 1960, 201 p.

Test rolling of square and round billets of Cu, pure Al and MSt 3b, CK 45, MK 73, St 7, 16MnCr5, 100 Cr, 18 Mn 5, 65 Si 7 and 55 SiMn steels in various breaking-down pass sequences and to evaluate rolling force, torque moment, deformation resistance and specific rolling work at rolling temperatures from 980-1240° C. 37 ref. (F23n, 1-66; Al, Cu, ST)

13-F. Fundamentals of Wire Drawing. Pt. 4. Slip on Wire Drawing Machines. C. P. Bernhoeft. Wire Industry, v. 27, Oct. 1960, p. 1007-1009.

Wire drawing with constant slip from block to block or accumulative slip. Loss of horsepower through slip. Calculation of drawing block circumferential speed. (F28)

14-F. Grinder Breaks Speed Barrier. Iron Age, v. 186, Nov. 24, 1960, p. 95.

Special unit grinds stainless steel slabs at 12,500 sq. ft. per min. (F21f; SS)

15-F. (Russian.) Developmental Trends in Blooming Mills. S. V. Makaev. Stal', Oct. 1960, p. 915-919.

The reduction rate during rolling of blooms is raised to 100-110 mm. per pass to increase the uniformity of transverse, horizontal and vertical reduction and improve mechanical properties of the billet. (F23n; ST, 4-52)

16-F. (Russian.) Vacuum Rolling Mill. V. M. Amonenko, A. S. Stron, V. V. Mukhin and V. A. Tarasov. Stal', Oct. 1960, p. 920-922.

Rolling of highly deformation resistant W, Mo and Cb alloys in a new two-high reversible mill having rollers enclosed in a vacuum chamber. (F23, W23, 1-73; Cb-b, Mo-b, W-b)

17-F. High Velocities Form Tungsten for Structural Uses. Machinery, v. 67, Dec. 1960, p. 145.

Tests conducted on high velocity Dynapak extruding and forging machines indicate that if the metal is formed fast enough, extensive grain refinement occurs, with a striking improvement in the ductility of the metal and its consequence toughness. Reductions up to 45 to 1 can be obtained without the need for cladding or lubricant. (F22, F24; W)

18-F. (Russian.) Mechanism of Metal Destruction During Transverse Rolling. P. K. Teterin and Yu. F. Lusin. Stal', Oct. 1960, p. 930-932.

Effect of axial and lateral tensile stresses produced during hot rolling on the axial destruction of 1KH18H9T steel billets. (F23, 3-66; ST)

19-F. Textures in Extruded Uranium. R. B. Russell. Paper from "Advances in X-Ray Analysis", v. 3. Plenum Press, Inc., New York, 1960, p. 315-330.

Effect of extrusion variables such as prior texture, billet and liner temperatures, reduction in area and ram speed on the texture of extruded uranium rods and tubes is examined by crystallographic (inverse) pole figures. 2 ref. (F24; U, 4-60)

20-F. (German.) Fabrication Process Development and Problems With Broad and Parallel Flange Joists. Kurt Bollmann and Gerhard Kuchenbuch. Stahl und Eisen, v. 80, Oct. 27, 1960, p. 1501-1507.

Historical review of rolling mill operations in the rolling of steel flanges with description of some modern mills. Effect of ratio of vertical to horizontal revolutions on quality of rolled product. Problems encountered in determination of roll wear mechanism, deformation

phenomena and power requirements. (F23, W23; ST, 4-57)

21-F. (German.) Influence of Technical Progress on Tube Fabrication Processes. Helmut Nierlich. Stahl und Eisen, v. 80, Oct. 27, 1960, p. 1507-1517.

Development of processes and machinery for production of seamless and welded steel tubes by skew-rolling, cold shaping, extrusion, electric and autogeneous butt and lap-welding. Corrosion protection by plastic coatings. (F24, F26; ST)

22-F. (German.) Contributions of German Works to the Development of Large-Size Forgings. Heinz Gummert. Stahl und Eisen, v. 80, Oct. 27, 1960, p. 1517-1524.

Development of hammers and presses and auxiliary equipment such as manipulators for producing forgings up to 290 tons. Forging and inspection techniques for steel. Fabrication of special products such as seamless tires, shell rolls and back-up rolls. (F22, 10-54, W22; ST)

23-F. (German.) Evaluation of Roll Forces and Power Demand in Hot Rolling of Steel Sections by Computation. Alexander Geleji. Archiv fur das Eisenhuttenwesen, v. 31, Oct. 1960, p. 571-576.

Measurement of roll pressure and motor power in rolling mine rails and U-profiles of unalloyed 0.17-0.48% C steel at temperatures from 970-1210° C. (F23; CN, 4-57)

24-F. Fabrication Methods Evaluation. J. G. Frantzreb. Modern Castings, v. 38, Dec. 1960, p. 97-106.

Evaluation of the status of the various competitive methods of fabrication such as forging, shaping, machining and joining. (F-general, G-general, K-general)

25-F. High Head Alloy Slab Heating for Planetary Mill Rolling. Oscar J. Zanatta. Iron and Steel Engineer, v. 37, Oct. 1960, p. 121-135.

Alloy steel slabs for planetary rolling rapidly heated without scale formation in an in-line, atmosphere-controlled furnace operating on the high thermal head principle. (F21b; AY, 4-52)

26-F. High Speed Rod and Merchant Mill. A. H. Griffiths, Iron and Steel Engineer, v. 37, Nov. 1960, p. 139-143.

Rolling of steel billets to produce rods, flats and skelp using a three-strand rod and merchant mill. Design, operation and capacity of the mill. (F23, W23, 1-52; ST, 4-52)

27-F. Remote Control Used on Plutonium Rolling Mill. Iron and Steel Engineer, v. 37, Nov. 1960, p. 155-156.

Rolling of Pu in a remote-controlled mill enclosed in an airtight steel vessel filled with argon gas. (F23, W23, 1-52; Pu)

28-F. Forgings for Missiles and Space Vehicles. Jose R. Canal and William C. Kunkler, Jr. American Society of Mechanical Engineers, Paper no. 60-WA-316, 1960, 15 p. $1.

Forging of steel, Ti, Be, Al, Ni and refractory metals for application in reentry and space vehicles, missile frames and guidance systems, solid propellant rocket motors, liquid propellant rocket engines and nuclear rocket motors. 13 ref. F22, T24e; Ti, Be, Ni, AY)

29-F. New Line Boosting Pipe Plant Output. Steel, v. 147, Nov. 14, 1960, p. 112-113.

Production of high strength large diameter steel pipe in a mill using automatic machines to plane, form, weld, expand and test the pipeline sections. (F26, W24, 1-52; ST)

30-F. Roll Forces and Torques in Hot Rolling. Z. Wuzatowski and B. Hoderny. Iron & Steel, v. 33, Nov. 1960, p. 558-560.

Experimental hot rolling of mild steel samples to show the effects of torque, force, temperature, speed, draft coefficient, reduction percentage and ratio of sample to roll dimensions on final dimensions, configurations and rollability. 7 ref. (To be continued.) (F23, 1-66; CN)

31-F. Helical Rolling of Short Components. O. Tedder. Iron & Steel, v. 33, Nov. 1960, p. 562.

Production of steel balls and cylinders for bearings and crushing mills by a deforming operation using revolving helical dies which prevents cavity and porosity formation. (F23, T7d; ST)

32-F. (Russian.) Skewing of the Edges and Curving of Blooms During Rolling. N. F. Gritsuk and S. V. Merekin. Metallurg, Oct. 1960, p. 26-27.

Wear and skewing of the first rolls, shape of the first bloom end, uniformity of heating, steel grade of the ingot, deformation degree and dimensions of the ingot as factors influencing skewing and curving of the blooms. (F23; ST)

33-F. Over Estimates of Load for Some Two-Dimensional Forging Operations. W. Johnson. 3rd. U. S. National Congress of Applied Mechanics, Proceedings, 1958, p. 571-579.

Estimation of the largest load which is likely to be encountered during forging with dies of unequal size, whose width exceeds the material thickness and with partly open dies. For thin material the forging pressure is determined using discontinuous velocity patterns for equal width rough dies. The pressure to forge thick material with two dies of unequal width is derived using a slip-like field. 13 ref. (F22)

34-F. Precision Forging. L. R. Beesly. Machinery, v. 97, Nov. 16, 1960, p. 1145-1148.

Formation of rifling in small arms barrels composed of 1% CrMo alloy steel by a precision cold forging process using a vertical forging machine and mandrel composed of a 2% C-12% Cr die steel. Effect of cold forging on the physical and mechanical properties of the material being worked. (F22, 1-67, T2m, P-general, Q-general; AY, Cr, Mo)

35-F. Continuous Buttweld Mill Modernizes Pipemaking. Steel, v. 147, Dec. 12, 1960, p. 80, 88, 90.

Coiled skelp is fabricated into buttweld pipe at speeds of 150-700 ft. per min. by forming, welding, reducing and sizing rolls. Interstand speed ratios are kept constant by a hydraulic, differential drive system. (F26p; 4-53)

36-F. (Pamphlet.) Cold Roll Formed Products. 4 p. n.d. Solar Steel Corp., 651 Lehigh Ave., Union, New Jersey.

Flat strips of carbon and stainless steel, Al, bronze, brass, Cu and Zn are progressively formed into desired shapes by a series of rolls arranged in tandem. Uniformity, accuracy, surface finish, strength-weight ratio, fabricability and weldability of the roll formed products. Applications. (F23, 1-67; Al, CN, Cu, Cu-n, Cu-s, SS, Zn, 4-53)

37-F. (French.) The Manufacture of Plate for Large-Diameter Welded Pipe. M. Filliatre. Soudage et Techniques Connexes, v. 14, Sept-Oct. 1960, p. 370-374.

Description of high-speed plate rolling mill at Ste. Lorraine-Escaut's Longwy plant. Rolling operations in which 4 to 25 ton steel ingots are fabricated into plate of high dimensional accuracy and good surface appearance in widths ranging from 100-3800 mm., minimum thicknesses of 4.76 mm. and unit weights to 15 tons. (F23, W23b; ST)

38-F. (French.) Manufacture of Large-Diameter Welded Pipe for Pipe-Lines. H. Bouchon. Soudage et Techniques Connexes, v. 14, Sept-Oct. 1960, p. 375-391.

Description of Ste. Lorraine-Escaut's Sedan pipe mill. Roll-forming operations, external and internal welding, cold hydraulic expansion and finishing operations to produce steel pipe of 20 to 40 in. diameter, 40 in. length and 1/4 to 1/2 in. wall. Variations in mechanical properties of material at each stage of manufacture. Inspection methods. (F26, W23h; ST)

39-F. (Italian.) Determination of Working Time in Wire-Drawing of Steel. Giuseppe Ranzi. Ingegneria Meccanica, v. 9, Aug. 1960, p. 17-21.

Formulas for precalculation of optimum drawing speed and of drawing time. Example in case of dry drawing. (F28)

40-F. (German.) Modern Forging and Pressing. Helmut Cramer. Glasers Annalen, v. 84, Sept. 1960, p. 499-508.

Processes and machinery for hot and cold working of steel including hammer forging, die forging, forge rolling, bulging, automatic forging, deep drawing and cold pressing. Preparation of material by induction heating in gas, oil or coke furnaces. Production of dies. 14 ref. (F21b, F22, G1, G4b, G14, 1-52)

41-F. (Japanese.) Influence of Sulphur in Heavy Oil Used for an Ingot-Reheating Furnace on Rolling. Tomoyuki Mori and Masashi Kamakura. Tetsu-to-Hagane (Iron and Steel Institute of Japan, Journal), v. 46, Nov. 1960, p. 1533-1538.

Oxide scale formation on ingots during rolling after reheating in a continuous furnace at 1170-1215° C., using bunker C-oil of high and low sulphur content. Data for microstructure and scale composition. 3 ref. (F21, F23, 9-52, M27; ST, S)

42-F. Aluminium Production at Rogerstone. Metal Treatment and Drop Forging, v. 27, Nov. 1960, p. 470-472.

Al sheet, strip and plate with good mechanical properties are produced at high rate by expanded plant facilities including continuous strip mill and tunnel furnace at the Rogerstone works of Alcan Industries Ltd. (England). Hot and cold rolling and annealing. (F23, J23; Al, 4-53)

43-F. Manufacture of Weldless Steel Tubes. Edgar Allen News, v. 39, Nov. 1960, p. 241-245.

Automatic processes for tube manufacture including magnetic lifting of the steel bars, sawing by oxy-ferrolene flame, hydraulic charging of the billets, heating, shaping, piercing, polishing, cooling and finishing. Description of the older, standard Pilger process. (F26; ST)

44-F. What Factors Influence Design of Glass-Extruded Steel. J. H. Rice. Iron Age, v. 186, Dec. 22, 1960, p. 59-61.

Extrusion of stainless, carbon and other steels using glass lubricants to lower friction, insulate and absorb the shear stress which builds up during extrusion. Effect of metal deformability and press geometry on the process. (F24; CN, SS)

45-F. Iron Ore and Raw Materials. Notes on the Manufacture of Open-Hearth Bridge-Steel. N. W. Shed. Blast Furnace and Steel Plant, v. 48, Nov. 1960, p. 1194.

Bridge steel containing 0.13% sulphur and a small amount of pig iron is rolled satisfactorily. The effect of sulphur is neutralized by treatment in an openhearth furnace. (F23, 2-64; ST, S)

46-F. (Russian.) Widening of Titanium During Hot Rolling. V. I. Shilov and M. P. Lednev. Tsvetney Metally, Sept. 1960, p. 75-77.

Determination of deformability and cracking of the edges of VT-ID Ti sample during hot rolling at 800° C. and comparison with deformability of 45 steel. Influence of rolling speed on widening. (F23, 1-66, Q23q; Ti)

47-F. Reheating Aluminum Ingots. Metal Industry, v. 97, Nov. 25, 1960, p. 444.

Al ingots are reheated to 440-630° F. in an oil-fired reheat furnace controlled by iron-constantan thermocouples, electronic circular scale contact controllers and a strip chart recorder to a temperature within 1° F. of the desired value. (F21b, X9s; Al, 5-59)

48-F. Aspects of Heavy Press Utilization. J. Brayman. American Society of Mechanical Engineers Paper no. 60-WA-317, 1960, 5 p. $1.

Closed-die forging and cylindrical billet extrusion of Al alloy, stainless steel, alloy steel, toolsteel, Be, Mo and W to produce aircraft and missile components. Use of auxiliary tooling and mechanical handling and heating equipment. (F22, F24, T24, W22p; Al-b, AY, Be, Mo, SS, TS, W)

49-F. (Russian.) Selection of Optimum Temperature Range for Press-Forging of Carbon Steels. B. F. Trakhtenberg. Kuznechno-Stampovochnoe Proizvodstvo, May 1960, p. 21-26.

Highest and lowest temperature limits for press forging of large and small (50 mm. and over 70 mm. cross section) forgings of hyper and posteutectic steels. Temperature range is selected with consideration of grain size, degree of deformation, composition and size of forging. (F22; CN)

50-F. Large Continuous Pipe-Forming and Welding Plant. Machinery (London), v. 97, Nov. 30, 1960, p. 1239.

Tubes produced from flat steel plate by a continuous rolling process are seam-welded to form pipe by a high frequency resistance welding technique. (F26, K3; ST, 4-53)

51-F. Versatile Heat Exchange Material. Light Metals, v. 23, Dec. 1960, p. 326-327.

Fabrication of tubular passageways in Al sheets or strips by inserting rods composed of an inert material into slabs prior to casting. Tubes may be of different sizes and of variable spacing within same strip. After rolling, the rods are removed, the tubes then being inflated by hydraulic or pneumatic pressure. Possible applications are in oil and hot water radiators and multiple gas or liquid pipelines. (F26s; Al, 4-53)

52-F. Reinforced Light Metal Extrusions. Light Metals, v. 23, Dec. 1960, p. 330.

Extrusion of Al sections with an open, longitudinal groove or series of grooves to accommodate steel reinforcing rods or stranded cable. Resulting sections have high tensile strength and good corrosion resistance. (F24, Q27a, R-general; Al)

53-F. Press to Forge the Impossible. Steel, v. 148, Jan. 9, 1961, p. 60-61.

Design of a multiple ram press for forging, blocking, forming and extrusion of ferrous metals, Mo, W, Ta and Cb for aircraft and missile components. (F22, F24, W22p, T24; Cb, Fe-b, Mo, Ta, W)

54-F. Filter System Upgrades Ultra-Thin Steel Strip. Steel, v. 148, Jan. 9, 1961, p. 76-77.

Production of stainless steel foil for use in honeycomb sections for aircraft and missile components. During rolling of strip, beta ray gages monitor the thickness and filter system removes solid particles that would cause dents and scratches. Chemical processing removes soluble material that would stain the steel. (F23, L-general; SS, 4-53)

55-F. Fillet Rolling. Walter Egger and Gerald X. Diamond. Machine Design, v. 33, Jan. 5, 1961, p. 112-119.

Effect of fillet rolling on the residual compressive stress, work hardness, surface finish and corrosion fatigue of the workpiece. Comparison with results obtained by shot peening. Data are given for fillet rolling tolerances and work hardenability of steel, cast iron, Al and Mg. 10 ref. (F23; Al, CI, Mg, ST)

56-F. Huge Press to Make Record Forgings. Missiles and Rockets, v. 8, Jan. 9, 1961, p. 32.

Production of complex steel, Mo, Ta, W, Cb, Mo-W, Ta-W and high density alloy forgings and extrusions with uniform physical properties. Nuclear and space applications. (F22, P-general, W22p; Cb-b, Mo-b, ST, Ta-b, W-b)

57-F. Roll Forces and Torques in Hot Rolling. Z. Wuzatowski and B. Hoderny. Iron & Steel, v. 33, Dec. 1960, p. 578-581.

Torque tests during rolling of low carbon steels to determine relationship between mean resistance to deformation and temperature and total torque as a function of degree of reduction at specified temperature. 7 ref. (F23, 1-66; CN-g)

58-F. Graphite Die Lubricant Cuts Forging Costs. Western Metalworking, v. 18, Dec. 1960, p. 50.

A colloidal graphite die lubricant is applied to preheated dies as operational lubricant in the forging of 650 Al alloy. (F22, 18-73; Al-b)

59-F. (German.) Problems in Manufacture and Estimation of Quality of Aluminum Deep Drawing Sheets. Karl-Robert Vassel. Neue Hutte, v. 5, Nov. 1960, p. 652-655.

Selection of deep drawing tests and of mechanical properties such as yield point, true maximal strength elastic elongation and necking which indicate quality of drawing sheets. Sequence of operations used in homogenizing before rolling at 550° C., process annealing at 400-450° C., final annealing at 230-300° C. and rolling. (F23, J23, G4, 17-52; Al, 4-53)

60-F. Forge-Shop Controls Minimize Machine-Shop Woes. E. M. Hunt. American Machinist/ Metalworking Manufacturing, v. 104, Dec. 26, 1960, p. 65.

Truck drive shafts composed of 4140, 8640 and 4340 steel are upset forged under carefully controlled conditions to minimize stock removal for machining. (F22; AY)

61-F. (Czech.) Effect of Extrusion Process on Properties of Al Rods Used in Forging. Josef Kreuter. Hutnicke Listy, v. 15, Nov. 1960, p. 851-857.

Cylindrical rods are extruded from ingots of the alloys CSN 422401 and CSN 424205 at 380-480° C. and with heating times from 3-16 hr. Effects of extruding velocity recipient-diameter, rod-diameter, ratio, temperature and heating time on the formation of coarse grain and surface defects. 7 ref. (F24, 2-61, 3-67; Al, 5-59)

62-F. Extrusion of Hard Alloys. A. B. Graham. Metal Industry, v. 97, Dec. 1960, p. 455-458.

Design criteria for dies, mandrels and containers used in extrusion of very hard alloys such as Monel, Ni, Inconel, stainless steel, stainless iron, Nichrome

and high speed steel. (F24; Ni-b, SS, SGB-q)

63-F. Tube-in-Strip, a New Fabricating Method. Metalworking Production, v. 104, Dec. 14, 1960, p. 68-72.

Fabrication of Cu or Al strip having integral tubes by inserting rods of inert material in the mold before casting, pouring the metal around them and rolling the slab to strip. Application of the tube-in-strip in heat exchangers, stiffening panels and pipelines. (F26; Al, Cu)

64-F. Basic Features of the Cold Forging Process. A. M. Cooper. Metal Treatment and Drop Forging, v. 27, Dec. 1960, p. 480-486.

Types of cold forging machines; basic sequence of operation of split-die and solid-die headers; cold forging limitations with regard to upset ratio, length and radii. Materials for cold forging; design drawing and specification. (F22, 1-67)

65-F. New Developments in Copper Wire Rod Mills. M. M. Feuer. Wire and Wire Products, v. 35, Dec. 1960, p. 1675-1677.

Rolling of Cu wire bar to 5/16 in. diameter rod by a rolling mill featuring automatic handling and automatic coiling. Bars are heated in a walking beam furnace. (F23, W23d; Cu, 4-55)

66-F. (Translation-ConBur.) Glass Lubricants in Metallurgy. L. K. Kovalev and V. A. Ryabov. Glass and Ceramics, v. 15, Sept. 1960, p. 352-357.

Applications of glass lubricants in the drawing and hot pressing of steel, Mo, W and Ti alloys. (F26r, G1, 1-66, 18-73; Mo, ST, Ti-b, W)

67-F. Forge Furnace Takes Minimum Space but Handles King Size Ingots. Steel, v. 147, Dec. 26, 1960, p. 62-63.

Ingots are heated to 2400° F., stress relieved and equalized in a car-bottom furnace with an automatic pressure control system, roof flues and high velocity burners in the upper sidewalls. Advantages are low initial cost, small space requirement, versatility and large capacity. (F21b, 1-55; 5-59)

68-F. Spiral Pipe Machine Welds Inside, Outside Seams. Steel, v. 147, Dec. 26, 1960, p. 64.

Description of a machine which winds steel strip into a spiral train and butt-welds the edges, inside and out, into a continuous pipe. Auxiliary units permit corrugating of the pipe and ultrasonic testing of weld quality. (F26p, K-general, W29; ST, 4-53)

69-F. Columbium Forgings Weigh Over One-Half Ton. Steel, v. 147, Dec. 26, 1960, p. 72.

Forgings weighing up to 1300 lb. are produced from Cb-1% Zr alloys at extremely high temperatures (2100-2250° F.) Ceramic coating of forgings. (F22, 1-66, L27; Cb-b, Zn)

70-F. (French.) Effect of Aluminum Nitride on the Forgeability of Steels. Paul Bastien and Philippe Portevin. Comptes Rendus, v. 251, Nov. 21, 1960, p. 2347-2349.

Steels containing 0.29-0.35% C, 0.12-0.24% Si, 0.62-0.9% Mn and 0.0045-0.09% Al are tension and torsion tested in a controlled atmosphere at 700-1200° C. to study hot shortness caused by the Al content. (F22, 17-52, Q26s, Q1, 2-60; ST, Al)

71-F. (Russian.) Effect of Forging Reduction Ratio on the Sound Permeability of Forgings of High Alloy Heat Resistant Steels and Alloys. M. Ya. Dzugutov, Yu. V. Vinogradov and V. P. Stepanov. Kuznechno-Shtampovachnoe Proizvodstvo, Mar. 1960, p. 10-13.

Problems of false defect impulses in ultrasonic control of high alloy heat resistant forgings with large grain structure zones. Sound permeability as a function of composition, size of semi-product, reduction ratio and subsequent heat treatment. (F22, S13g; SGA-h, SS)

72-F. (Russian.) Formation of Laps During the Open-Die Forging of Ring-Shaped Blanks. A. V. Altykis. Kuznechno-Shtampovochnoe Proizvodstvo, June 1960, p. 10-12.

Influence of the height and inner and outer diameters of the rings on lap formation on the inner surface. Data are given for the relationship between degree of reduction and direction of metal flow and for optimum ring dimensions to eliminate surface laps. (F22, 9-71)

73-F. (Russian.) Drop Forging Large Blades of Irregular Shape. P. M. Pavlovich. Kuznechno Shtampovochnoe Proizvodstvo, June 1960, p. 41-42.

Roll and drop forging of large steam turbine blades composed of 2Kh13 steel and Ti alloy. Heating, forming, drop forging, trimming, straightening, heat treating and finishing operations. Ratio of net weight of forging to consumed weight. (F22, T7h; ST, Ti-b)

74-F. (Russian.) Forging Heat Resistant Steel Ingots. F. M. Valyavkin. Kuznechno Shtampovochnoe Proizvodstvo, July 1960, p. 8-13.

Elimination of surface cracks and pores during production of large steel machine shafts by light preliminary deformation of the billet followed by heating at the rate of 100-120° C. per hr., forging with steam-hydraulic press at 1160-920° C. and punching with dies of rhombic shape having a cylindrical contact surface. 5 ref. (F22, T7; ST, SGA-h, 4-52)

75-F. (Russian.) Increased Durability of Forging Press Piston Rods Attained by Cold Rolling. M. Ya. Belkin. Kuznechno Shtampovochnoe Proizvodstvo, July 1960, p. 36-38.

Cold surface hardening of heavy duty 45 Kh steel piston rods by uni and multi-roller rolling machines. Design and operation of equipment. Data for maximum attainable hardness depth. 6 ref. (F23, 1-67, T21b; ST)

76-F. (Russian.) Special Dies for Working of Tungsten and Molybdenum on Rotary Forging Machines. B. S. Sekun. Kuznechno Shtampovochnoe Proizvodstvo, July 1960, p. 42-43.

Production of durable dies for roll-forging of tungsten and Mo wire by compressing powdered W and Mo carbides in steel press-forms at 1400-1500° C. Design and operation of forging machine. (F22p, H14, W22a; Mo, W, 4-61)

77-F. Basic Features of the Cold Forging Process. A. M. Cooper. Wire Industry, v. 27, Dec. 1960, p. 1189-1194, 1204.

Characteristics of basic types of cold forging machines. Calculation of limitations on upset ratio, length and finished shape. Methods of extruding, underhead forging and pointing. (F22, 1-67, W22)

78-F. The Fundamentals of Wire Drawing. Pt. 6. Profile of a Drawing Wire. C. P. Bernhoeft. Wire Industry, v. 27, Dec. 1960, p. 1197-1198, 1225.

Relationship between drawing cone angle, height of drawing cone and reduction in wire area when drawing wire through dies. (F28)

79-F. Expansion of Rogerstone Aluminum Strip Mill No. 1. J. M. Waldram. Engineer, v. 210, Dec. 15, 1960, p. 635-638.

Design of an Al strip mill in which slab ingots for rolling are made by remelting commercial purity Al, alloying it and casting it by a continuous process. Ingots are then scalped, preheated and rolled in the hot roughing and finishing mills to produce 10 ft. wide plate 50 ft. long. (F23, 1-66, W23; Al)

80-F. Low Cost Reversing Narrow Strip Rolling Mill. Engineer, v. 210, Nov. 28, 1960, p. 652.

Stainless steel, Ni, Zr, Pt, beryllium copper, Au plate and clad materials including thermostatic bimetal In-Al and Ag-Sb are reduced to close tolerances in a two-way rolling mill. Cold reduction of 6 in. widths at 250 ft. per min. (F23, 1-67, W23f; Ag, Al, Au, Be-b, Cu-b, Ni, Pt, SS, Zr)

81-F. (Russian.) New Method for Determination oi the Friction Coefficient in Cold Rolling of Tubes. Ya. F. Shevakin and A. M. Ritikov. Tsvetnye Metally, Oct. 1960, p. 76-78.

Method based on measurements of the forces resulting from metal flow with the contact surface kept constant during deformation. Dependence of friction forces upon the deformation degree is tested during deformation of a Cu sample. (F26s, Q9p, 3-68; Cu)

82-F. Teflon-Insert Die Tames Toughies. Steel, v. 148, Jan. 16, 1961, p. 87.

Cold working and forming thin pieces of Ti and stainless steel for aircraft and space vehicle parts using Teflon insert dies. Design of the steel box, punch and die. (F-general, 1-67, T24, W24n; SS, Ti)

83-F. Paper Thin Tantalum, Columbium Cut Weight. Steel, v. 148, Jan. 16, 1961, p. 92-93.

Drawing, swaging and annealing thin walled Cb and Ta tubes. Corrosion resistance, thermal and gettering properties and dimensions of the tubing. Applications of the tubing in heat exchangers, thermocouples and vacuum tubes. (F26r, F25, J23, R-general, P11; Cb, Ta, 4-60)

84-F. (Russian.) Improvements in Forging Methods. F. Sh. Rabaneev. Kuzechno-Shtampovochnoe Proizvodstvo, Feb. 1960, p. 39-40.

Outline of a new method using slabs cut to special dimensions and heated to 400-1100° C. for production of forgings for gears, flanges, hubs and pinions composed of alloy and carbon steel. (F22; AY, CN, 4-52)

85-F. (Japanese.) Surface Faults of Hot Rolled Stock. Takashi Ikeno. Light Metals, v. 10, Nov. 1960, p. 386-393.

Study of factors controlling surface conditions of hot rolled stock for obtaining good surface finish on cold rolled sheet without pickling. Photomicrographic examination of defects in hot and cold rolled Al-Mg alloy after anodizing. 4 ref. (F23, 9-71; Al-b, Mg)

86-F. Extrusion of Hard Alloys. A. B. Grahman. Metal Industry, v. 97, Dec. 16, 1960, p. 502-504.

Extrusion of high Ni alloys by a process in which the billet is clad with Ni and coated with molten glass to facilitate extrusion. Tables of heating time required for 4 in. billets before extrusion. (F24; Ni-b, SGB-q, 8)

87-F. Extrusion of Hard Alloys. A. B. Graham. Metal Industry, v. 97, Dec. 9, 1960, p. 480-482.

Extrusion of high Ni alloys coated with glass lubricants. Viscosity-temperature curves for 23H and "E" type glasses. (F24; Ni-b, SGB-q)

88-F. The Extrusion of Lead and Other Soft Metals. Claude E. Pearson and Redvers N. Parkins. Chapter from "Extrusion of Metals", 2nd Edition. John Wiley & Sons, Inc., New York, N. Y., 1960, p. 20-30.

Design of vertical hydraulic presses operating by the inverted process to extrude Pb pipe and sheathing. Methods of avoiding defects. (F24; Pb)

89-F. The Extrusion of Cable-Sheathing. Claude E. Pearson and Redvers N. Parkins. Chapter from "Extrusion of Metals", 2nd Edition. John Wiley & Sons, Inc., New York, N. Y., 1960, p. 31-73.

Extrusion of Pb and its alloys to produce protective sheathing for electrical conductors and telegraphic transmission lines. (F24, T1b; Pb)

90-F. Equipment for the Hot Extrusion of Hard Metals. Claude E. Pearson and Redvers N. Parkins. Chapter from "Extrusion of Metals", 2nd Edition. John Wiley & Sons, Inc., New York, N. Y., 1960, p. 74-141.

The study of the hydraulic and mechanical auxiliaries used to increase the speed of extrusion operations and the quality of extrusion products. (F24, 1-66, 1-52; SGB-q)

91-F. Flow in Metals During Extrusion. Claude E. Pearson and Redvers N. Parkins. Chapter from "Extrusion of Metals", 2nd Edition. John Wiley & Sons, Inc., New York, N. Y., 1960, p. 142-179.

Study of metal flow during extrusion of Al, brass, Mg and Sn to determine the degree and distribution of the distortion undergone by the metal and the cause of piping, a defect occurring frequently on extrusions. (F24; Al, Cu-n, Mg, Sn)

92-F. The Pressure of Extrusion. Claude E. Pearson and Redvers N. Parkins. Chapter from "Extrusion of Metals", 2nd Edition. John Wiley & Sons, Inc., New York, N. Y., 1960, p. 180-200.

Effect of deformation, extrusion speed, temperature and friction on the amount of pressures required to extrude Al, Sn, Mg, Cd and Zn alloys. (F24, 2-61, 3-68, 3-74; Al-b, Cd-b, Mg-b, Sn-b, Zn-b)

93-F. Theoretical Analysis of Flow in Extrusion. Claude E. Pearson and Redvers N. Parkins. Chapter from "Extrusion of Metals", 2nd Edition. John Wiley & Sons, Inc., New York, N. Y., 1960, p. 201-222.

Study of extrusion variables to determine the optimum extrusion ratio, temperature and speed in relation to the metals to be extruded. Parameters are correlated for Cu, brass, Pb, Sn, Al and Te. (F24; Al, Cu-b, Pb, Sn, Te)

94-F. Metals and Alloys for Hot Extrusion. Claude E. Pearson and Redvers N.

Parkins. Chapter from "Extrusion of Metals", 2nd Edition. John Wiley & Sons, Inc., New York, N. Y., 1960, p. 223-273.

Recommended temperatures for hot extrusion of Cu alloys, nickel silver, high Ni alloys, steel and Al alloys. Tensile strength and elongation of the extrusions as extruded and after annealing. (F24, 1-66, 2-61; Al-b, Cu-b, Ni-b, ST)

95-F. Properties of Extruded Metals. Claude E. Pearson and Redvers N. Parkins. Chapter from "Extrusion of Metals", 2nd Edition. John Wiley & Sons, Inc., New York, N. Y., 1960, p. 273-296.

Effect of inclusion of impurities on the quality of extrusions. Amount of deformation and its distribution over the length and cross section of the extruded part as it affects physical properties. (F24, P-general, 3-68, 3-69)

96-F. Some Special Applications of Extrusions. Claude E. Pearson and Redvers N. Parkins. Chapter from "Extrusion of Metals", 2nd Edition. John Wiley & Sons, Inc., New York, N. Y., 1960, p. 319-329.

Combination of forging and extruding techniques to produce valves, projectile shells, cylinder sleeves, pistons, valve bodies, turbine blades and nozzles composed of chrome-steel alloys and nickel chromium. (F24, F22, T7; Ni-b, ST, Cr)

97-F. Steelcord Tire and Wire Production Techniques. Arthur F. Weber. Preprint no. 278B, Society of Automotive Engineers, 485 Lexington Ave., New York 17, N. Y. 1960. 5 p.

Production of a Firestone Steelcord W-2 tire in which high quality steel rods composed of 0.70% C, 0.60% Mn, 0.25% Si, 0.025% S and P and traces of Cu and Cr are used as cords and enclosed in rubber. Methods of rod selection, patenting, cleaning, brass plating, drawing and stranding to produce steel cord. (F28, J25, L17, T21; ST)

98-F. Manipulation of Metals. Welding and Metal Fabrication, v. 28, Dec. 1960, p. 499-502.

Developments in the fields of extrusion, precision forging, forming by rolling and sheet forming considering only methods which do not involve mechanical or gas cutting. (F-general, G-general)

99-F. Extrusion of Hard Alloys. A. B. Graham. Metal Industry, v. 97, Dec. 23, 1960, p. 521-524.

Die container and liner materials and design; extrusion stems; extrusion of high Ni-containing materials. (To be continued.) (F24; Ni-b)

100-F. Plate Mill Furnaces at Consett. Iron & Steel, v. 34, Jan. 1961, p. 12-15.

Odd shaped and thick slabs for rolling are heated to 900-950° C. in two triple-fired furnaces or in soaking pits which are partly oil-fired and partly electrically heated. Both itms of equipment are completely described. (F21b, 1-52; 4-52)

101-F. Edge Cracking of a Steel Band Conveyor. G. C. C. Parker, T. Furman and K. W. Chandler. Engineer, v. 210, Dec. 30, 1960, p. 1099-1104.

Cracks in the 170,000 psi. steel strip operating over three types of troughing rollers are detected by stress analysis, using strain gages attached to the strip to record eddy current patterns. Cracking is prevented by installing articulated rollers. (F2, W12r; ST, 4-53)

102-F. Designing for the Extrusion Process. Pt. 2. W. F. Walker. Mass Production, v. 36, Dec. 1960, p. 93-99.

Extruding temperature range and speed for extrusion of Al, brass, bronze, Cu, Mg and Ni alloy tubes and hollow sections on various 250-8000 ton horizontal and vertical hydraulic extrusion presses. (F24; Al, Cu-b, Mg, Ni-b)

103-F. (German.) Deformation Theory in the Light of Physical Metallurgy. Hein-Peter Stuwe. Stahl und Eisen, v. 80, Dec. 22, 1960, p. 1963-1969.

Theoretical discussion of the significance of material properties during strip rolling with emphasis on external friction and yield stress. Relation between yield stress and material flow. Influence of temperature, degree of deformation and deformation rate on yield stress. (F23, Q23b, 2-61, 3-68; 4-53)

104-F. Forging Firm Redesigns, Cuts Part Costs 25%. Steel, v. 148, Feb. 6, 1961, p. 74-75.

Outline of a forging cost reduction program in which uniform, rapid heating of the steel, use of contemporary

die design, holding a constant parting line and maintenance of scale-free forgings are the four key points. (F22; ST)

105-F. Ring-Rolling. D. M. Potter. Aircraft Production, v. 22, Dec. 1960, p. 468-474.

Description of a ring mill designed to give uniform circularity, hardness and grain size and circumferential grain flow in Al and Al-bronze products. (F23, Q29n, M27c; Al-b, Cu-b, 4-60)

106-F. Cold Forging Gun Barrel Rifling. L. R. Beesly. Metalworking Production, v. 104, Nov. 16, 1960, p. 63-66.

Chipless forming of a rifle barrel composed of 1% Cr-Mo alloy steel using a vertical cold forging machine which freezes the workpiece between a number of hammers with a predetermined stroke and position. Greater resistance to corrosion and wear and improved surface finish are attributed to the process. (F22, 1-67, T2m; AY, Cr, Mo)

107-F. New Developments in Metal Working. E. L. H. Bastian, I. Rozalsky and K. F. Schiermeier. Lubrication Engineering, v. 17, Jan. 1961, p. 40-47.

Energy transfer and lubrication requirements for forming of refractory metals, super alloys and ordinary metals by cold press and rotary extrusion, radial draw forming, roll forming, hot forging, spark-discharge machining, chemical milling, electrolytic machining and ultrasonic machining. 43 ref. (F-general, G-general, 18-73; SGA-h, SGB-d)

108-F. (Russian.) Automatic Regulation of Thickness of Hot Rolled Strip in Semicontinuous Mills. F. D. Ivanov. Stal', Nov. 1960, p. 1008-1012.

Automatic pressing of steel strip ends and automatic tension of the strip by varying the speed travel through the rolls for regulation of the thickness. Basic principles of the device used for producing tension in the strip. (F23; ST, 4-53)

109-F. (English.) Roller Straightener. Report 1. Straightening of Sections. Haruo Tokumaga. Bulletin of JSME, v. 3, Nov. 1960, p. 572-579.

Calculation of the bending radius required for straightening sections on a roller straightener. Tensile and bend testing of mild steel SS41, hard steel S45C and forged brass BSBF to determine the tensile and hysteresis properties, which must be known in order to use the proper power and axial thrust on the straightener. 5 ref. (F29r, Q5, Q27, Q21; CN, Cu-n, SGB-q)

110-F. Rock-Forging "Irons" Welds to Give Quality Tubing. J. A. Seme. Iron Age, v. 187, Feb. 2, 1961, p. 88-89.

Rock-forging technique does not cold draw tubing. Instead it compression forms the stock by rocking over an internal mandrel. A polished, taped mandrel controls the inside diameter while cam dies control the outer diameter. (F26)

111-F. (German.) Rolled and Drawn Tube Joints in Boiler Production. Horst Buldt. Industrie-Anzeiger, v. 82, Dec. 20, 1960, p. 1739-1745.

Methods and machinery for joining tubes to boiler bottoms and walls by rolling and drawing. Comparison of rolling and drawing operations. Working faults. (F26, K-general, T26q)

112-F. Power Spinning. Charles H. Wick. Chapter 6 from "Chipless Machining". Industrial Press, New York, 1960, p. 145-199.

Description of a cold rolling process for production of cones, cylinders and curved wall sections in which material is plastically deformed to the shape of a rotating mandrel by power fed rolls. Increases in tensile strength and fatigue resistance of steel after rolling are attributed to the process. Thickness of material to be formed is major limitation. 18 ref. (F23, 1-67, Q27a, Q7; ST)

113-F. Rotary Swaging. Charles H. Wick. Chapter 7 from "Chipless Machining". Industrial Press, New York, 1960, p. 200-228.

Reduction process for shaping bars, tubes or blanks by uniformly spaced hammer blows applied in rapid succession by rotating dies. Selection of materials, design and applications. Tooling. 7 ref. (F25)

114-F. Internal Swaging, Rotary Forging and Cold Forming of Multiple-Diameter Shafts. Charles H. Wick. Chapter 8 from "Chipless Machining". Industrial Press, New York, 1960, p. 229-256.

Description of three new chipless forming processes to improve tolerances, surface finish and mechanical properties of metal parts. 7 ref. (F25, F22, G-general, 1-67)

115-F. How to Forge Astroloy. John Luchok. Metal Progress, v. 79, Feb. 1961, p. 91-93.

Large forgings, up to 1000 lb. in weight and 35 in. in diameter, are now being made of this alloy, the newest member of the Ni-base superalloys. Continuing research is expected to make the alloy even more useful as time goes on. (F22; Ni-b, SGA-h)

116-F. Designing for the Extrusion Process. W. F. Walker. Mass Production, v. 36, Nov. 1960, p. 72-81.

Problems in design of Al alloy, brass and Zn extrusions. Effect of extrusion shape on die life and tolerance. Typical materials for extrusions. (To be concluded.) (F24; Al-b, Cu-n, Zn)

117-F. Precision Rolling of Flat Products With Small Diameter Work Rolls. M. G. Sendzimir. Australian Institute of Metals, Journal, v. 5, Nov. 1960, p. 187-200.

Theory, practice and equipment involved in the Sendzimir planetary hot strip and Sendzimir cold strip mills. (F23)

118-F. Some Problems Relating to Hot-Strip Mill Operations. Shigeo Hosoki. Australian Institute of Metals, Journal, v. 5, Nov. 1960, p. 201-208.

Difficulties encountered include problems with roll wear and rolled-in scale and difficulties in temperature control during rolling and coiling. (F23)

119-F. Basic Features of the Cold Forging Process. Pt. 2. A. M. Cooper. Wire Industry, v. 28, Jan. 1961, p. 53-55.

Cold drawing of carbon steel, alloy steel, stainless steel, Cu, Ag, brass and bronze to produce cold heading wire. Effect of cold drawing and impurity content on area reduction, elongation and tensile strength. Dimensional tolerances. (F28, 1-67, Q23p, Q27a; Ag, AY, CN, Cu-b, SS)

120-F. Works Problems. Wire Industry, v. 28, Jan. 1961, p. 67.

Heating and soaking of mild carbon steel at 680-700° C. prior to cold drawing eliminates need for annealing during production of 14 S. W. G. wire from 1/4 in. m. s. rods. Description of the McQuaid Ehn grain test which consists of carburizing the steel sample at 927° C. and examining it microscopically. (F28, 1-67, M27c; CN, 4-61)

121-F. The Fundamentals of Wire Drawing. C. P. Bernhoeft. Wire Industry, v. 28, Jan. 1961, p. 69-70.

Methods of calculating drawing angle, ratio of drawn size of wire to inlet size of wire and area reduction and the relationships between them. (F28)

122-F. Modern Trends in the Manipulation of Metals. C. G. Keil. Aircraft Engineering, v. 32, Nov. 1960, p. 327.

Summaries of papers presented at the Institution of Production Engineers Conference held at Brighton include methods of cold extrusion, cold and precision forging, spline and thread rolling, explosive forming, fluid forming and tube-in-strip process. (F-general, G-general)

123-F. Ductile Vanadium: Techniques That Make Fabrication Easier. T. W. Merrill. Iron Age, v. 187, Feb. 9, 1961, p. 110-112.

Methods for avoiding contamination and oxidation during heating for hot working. Cold working of vanadium without excessive hardening. Heat treatment, drawing, extruding and machining techniques. (F21b, J-general, G17, F24, F27; V)

124-F. Application of Flow Research to Industrial Furnaces With Particular Emphasis on Soaking Pits. Herbert Boenecke. Iron & Steel, v. 33, Dec. 19, 1960, p. 630-634.

Observation of flow patterns using smoke tests in model and full scale one-way soaking pits for achieving rapid and intensive mixing of the fuels using as few burners as possible. Experiments show that the gas volume to be circulated can be influenced by the pre-pressure of gas and air at the burner, without having to change the

furnace chamber pressure. Effect on temperature differences between top and bottom of individual ingots during soaking. (F21b, W20g, 1-54)

125-F. Economy of Metal in the Rolling Process. I. M. Pavlov. Paper from "Contemporary Problems of Metallurgy". Consultants Bureau, Inc., New York, 1960, p. 383-391.

Survey of rolling characteristics of light metals, refractory metals, steels, cast iron, reactive metals, bimetals and composite metals. Savings of metal during rolling is discussed in terms of rolling process variables and workpiece size and shape, pretreatment and surface condition, defects, initial cost and ratio of dimension of finished product to the original dimensions. 16 ref. (F23; ST, CI, EG-a, EG-d, 7-59)

126-F. Modernization of Blooming Mills. P. A. Aleksandrov. Paper from "Contemporary Problems of Metallurgy". Consultants Bureau, Inc., New York, 1960, p. 416-442.

Equipment design and technological parameter for rolling steel blooms and billets. Investigation of the ingot reduction process and consolidation of cast steels, with attention to defects producing stress caused by workpiece size and weight increase. Application of modernized blooming-slabbing equipment to production of carbon and alloy steel and slabs. 24 ref. (F23n, W23a, 17-51; ST)

127-F. (German.) Steel Extrusion Profiles. N. Fromm. Stahlbau, v. 30, Jan. 1961, p. 30-32.

Hot extrusion of steel at 1100-1300° C. using steel dies with glass as lubricant (Ugine-Sejournet process). Mechanical properties, surface quality and gage accuracy of extruded profiles. Applications. (F24, 1-66, Q-general; ST)

128-F. Fillet-Rolling Operation on Diesel-Engine Crankshafts. W. Egger. Machinery (London), v. 98, Feb. 1, 1961, p. 276-278.

Fillet radii of main and pin journals of diesel engine crankshafts are rolled by wedge shaped rollers under a pressure of 175 lb. Rolling operation increases the hardness value of the fillet and improves surface finish. (F23)

129-F. Largest Titanium Forgings Made in Closed Die. N. G. Arrell and J. E. Coyne. Materials in Design Engineering, v. 53, Feb. 1961, p. 20-21.

Production of rocket motor cases from 13V-11Cr-3Al beta Ti alloy by closed die forging or extrusion. (F22, F24, T24b; Ti, 17-57)

130-F. Net Size Forging for Stainless Steel. JL Explorer, v. 2, 1961, p. 8-9.

Forging of 302 and 321 stainless steel into turbine blades, housing bells and pressure vessel caps by a high-energy rate forging technique. The forging machine (Dynapak) uses ultra-high pneumatic velocities to create pressures up to 200 psi. (F22, T7h; SS, 17-57)

131-F. Operations of the Wide Strip Rolling Mills at Fairless Works. K. L. Johannsen. Paper from "Production of Wide Steel Strip". Iron and Steel Institute, London, England. May 1960, p. 76-91.

Hot rolling slabs and blooms directly from steel ingots with width and thickness of hot strip controlled by photoelectric cells and X-ray gages. Design and layout of soaking pits, slabbing mill, hot strip mill and cold reduction mill. (F23, 1-66, W23a, 17-51; ST, 4-53)

132-F. Metallurgical Principles and Practice in the Manufacture of Cold-Reduced Tinplate. W. J. S. Roberts. Paper from "Production of Wide Steel Strip". Iron and Steel Institute, London, England. May 1960, p. 95-102.

Production of a prepared steel base from rimming steel, Al killed steel, capped steel by hot rolling, cold reducing and temper rolling followed by strain aging and pickling. Coating with tin by hot dipping or electrolytic plating. Influence of base metal on surface quality. (F23, L16, L17; ST, Sn, 4-53)

133-F. The Rolling of Very Thin Tinplate. M. D. Stone. Paper from "Production of Wide Steel Strip". Iron and Steel Institute, London, England. May 1960, p. 103-111.

Quality and economic considerations and production problems in manufacture of thin tinplate by a single pass through a higher-speed 6-stand tandem cold

mill, by rolling twice through a 5-stand mill and by cold rolling after electrotinning. (F23; ST, Sn, 4-53, 8)

134-F. (French.) Pieces Precision-Forged and Extruded by the Dynapak Process. F. A. Monahan. Machine Moderne, v. 54, Dec. 1960, p. 19-23.

Fabrication of metals to high tolerances by a high energy forming method using compressed air. Application to stainless steel superalloys, refractory metals, bronze and Al. (F22, F24)

135-F. (French.) Production of the "Simca-Aronde". Production of Direction and Relay Levers. Machine Moderne, v. 54, Dec. 1960, p. 41-49.

Metalworking, machining and polishing operations and machinery used in manufacturing direction and relay levers made from forged pieces of 16 NC 6 steel. (F-general, G17; ST, 4-51)

136-F. Works Practice in the Manufacture of Nonferrous Extruded and Rolled Products. J. N. Morris. South African Institute of Mining and Metallurgy, Journal, v. 61, Dec. 1960, p. 264-283.

Processes employed in the melting, casting, extrusion and rolling of Cu alloys. (F23, F24, C-general, E-general; Cu-b)

137-F. (Japanese.) Nickel Base Heat Resisting Alloys. Pt. 1. Effect of Aluminum and Titanium on the Forgeability and the Age-Hardening Property of Nimonic-100 Type Alloys. Renpei Yoda, Heitaro Yoshida and Sennosuke Takahashi. Japan Institute of Metals, Journal, v. 24, Nov. 1960, p. 723-727.

Specimens containing 0.72-6.89% Al and 0.74-4.64% Ti are hot worked after solution treatment, quenching, oxidizing and aging at 900-1200° C. for various times. Data are given for deformation and oxidation resistance, forgeability, age-hardening characteristics, metallographic structure, constitutional diagram and hardness as a function of composition, Al and Ti concentration and heat treatment time and temperature. 9 ref. (F22, 17-52, Q-general, 2-60, 2-64; Ni-b, Al, Ti)

138-F. High Strength Steel Forgings. H. J. Henning and F. W. Boulger. Defense Metals Information Center, Battelle Memorial Institute, DMIC Rept. 143, Jan. 5, 1961, 62 p. (Available as PB 151102 from U. S. Office of Technical Services, Washington 25, D. C.)

Forging of martensitic-hardenable and semi-austenitic precipitation-hardenable steels. Data are given for ultrasonic quality, magnaflux quality and grain flow of the materials and for mechanical properties of the finished forgings. (F22; SS, SGB-a)

139-F. Cold Forging of Steel. Machinery Lloyd (Overseas Edition), v. 33, Jan. 7, 1961, p. 37-39.

Finished components are cold forged from low carbon steel rod following cropping, phosphating, lubricating, preforming, deburring and chamfering. (F22, 1-67; CN-g)

140-F. Forging Turbine-Blades. Aircraft Production, v. 23, Jan. 1961, p. 2-4.

Rough and close forging of Nimonic alloys to form gas turbine blades. (F22, T7h; Ni-b)

141-F. What's Needed to Produce Bright Drawn Aluminum Tube. Vern G. Gerschutz. Modern Metals, v. 17, Feb. 1961, p. 56.

Influence of proper lubrication and the finishing draw on the successful production of bright finish drawn Al tubing. (F26r, 18-73; Al)

142-F. Skelp Welder Speeds Tubemaking. Steel, v. 148, Mar. 6, 1961, p. 72.

Design of an automated continuous line handling steel skelp up to 3/16 in. thick and 15 in. wide. Coil ends are angle cut and aligned, then butted together for arc welding. (F26p, K1; ST)

143-F. The Fundamentals of Wire Drawing. Wire Industry, v. 28, Feb. 1961, p. 166-169.

Relationship between the breaking load of Al and Al alloy wire and the die pull necessary for producing a sound quality wire. Die pull as affected by kind of material drawn, its size and temper and the area reduction given per pass. (F28)

144-F. (French.) Heating of Special Steel Ingots and Billets. Metallurgie et la Construction Mechanique, v. 92, Nov. 1960, p. 973, 975, 977, 979.

Heating of electric steel ingots and billets in electric soaking pits. Description of continuous crane operated pits. Temperature control. (F21b; ST)

145-F. Modern Trends in the Manipulation of Metals. D. F. Galloway. Production Engineer, v. 40, Feb. 1961, p. 83-98.

Production of steel, Al, Cu and Sn sections and finished components by extrusion, forging, precision rolling and sheet forming. (F24, F23, F22; Al, Cu, Sn, ST)

146-F. Inland's New Automatic Slabber. E. R. McGaughey. Iron and Steel Engineer, v. 38, Feb. 1961, p. 105-123.

Tandem and hot rolling of steel ingots by an automized slabbing mill controlled by punched cards. Measuring devices include electromechanical device, Pt-Rh thermocouple and infrared hot metal detector. Ingots are handled by an automatic positioned, cable driven ingot buggy. (F23, 1-52; ST, 5-59)

147-F. X-Ray Gages Increase Output on Fast Foil Mills. Iron and Steel Engineer, v. 38, Feb. 1961, p. 132.

Rolling of Al on foil mill and cold mill at 800-2000 ft. per min. with thickness controlled automatically by X-ray gages to tolerances of 2% in the range of 0.007-0.002 in. and 1% in the range of 0.002-0.025 in. (F23, S14e; Al)

148-F. Forming Beryllium. Metalworking Production, v. 105, Feb. 15, 1961, p. 66.

Rolling, forging, forming or extrusion of Be above 1400° F. using metal clad in a mild steel, covered with a protective coating or handled under an inert atmosphere. (F23, F22, F24; Be)

149-F. Rotary Swaging Goes Automatic. Metalworking Production, v. 105, Feb. 15, 1961, p. 77-79, 81.

Profiles are formed on the inside diameter of cylindrical workpieces by a rotary swaging machine to produce starter motor clutch housings for automobiles. Increases in hardness, tensile strength and fatigue strength are attributed to the process. (F25, T21b)

150-F. (German.) Engineering Techniques in Manufacturing Nonferrous Semi-Finished Products. Pt. 1. Problems in Modern Metal Rolling Processes. O. H. C. Messner. Zeitschrift fur Metallkunde, v. 52, Jan. 1961, p. 57-68.

Cold and hot rolling of Cu and alpha brass sheet and strip is discussed in terms of machinery (roll, stands, auxiliary equipment such as reels, manipulators, cutting machines); rolling conditions (rolling temperature, initial and final dimensions); intermediate surface treatments and lubrication and cooling of rolls. (F23, 1-52; Cu-b, 4-53)

151-F. (German.) Engineering Techniques in Manufacturing Nonferrous Semi-Finished Products. Pt. 2. Drawing of Metal Rods and Tubes by Modern Drawing Machines. Heinrich Makelt. Zeitschrift fur Metallkunde, v. 52, Jan. 1961, p. 69-75.

Design and operation of an automatic 25 ton drawing bench for brass and Cu rods and tubes. Computation of drawing forces and presentation of results by nomogram. (F26r, F27, 1-52; Cu-b)

152-F. Extruded Magnesium Pellets. R. S. Busk. Precision Metal Molding, v. 19, Mar. 1961, p. 50-51.

Comparison of a commercial Mg pellet alloy, (P) ZK60B, with ZK60A as to mechanical properties, composition and ease of extrusion. Production of pellet, foam and wool extrusions or extrusions containing dispersed oxides. (F24, Q-general; Mg-b)

153-F. Drop-Forging Titanium Alloys. J. C. Bell and E. Leybourne. Metal Treatment, v. 28, Feb. 1961, p. 45-47.

Drop forging of Ti billets at 400-920° C. by oil hardened steel dies to produce aircraft parts. Finishing by sand or shot blasting. Data are given for tensile properties of heat treated part. (F22n, L10c, Q27, T24; Ti-b)

154-F. Press-Forged Titanium Components. E. T. Stewart-Jones. Metal Treatment, v. 28, Feb. 1961, p. 48-49.

Press-forging of Ti alloys such as ICI 314A and EX013C by a hydraulic press and steel dies. Tensile properties, ductility and hydrogen and oxygen affinity of vacuum melted Ti. Comparison with Al and steel. (F22, Q27, Q23p; Ti-b)

155-F. Titanium Compressor-Blade Forgings. G. P. Eccles. Metal Treatment, v. 28, Feb. 1961, p. 50-52.

Mechanical or electrical upsetting, extrusion at up to 850° C. and forging at up to 1040° C. of Ti, T150A Ti alloy, T75 ICI Ti alloy and G79 Ti alloy. Finishing by sand blasting, electropolishing and chemical etching. (F22j, F24, L10, L12, L13p; Ti-b)

156-F. Close-to-Form and Close-Tolerance Forgings. Metal Treatment, v. 28, Feb. 1961, p. 53-58.

Forging techniques at temperatures up to 1140° C. for steels, Nimonic alloys, Ti, Al alloys, Hiduminium and Mg alloy. (F22; Al-b, Mg-b, Ni-b, ST, Ti)

157-F. Temperature Changes Occurring During the Extrusion of Aluminum, Tin and Lead. A. R. E. Singer and J. W. Coakham. Institute of Metals, Journal, v. 89, Feb. 1961, p. 177-182.

The temperature at which extrusions emerge from the die is measured in the case of commercially pure Al, super pure Al, Sn and Pb extruded at ram speeds varying from 1-30 in. per min. on a 100 ton laboratory press at 20-400° C. Emergent temperature rises of up to 200° C. occurring in three stages, rapid, slow and sharp, in that order, are observed as a function of the physical properties of the metal and the extrusion ratio and speed. 6 ref. (F24, 2-61; Al-b, Pb, Sn)

158-F. German Gear Process Often Bypasses Machining Step. Steel, v. 148, Mar. 20, 1961, p. 100-101.

Production of gears by a forging process in which blanks are cut from a rod so that grain flow in the finished piece will run parallel to the gear axis, then heated, rough forged, finish forged and trimmed to remove flash. (F22, T7a)

159-F. Tapco Explores Tungsten Fabrication. John F. Judge. Missiles and Rockets, v. 8, Mar. 13, 1961, p. 36-37.

Extrusion techniques for production of W-15% Mo alloy bar stock. Description of research on the compatibility of tungsten aircraft components with other materials. (F24, T24; W-b, Mo)

160-F. Forging Effects on the Mechanical Properties of Three Boron-Treated Steels. E. DiCesare. Watertown Arsenal Laboratories. U. S. Office of Technical Services, PB 151814, July 1959, 50 p. $1.25.

Forging characteristics of structural steels containing boron and rare earths. Three alloys were hot forged (225° F.) by upsetting and drawing out (swaging) with reduction ratios up to 8:1 and 13:1 respectively. Heat treatment gives optimum tensile properties and toughness in both the upset forged and the drawn-out ingots. There is about a 66% reduction for the swaged ingots, 50% reduction for the upset-forged 14B35 alloy and no reduction for the upset-forged 145B50 and 10R70 alloys. (F22, 17-52; ST)

161-F. Do Molybdenum Disulphide Containing Wire Drawing Lubricants Have a Place in Your Mill? Walter A. Smigel and William A. Stillwell. Wire and Wire Products, v. 36, Mar. 1961, p. 313-314, 376.

Drawing of high carbon and spring steel, Al core wire welding rod and wire rope using lubricants containing MoS_2. Data are given for drawing speed and die wear as influenced by lubrication. (F28; Al, CN-r)

162-F. New Temper Mill Slashes Processing Time. Western Metalworking, v. 19, Mar. 1961, p. 42.

Rolling of carbon, stainless and alloy steel strip in a new two-high temper mill. Design features and capacity. (F23, W23c, 17-51; AY, CN, SS)

163-F. (French.) General Study of Drop Forging. Pt. 5. Heating in Drop Forging. Pratique des Industries Mecaniques, v. 47, Jan. 1961, p. 1-5.

Heat economy in drop forging. Influence of coal, coke, light and heavy fuel oil and natural gas heating on production costs. Application of resistance and induction heating. (F21b, F22n)

164-F. Strength of Castings Multiplied by Forging. John F. Judge. Missiles and Rockets, v. 8, Mar. 20, 1961, p. 30.

Press forging of 17-4-PH-stainless steel and 18-8 stainless steel at -100° F. to impart higher tensile strengths and increase yield and proof strengths without the ductility increase associated with heat treatment alone. (F22; SS, 5)

165-F. (Russian.) Production of Steam and Gas Turbine Blades. B. N. Bohatov,

V. N. Martinov and V. S. Povarov. Kuznechno Shtampovochnoe Proizvodstvo, Jan. 1960, p. 17-19.

Roughing, extrusion, rolling, lubricating, heat treating and finishing techniques in production of turbine blades. Economy in metal usage and machining time as influenced by machining sequence. (F22, T7h)

166-F. (Translation-ConBur.) The Use of Glass Lubricants for Hot Deformation of Chrome-Nickel and Titanium Alloys. L. K. Kovalev. Glass and Ceramics, v. 17, Dec. 1960, p. 181-183.

Metal blanks are covered with molten glass film to insulate hot metal from atmospheric air, to prevent oxidation and scale formation and to increase the working interval. Glass is easily separated from metal surface by hammer blows. (F-general, 18-73; Ni-b, Cr, Ti-b)

167-F. (German.) Production of Fuel Elements by Extrusion. Hans Pischel. Kerntechnik und Isotopentechnik, v. 2, Nov. 1960, p. 366-369.

Review of extrusion and coextrusion techniques using presses of 315-1000 tons pressing force. Extrusion of Al, Zr, Cu and alloy steel and of uranium in the gamma and alpha phase. Coextrusion of U-Al and Pu-Zr combinations. Use of protective atmosphere and of protective salt. (F24; Al, AY, Cu, Zr)

168-F. Extrusion of Steel. D. A. Edgecombe. Journal of Metals, v. 13, Mar. 1961, p. 211-214.

A brief review of forward, inverted and piercing extrusion methods and an outline of the specific production techniques for tubular and solid-shape steel and steel alloy extrusions. Emphasis is given to glass lubrication and to pressure and flaw considerations. (F24; ST)

169-F. (French.) Use of Heat Reflectors in Forging. D. Flament. Metallurgie et la Construction Mecanique, v. 93, Jan. 1961, p. 15-17.

Forging of round low carbon steel stock into a hexagonal cross section, using a steel tube surrounding the rod to be forged as a protection against heat losses. Factors influencing the degree of protection are the reflecting power of the internal tube surface and the tube diameter. (F22; CN-g)

170-F. Pipe Mill, Most Modern of Its Kind, Completed at Lorain. U. S. Steel Quarterly, v. 15, Feb. 1961, p. 3.

Production of black and galvanized steel pipe of 1 1/4-4 in. diameter in a continuous butt welding pipe mill, with elongation and reduction in a stretch reduction mill and quality control by hydrostatic testing. (F26, 1-52; ST)

171-F. Temperature Changes Associated With Speed Variation During Extrusion. A. R. E. Singer and S. H. K. Al-Samarrai. Institute of Metals, Journal, v. 89, Mar. 1961, p. 225-231.

Al and Pb are extruded at several extrusion ratios, using constant ram speeds, stepped variations and speed programs. The temperatures at which the extrusions emerge from the die are measured and related to the process variables, with theoretical analysis of heat flow. 12 ref. (F24, P11k, 1-66; Al, Pb)

172-F. (German.) Friction Welding. U. Oestmann. Maschinenbau, v. 9, Dec. 1960, p. 356-359.

Butt welding of cylindrical parts and tubes of steel, cast iron, Cu, Ti, light metal and plastics on a lathe by friction heating without external heating or welding additions. Principles of reaction mechanism and design of equipment. (F26p, 1-52; ST, CI, Cu-b, Ti, EG-a39, NM-d)

173-F. (German.) Investigation of Power Demand and of Kinetics in Blooming (Rolling). E. Kiss. Technical University for Heavy Industry, Publications (Miskolc, Hungary), v. 21, 1960, p. 313-323.

Production test rolling of 3100-5100 kg. steel ingots to measure kinematic rolling data such as temperature changes during rolling, roll pressure and force and power consumption for correlation with optimum rolling time. (F23; ST, 5-59)

174-F. (German.) Evaluation of Power Demand in Rod Drawing Using Drawing Dies With Curved Profiles. I. Mecseki. Technical University for Heavy Industry, Publications (Miskolc, Hungary), 1960, p. 303-311.

Derivation of formulas for computation of drawing forces and correlation with production and laboratory tests in measuring drawing force, drawing angle

and drawn surface on Cu and brass rods. (F27; Cu-b)

175-F. (German.) Influence of Die Shape and Lubricant on Hollow Drawing of Al 99.5 Tubes. G. Devenyi. Technical University for Heavy Industry, Publications (Miskolc, Hungary), v. 21, 1960, p. 281-302.

Test drawing of predrawn and annealed 99.5% Al tubes of given mechanical properties using dies of various drawing angles and with various lubricants such as beeswax and organic and inorganic oil. Determination of drawing force and surface quality of tubes as influenced by shape of die and lubricant. (F26r; Al)

176-F. Elongation vs. Reduction--A New Precept. Anton F. Mohrnheim. Wire, no. 51, Feb. 1961, p. 21-24.

The elongation factor is suggested for wire and tube drawing calculations in place of the per cent reduction in area as a principal measure of plastic deformation. A clearer conception of different mechanical and metallurgical influences on the process and the material is attributed to the derived mathematical relationship. 7 ref. (F26r, F28, Q24)

177-F. (Japanese.) Cold Rolling With a Sendzimer Mill. Kyou Ouhama and Yoshiaki U'eda. Japan Society of Mechanical Engineers, Journal, v. 63, Nov. 1960, p. 1500-1505.

Construction and mechanism of the mill; application and process parameters in the rolling of stainless steel strip. (F23, W23f; SS, 4-53)

178-F. (Czech.) Joining of Low Carbon Steel With Stainless Steel in the Manufacture of Clad Steel. Milan Zidek. Hutnicke Listy, v. 16, Jan. 1961, p. 19-28.

Solid face bonding of composite ingots cast from carbon steel containing 0.14-0.5% C, 0.39-0.43% Mn and 0.16-0.30% Si and alloy steel with 0.07-0.13% C, 0.42-1.60% Mn, 0.33-0.98% Si, 11.85-19.20% Cr, 0-12.90% Ni, 0-0.51% Ti and 0-1.80% Mo by rolling. Effect of diffusion and heat treatments on structure of contact zone and shear strength. 15 ref. (F23, K5k, L22, N-general, 2-64; SS, CN)

179-F. Introduction to the Theory and Practice of Flat Rolling. Pt. 7. C. W. Starling. Sheet Metal Industries, v. 38, Mar. 1961, p. 211-218.

Mechanical, electromechanical, hydraulic, electrical and optical methods of measuring roll force on a rolling mill. Devices for measuring torque. (F23)

180-F. The Transient Temperature Distribution Within Slabs Heated in Continuous Furnaces. A. H. El-Waziri. Iron and Steel Engineer, v. 38, Mar. 1961, p. 130-138.

Prevention of longitudinal temperature variation in steel slabs to be rolled into steel strip and consequently the periodic gage variation in the finished strip. Methods are proposed for control during heating involving raising the skid coolant temperature and changes in the geometrical configuration of the skids. 8 ref. (F21b)

181-F. The Drawing of Stainless Steel and Nickel Chrome Alloys. Wire Industry, v. 28, Mar. 1961, p. 261, 286.

Ni-Cr alloys and stainless steel are drawn using an oxalate coating which automatically disperses during annealing of the wire. (F28, 18-72; SS, Ni-b)

182-F. The Fundamentals of Wire Drawing. Pt. 9. Die Pull. C. P. Bernhoeft. Wire Industry, v. 28, Mar. 1961, p. 266-267, 272.

The relation between the breaking load of wire and die-pull is shown for pure Al and Al alloy. The die-pull increases as the breaking load increases. (F28; Al-b)

183-F. Portable Radiant Heater Simplifies Hot Forming Work. Douglas B. Hugill. Modern Machine Shop, v. 33, Apr. 1961, p. 116-119.

Design and operation of a heating unit built into a caster-equipped carriage frame and consisting of an extendable and retractable lamp bank which is used for difficult hot forming operations on Al, Mg, Ti, Mo and U. (F23b, 1-52; Al, Mg, Ti, Mo, U)

184-F. Combined Town/Gas Fuel Oil Flames for Heating Ferrous Metals. E. A. K. Patrick and N. G. Patel. Insitution of Gas Engineers, v. 1, Mar. 1961, p. 157-183.

Application of gas and oil burners to the heating of "35" carbon steel,

carbon case hardening steel and Ni-Cr-Mo steel for forging. Effect of types of fuel (i.e., fuel oil, town gas and various mixtures of fuel oil and town gas) at differing excess air pressure and times of heating on the quantity and adherence of scale formed on mild steel and alloy steels. 32 ref. (F23b, 1-52, 9-52; CN, ST, 5-59)

185-F. Forging Research in Sweden. Erik Tholander. Metal Treatment and Drop Forging, v. 28, Mar. 1961, p. 89-94.

Description of research on forging of Pb in open and closed dies to determine the effect of the internal pressure of the metal on the behavior of the metal during a forging blow. (F22; Pb)

186-F. Precision Forging of Steel Shafts. Metal Treatment and Drop Forging, v. 28, Mar. 1961, p. 95-98.

Multiple-diameter steel shafts are produced from hot billets by a vertical or horizontal forging machine having multiple hammers arranged to reciprocate at high speed. Surface finish does not require additional machining. (F22; ST)

187-F. Straightening of Steel and Aluminum. Michael V. Zaustin. Tool and Manufacturing Engineer, v. 46, Mar. 15, 1961, p. 69-74.

Manual, roller and rotational straightening methods. Calculation of bending moments, using the ratio of the plastic section modulus to the elastic section modulus to define variational limits. Deformation mechanisms. (F29r; Al, ST)

188-F. (German.) Influence of Back Pull in Drawing of Steel Wire on Drawing Technology and Properties of Drawn Wire. Manfred Martin, Heinrich Koch and Fritz Fischer. Stahl und Eisen, v. 81, Mar. 16, 1961, p. 349-356.

Drawing of Pb-patented, pickled steel wire (5.2 mm. diameter) with sorbitic microstructure and 0.62-0.82% C at various intensities of back-pull. Influence of back-pull on drawing force, drawing work drawing temperature and on mechanical properties of drawn wire. (F28; ST)

189-F. (German.) Some Principles of the Plasticity Theory of Strip Rolling and an Approximate Estimation of the Position of the Nonslip Point. Alex Troost and Karlheinz Holling. Zeitschrift fur Metallkunde, v. 52, Feb. 1961, p. 95-100.

Novel quasi-linear solution of the differential equation of strip rolling for evaluating stress distribution in rolling gap. Comparison of computed results with those obtained in cold rolling of Al and hot rolling of steel. (F23; Al, ST)

190-F. Composite Tubing and Piping. J. B. Ulam. Steel Horizons, v. 23, no. 2, 1961. Insert.

Production of composite tubing from dissimilar metals by a hot extrusion process. Sizes, tolerances, corrosion resistance, mechanical and thermal properties of combinations of several types of steel, steel alloys and Inconel. Technique used in welding composite tubing. 4 ref. (F24, Q-general, K-general; Ni-b, ST, 4-60, 7-59)

191-F. Works Practice in the Manufacture of Nonferrous Extruded and Rolled Products. J. N. Morris. Engineer and Foundryman, v. 26, Jan. 1961, p. 31-40.

Foundry technique for Cu, Cu alloys, Al and Al alloys cast into suitable shapes for subsequent work. Description of rolling mill operations including scalping and blanking, cold rolling and annealing and pickling. Tube and hollow shape production by extrusion. (F23, F24; Al-b, Cu-b)

192-F. Basic Features of Cold Forging. A. M. Cooper. Machinery Lloyd (Overseas Edition), v. 33, Mar. 4, 1961, p. 41-45.

Cold forging of Cu, Ag, brass, bronze, carbon, alloy and rimmed steels and 18-8 stainless steel to increase tensile strength, area of reduction and elongation while reducing the ductility. (F22, 1-67; Ag, AY, CN, Cu-b, SS)

193-F. The Manufacture of Sheet Metal for Porcelain Enameling. P. A. Reynolds. Paper from "Porcelain Enamel Institute Forum, Proceedings". v. 20. Porcelain Enamel Institute, Inc., Washington, D. C., 1958, p. 4-7.

Ways of enhancing flatness, formability, enamelability, resistance to sag and surface texture during casting, rolling and normalizing operations on steel sheets for porcelain enameling. (F23, D9, J24; ST)

194-F. Double Advantages for Carbon and Alloy Steel Tubing. Electrified Industry, v. 25, Apr. 1961, p. 33-35.

Production of seamless steel tubing by combining arc furnace melting and a new extrusion process results in a pipe with better grain structure, improved physical properties, more uniform wall thickness and high steel quality. (F24, D5; AY, CN)

195-F. (German.) Progress in Processing of Sinter Aluminum. A. Akeret. Metall, v. 15, Mar. 1961, p. 199-200.

Methods of processing sintered Al containing 5-13% Al_2O_3 such as die forging, impact extrusion, drawing, cold pilgering, hot and cold rolling and cold pressing; dyzacking, deep drawing and bending of sheet; and machining. (F-general, G-general; Al-b, 6-70, 6-72)

196-F. (German.) Use of Divided Strip of Killed and Rimming Steel Quality in Manufacturing Longitudinally Welded Tubes. Klaus Edelmann. Neue Hutte, v. 6, Feb. 1961, p. 81-87.

Test welding of 0.08-0.10% C steel tubes (12-45 mm. diameter, 1-2.5 mm. wall thickness) with subsequent investigation of segregation by sulphur prints and chemical analysis and technological testing of tubes by tensile, expansion, folding, flanging and bursting tests. (F26p, Q-general, S13; ST, 4-60, 17-57)

197-F. (German.) Investigation on a Tube Cold Rolling Pilger Mill. Willi Jackel, Horst Neumann and Wolfgang Hofmann. Neue Hutte, v. 6, Feb. 1961, p. 87-91.

Calibration of a cold pilger machine for production of seamless steel tubes (57 mm. diameter, 5 mm. wall thickness) by various methods and subsequent measurement of rolling forces and roll wear in cold pilger rolling. (F26q, 1-52; ST)

198-F. (German.) Process Techniques in Nonferrous Semifinished Products Industry. Fritz Zeunert. Zeitschrift fur Metallkunde, v. 52, Mar. 1961, p. 152-158.

Production of high-quality seamless tubes (12-92 mm. diameter) by stepwise rolling and cold pilgering through a combination of a mechanical and hydraulic press or cross rolling mill and a single or multiple high-speed pilger mill. (F26q, 1-52)

199-F. Greater Integration for Broader Product Lines. H. K. Darby. Modern Metals, v. 17, Apr. 1961, p. 60, 62, 64-66.

Hot rolled coil of 5055 Al alloy is reduced to various gages in a cold rolling mill. Processes include annealing and vinyl coating. (F23, J23, L26; Al-b)

200-F. Brinsworth Cold Mill Features Latest Control Techniques. British Steelmaker, v. 27, Apr. 1961, p. 102-103.

Design and operation of a mill for rolling gage ranges of 0.010-0.160 in. in widths to 18 in. for all qualities of steel but primarily for cold rolling of low-carbon steels in all tempers. (F23, W23f; ST)

201-F. Recent Advances in the Theory of Drawing of Thin Shells. W. Szczepinski. Applied Mechanics Reviews, v. 14, Mar. 1961, p. 173-176.

Analysis of principles with derived equations for drawing rotationally symmetric shells and shells with arbitrary double curvature. 25 ref. (F27, 10-51)

202-F. (Translation-Brutcher no. 5090.) Effect of Temperature and Time of Reheating of Large Ingots for Forging Upon Steel Properties. M. P. Braun. Izvestiya Vuz-Chernaya Metallurgiya, Dec. 1960, p. 111-113.

Search for ways of speeding up hot working processes with special reference to the use of higher than usual reheating temperatures for 30-40 ton forging ingots of low-alloy Cr, Cr-Ni and Cr-Ni-Mo steels. (F-general, 1-66; ST, Cr, Mo, Ni)

203-F. Press-Furnace Setup Boosts Forging Capacity. Steel, v. 148, May 1, 1961, p. 59.

Forgings of 8620 and 4718 steel are produced in three strokes using a setup including a rotary hearth billet heating unit and a forging press. (F22, 1-53; ST)

204-F. New Trends in the Technology of Plastic Working of Metals. Czechoslovak Heavy Industry, Apr. 1961, p. 2-8.

An international symposium discussing problems in plastic working of metals including utilization of high-energy rate, piercing at high speed, friction

problems in hot and cold drawing sheets, plastic working by radial molding and extrusion from rings, rolling of serrated shafts and forging and production of forging dies. (F-general)

205-F. Experimental Investigation of the Extrusion of Metals. H. Ll. D. Pugh and M. T. Watkins. Production Engineer, v. 40, Apr. 1961, p. 256-282.

Effect of extrusion method, billet dimensions, ram speed, extrusion ratio, tool geometry and lubrication on the pressure required to extrude sample shapes from 99.5 Al, DTD 363 Al alloy, Cu, 70-30 brass, Cb, Ti and carbon, alloy and stainless steels. 29 ref. (F24; Al-b, AY, Cb, CN, Cu-b, SS, Ti)

206-F. Basic Features of the Cold Forging Process. A. M. Cooper. Production Engineer, v. 40, Apr. 1961, p. 283-296.

Cold forging and drawing of bronze, brass, Ag, Cu, Carpenter 10, 305 steel, EN 1 A, EN 58 E, 18-8 stainless and ferritic steels. Effect of carbon content on tensile strength, elongation, yield point and reduction in area. (F22, 1-67, F27, Q-general; Ag, Cu-b, SS)

207-F. The Fundamentals of Wire-Drawing. Pt. 10. The Parallel in the Die. C. P. Bernhoeft. Wire Industry, v. 28, Apr. 1961, p. 388-390.

Effect of parallel length on die pull and of lubricant on heat and gliding friction during drawing of Al wire. (F28, 18-73; Al-b)

208-F. Mass Production of Non-Ferrous Forgings at Harvey Aluminum. Industrial Heating, v. 28, Mar. 1961, p. 456-458, 460, 462, 464.

All types of forgings including precision, no-draft, blocker and impact types are produced on mechanical and hydraulic presses after heating to controlled temperature in a continuous heating furnace. Tensile properties and hardness are given for various forged alloys. (F22; Al-b)

209-F. Simultaneous Extrusion. George E. Henning. Engineer, v. 5, Apr. 1961, p. 39-41.

Multicoat extrusion line insulates and jackets a Cu conductor with polyethylene and polyvinyl chloride respectively by the use of a common extrusion head at the rate of 1500 ft. per min. Application in telephone wire. (F24; Cu)

210-F. The Attenuation of Dimensional Variations in Rolling. J. F. Wallace and K. Bayley. Sheet Metal Industries, v. 38, Apr. 1961, p. 242-246.

Development of reactive and resistive methods for attenuating and controlling variation in gage and profile of rolled sheet. Application of prestressing technique to continuous bar mills with short rolls. 3 ref. (F23; 4-53, 4-55)

211-F. An Introduction to the Theory and Practice of Flat Rolling. Pt. 8. C. W. Starling. Sheet Metal Industries, v. 38, Apr. 1961, p. 247-252.

Design principles and metallurgical features of the planetary mill method of rolling. Mechanical features and performance characteristics of the mill with suggested applications. (F23, W23)

212-F. Close-to-Form and Close Tolerance Forgings. E. W. Peel. Production Engineer, v. 40, Mar. 1961, p. 197-206.

Close-to-form forging of aircraft parts and automotive components in Nimonic alloys, alloy steel, Ti alloys, Mg alloys and Al alloys. Metals are heated to 900-1100° C. and deformed by powered drop hammers, hydraulic presses or mechanical presses. (F22, T21, T24; Al-b, AY, Mg-b, Ni-b, Ti-b)

213-F. (German.) Scale Investigation on Differently Rolled Heavy Plates. Paul Funke, Jr., and Werner Lueg. Archiv fur das Eisenhuttenwesen, v. 32, Mar. 1961, p. 133-144.

Investigation of pickling behavior, microstructure and composition of scale and of surface quality of differently heated (soaking pit with wet and dry slag) and differently rolled (three-high and four-high reversing mill) heavy St. 37 steel plates. Test annealing of low-carbon or surface decarburized steel sheet to investigate influence of carbon on scaling. (F23, J2, 9-52; ST, 4-53)

214-F. Internal Swaging Performs a Wide Variety of Jobs. Charles Wick. Machine and Tool Blue Book, v. 56, May 1961, p. 121-123.

Applications of internal swaging to cold forming of stainless steel, other corrosion-resistant materials, Ti, Ta, Zr and high-strength high-temperature alloys. Description of the intraform

machine in which hollow cylindrical stock is placed over a mandrel and plastically deformed by pulsating, rotating dies. (F25; SS, Ta, Ti, Zr)

215-F. Welding Polaris Missile Cases. R. D. Libert. American Machinist/Metalworking Manufacturing, v. 105, May 1, 1961, p. 90-91.

Hot edge-upsetting methods are used to reinforce welds in Polaris fuel chambers and prevent weld failures. (F22j, T24e; 7-51)

216-F. How to Plan Production Runs With Precision in Mind. W. N. Redstreake. Iron Age, v. 187, May 11, 1961, p. 105-112.

Production tips for rolling of thin foils, precision casting, forging, precision punching and rotor brazing operations used to produce aircraft and missile components to close tolerances. (F22, E15, F23, K8, T24e)

217-F. Complex Rotors Cast to Shape. Iron Age, v. 187, May 11, 1961, p. 113.

Use of semicold forming process to cast ultra-high purity Al rotors to close tolerances in one step. (F-general, 1-67; Al)

218-F. Folded Metal. Metal Industry, v. 98, Apr. 14, 1961, p. 295-296.

Al, brass, Cu and stainless steel sheet which has been corrugated, lanced, slotted, perforated and offset may be sheared, rolled, stretched and embossed on standard presses to form screens, ventilation grills, curtain walls and heat exchanger parts. (F23, F29q; Al, Cu-b, SS, 4-53)

219-F. Discussion on Extrusion. R. J. Wilcox and P. W. Whitton. Metal Industry, v. 98, Apr. 14, 1961, p. 286-288.

Review of papers presented at the Institute of Metals spring meeting, Mar. 23, 1961, covering extrusion of pure Al, Cu, Sn, Pb and Al-Mg and Al-Mn alloys at 20-550° C. and with speeds of 1-30 ipm. Extrusion pressures and temperature rise in the metal are related to physical properties, extrusion ratio, speed, die angle and containiner wall friction. Attention is given to the occurrence of "fir-tree" and "mottled-surface" defects in the process. (F24, 10-54; Al-b, Cu, Sn, Pb)

220-F. Ausform Steels, Ultra-High Strength Materials for Lightweight Rocket Casings. American Society of Mechanical Engineers, Paper no. 61-AV-40, 1961, 4 p.

Description of Ausform, a thermomechanical treatment capable of upgrading the mechanical properties of alloy steels to ultra-high-strength levels. (F-general, N8; AY)

221-F. Forming of Hi-Temperature Metals. I. J. Wilson. American Society of Mechanical Engineers, Paper no. 61-AV-6, 1961, 8 p.

Techniques for forming structural components subject to high-temperature use from precipitation-hardening stainless steel, H-11 toolsteel, heat treatable Ti alloys and Ni-base alloys. (F-general; Ni-b, SS, Ti, TS, SGA-h)

222-F. The Cold Rolling of Very Thin Ferrous Tapes. G. W. Lord. Post Office Electrical Engineers' Journal, v. 54, Apr. 1961, p. 51-52.

Special tensioning equipment and adaptors are applied to a rolling mill to allow cold rolling of magnetic Ni-Fe alloy tapes of less thickness than its designed limit (to 0.001 in. or less). (F23, 1-52; Fe-b, Ni, 4-53)

223-F. Effect of Carbide Stringers on the Distortion of Die Steels During Heat Treatment. K. Sachs. Metal Treatment and Drop Forging, v. 28, Apr. 1961, p. 157-164.

Effect of different forging methods, heavier deformation in forging and cast structure on amount of distortion. 23 ref. (F22, 9-74, 3-71; TS)

224-F. Preparation of Steel Blanks for Cold Forging. Metal Treatment and Drop Forging, v. 28, Apr. 1961, p. 168.

Cropping of steel barstock, preforming or flattening of the cropped blank and deburring or chamfering of the cropping burr on an automatic installation which carries out all three operations. (F21; ST)

225-F. (German.) Direct Resistance Heating in Rolling Mills. H. J. Forst. Elektrowarme, v. 19, Jan. 1961, p. 20-28.

Short-time electrical resistance heating of steel billets to rolling temperature. Metallurgical advantages such as prevention of sealing and surface decarburization and achievement of even temperature distribution. Design of plant, power consumption, efficiency. (F21b; ST, 4-52)

226-F. (Russian.) Approximate Method of Solving Volume Stationary Problems of Viscous-Plastic Flow. G. A. Smirnov and G. Ya. Gun. Izvestiya Vuz-Chernaya Metallurgiya, Sept. 1960, p. 62-67.

Mathematical analysis, including the LaGrange principle, used to investigate plastic deformation in rolling with emphasis on contact surface velocities and forces. 3 ref. (F23, Q24)

227-F. (Russian.) Application of Fourier Series Toward Calculating Deformation of Plate Rolls. S. S. Chepurkin. Izvestiya Vuz-Chernaya Metallurgiya, Sept. 1960, p. 68-78.

Fourier and differential equations in conjunction with theory of elasticity used to formulate heat and contact deformation equations for mill rolls with sample calculations. 11 ref. (F23, Q24)

228-F. (Russian.) Investigation of Scale and Rolling Conditions of Automatic Steel in Relation to Questions of Friction. I. M. Pavlov, I. K. Suvorov and Yu. E. Fomenko. Izvestiya Vuz-Chernaya Metallurgiya, Sept. 1960, p. 95-101.

Hot rolling of automatic steel ingots at 600-1200° C. with examination of scale formation kinetics. Analysis of sulphur content in scale and steel with reference to location and number of passes. 5 ref. (F23, 1-66, 2-60, 9-52; ST, S)

229-F. (Russian.) Specific Pressure of Metal on Rolls During Cold Rolling of Tubes. Yu. F. Shevakin and F. S. Seidaliev. Izvestiya Vuz-Chernaya Metallurgiya, Sept. 1960, p. 102-109.

Cold rolling of tubes is examined mathematically for determining energy balance, dimensional changes, work of deformation and formula for average specific pressure. Comparison of theory with forward and reverse rolling of 1Kh18N9T steel. Effect of coefficient of friction and roll size on specific pressure. 4 ref. (F26s, 3-74; ST)

230-F. (Russian.) Investigation of Forward Flow on an Uninterrupted Light-Section Mill. V. N. Vidrin, V. P. Volosnikov, I. N. Sardinskii and P. N. Amosov. Izvestiya Vuz-Chernaya Metallurgiya, Sept. 1960, p. 110-115.

Use of an electromechanical speed controller system with sample calculations to relate roll and sheet velocities and effects of forward and reverse sheet tensions. (F23)

231-F. (German.) Drawing Rate in Iron and Steel Wire Production. Fritz Kohlhase. Draht, v. 12, Mar. 1961, p. 110-113.

Dry and wet drawing at high-drawing rate is discussed in terms of mechanical requirements of drawing machinery; water and air cooling of dies; lubrication; pickling, lining and coating. Computation of drawing rate and drawing time. (F28, 3-67, 18-73; Fe-b, ST)

232-F. (German.) More Economical Hammer Forging. Martin Fritsche and Horst Hanfland. Fertigungstechnik und Betrieb, v. 11, Feb. 1961, p. 79-82.

Critique of current standards and acceptance tests for hammer forgings. Improved heating and forging operations in hammer forging of a C 30 steel 395 kg. clutch bar of given mechanical properties. (F22, F21; ST)

233-F. (German.) Determination and Selection of the Ratio of Reduction by Forging. Gustav Tittel. Fertigungstechnik und Betrieb, v. 11, Feb. 1961, p. 83-86.

Definition of the ratio of reduction by forging in terms of bulging and stretching parameters. Comparative investigation of notch-impact strength of an alloy steel block after various forging operations such as stretching only, and bulging and successive stretching. (F2, F22, Q6n, Q23p; AY, 4-51)

234-F. (German.) Methodological Engineering in the Forging Plant. Application to Manufacture of Forgings From Stainless Steel. Eberhard Pflaume. Fertigungstechnik und Betrieb, v. 11, Feb. 1961, p. 87-89.

Analysis of heat treatment operations such as heating before and annealing after forging as related to steel properties and of forging operations required for proper material flow in die forging of

X 22 CrNi 17 stainless steel. (F22n, F21b, J23; SS)

235-F. Metalworking. Pt. 4. Rolling, Drawing and Extrusion. OTS Selective Bibliography SB-463. (Available from U. S. Office of Technical Services, Washington 25, D. C.) $.10.

Listed are reports of the Department of Defense and other government agencies in addition to U. S. and foreign technical literature. Government owned patents on metalworking processes available for license also are included. (F23, F24, F27)

236-F. Stainless Steels Gain Strength. Iron Age, v. 187, May 18, 1961, p. 138-140.

Cold rolling at subzero temperatures alters the tensile strength of stainless steel. Explosive forming also affects strength and hardness levels in ultracold setups. (F23, G-general, NM-k34, 1-67; SS)

237-F. Zerolling Boosts Strength of Stainless Sheet. Materials in Design Engineering, v. 53, May 1961, p. 10-11.

Plastic deformation at subzero temperatures is used to increase the yield and tensile strengths of austenitic stainless steels as much as 70%. (F23, 1-67; SS-e)

238-F. Aus-Worked 12% Chromium Steel With High Yield Strength and Fracture Resistance. J. E. Srawley and T. C. Lupton. Report of NRL (Naval Research Laboratory) Progress, Feb. 1960, p. 7-10.

Aus-working, severe plastic deformation of an austenitized steel at temperatures where the austenite is unstable yet does not start to transform for several hours, is applied to a 12% Cr 0.15% carbon steel to improve yield strength, fracture toughness and transition temperature for full shear fracture. 6 ref. (F23, 1-66, J22; SS-e)

239-F. Extrusion Press Increases Seamless Tubing Output. Steel, v. 148, May 22, 1961, p. 134.

A vertical extrusion press, weighing 1800 tons, at Gulf States Tube Corp., Rosenberg, Texas, converts 24 x 4 in. billets into steel hollows 9 1/2-42 ft. long with outside diameters of 2 1/4-3 3/4 in. in about 20 sec. The press extrudes 150 billets per hr., producing 80-260 ft. of hollow stock per min. (F24; ST)

240-F. Mechanized Extrusion of Copper Alloys. Metal Industry, v. 98, May 5, 1961, p. 356-358.

Extrusion of Cu alloys using an oil hydraulic extrusion press. The billets are heated to 850° C. before extruding by frequency induction heaters. (F24; Cu-b)

241-F. Installation for the Preparation of Steel Blanks for Cold Forging. Metallurgia, v. 63, Apr. 1961, p. 189-190.

Continuous and automatic production of steel blanks of uniform mass and shape. Three distinctly separate operations may be carried out including cropping from bar-stock, flattening or preforming of the cropped blank and deburring or chamfering of the inevitable cropping burr. (F21; ST)

242-F. High-Strength, Landing-Gear Forgings--The Manufacture of Ductile Components From Air Melted Steels. R. L. Roshong. American Society of Mechanical Engineers, Paper no. 61-AV-54, 1961, 8 p. $1.

Press forging techniques to produce high-strength forgings with outstanding transverse ductility from air-melted steels. Billet stock properties are compared with forging properties for several landing gear configurations and grades of steel. (F22, T24a; ST)

243-F. Forging 900 Track Links an Hour. American Machinist/Metalworking Manufacturing, v. 105, May 15, 1961, p. 133.

A mechanized forging line incorporates automatic handling of billets through gas-fired furnace and press for high-speed forging of tractor track links. The four-stage die process includes two blocking operations, finishing, trimming and coining. Rapid transfer and a short heating cycle for billets at 2200° F. results in longer die life. (F22, T3n)

244-F. Russians Develop Heavy Helical Rolling. Metalworking Production, v. 105, May 10, 1961, p. 68-69.

Design, operation and performance characteristics for a heavy-duty three-roller helical-rolling machine for

rolling steel bar stock of 4 3/4 in. in diameter by 13 ft. 6 in. in length using a hydraulic tracing unit for controlling profiles. Stock is preheated in a 500 kW electric induction furnace in two stages to 723° C. and 723-1250° C. with automatic control of cycles. (F23, F21, W23d; ST, 4-55)

245-F. Gear and Pinion Forging. W. W. Collier. Metal Treatment and Drop Forging, v. 28, May 1961, p. 201-203.

Control of grain flow stability for prevention of distortion during forging of spiral hypoid gears and ring gears from 4620 steel billets. (F22, Q24c, T7a; ST, 17-57)

246-F. Slitter Saves Quality in Thin Gage Strip. Steel, v. 148, May 29, 1961, p. 81-82.

Steel strip with good surface quality and close dimensional tolerances is turned out at a rate of 300 miles per hr. on a slitting line. Accurate edge control on the payoff reel helps melt width tolerances and hardened and ground stripping maintain surface quality. (F29n; ST, 4-53)

247-F. Precision Forging of Steel Shafts. Robert Speck. Production Engineer, v. 40, May 1961, p. 321-324, 335.

Forging preheated steel and steel alloy billets with vertical hammer-forging machine to produce shafts of numerous sizes and shapes with tolerances to 0.010 in. (F22; ST)

248-F. Tandem Cold Rolling. Iron & Steel, v. 34, May 1961, p. 178-180.

Cold rolling of low-carbon steels in all tempers from hard bright unannealed to dead soft and intermediate tempers in the annealed condition, on a Davy-United four-stand, four-high tandem mill. (F23, 1-67; CN-g)

249-F. (English.) Continuous Production of High Strength Lead Strip by Direct Powder Rolling. S. Storchheim and A. Cross. Planseeberichte fur Pulvermetallurgie, v. 9, Apr. 1961, p. 21-25.

Production of high-strength and creep-resistant Pb strip capable of shielding aircraft nuclear reactors at 300° F. by horizontal and vertical rolling of commercially pure Pb powders at room temperature using acrylic resins dissolved in acetone as a lubricant. Tensile and stress-rupture strength; creep resistance. (F23; Pb, 6-68)

250-F. Stretch-Reducing Operations at Colorado Fuel and Iron's Seamless Tube Mill. C. C. Crawford. Iron and Steel Engineer, v. 38, Apr. 1961, p. 77-84.

Design, construction and operation of a stretch-reduction mill which increases the rate of production of seamless pipe of sizes of 2 3/8 through 9 5/8 in. (F26s, W23h)

251-F. Analysis of Today's Tube Welding Processes. Norbert C. Rubin. Iron and Steel Engineer, v. 38, Apr. 1961, p. 115-119.

A review of inert arc, resistance and induction welding of steel and non-ferrous tubes, in terms of type of material, wall thickness, weld quality, process speed, grain growth in the weld area, surface appearance, tube size and intended use. (F26p, K-general; ST, EG-a38)

252-F. (German.) Trends in Development of Processing Technology. K. Thamm. Maschinenbau Technik, v. 10, Jan. 1961, p. 2-12.

Development of processing techniques and machines for pressing, extrusion, pressure die casting, hammer and die forging, rolling, impact extrusion, stamping, drawing, bending, bevelling and sectioning. Economics; future development. (F-general, G-general, 1-53)

253-F. Analytical Investigation of the Cold Rolling of Bar Stock. Alvin S. Weinstein, Carl F. Zorowski and Frank J. Loss. Iron and Steel Engineer, v. 38, May 1961, p. 135-143.

Mathematical treatment of the cold rolling of bar stock between flat rolls. Pressure distributions, rolling loads and torques may be predicted from the model. 9 ref. (F23, 1-67)

254-F. Production of Suspension Cable Wire for the Forth Road Bridge. Wire Industry, v. 28, May 1961, p. 461-463.

Manufacturing of high-tensile steel wire for use as bridge suspension cables. Steel rods are heated to 950° C. and quenched in Pb at 510° C. The rod is then pickled in HCl, drawn, galvanized in Zn, spun and stored as coiled cable wire. (F28, Q27a, T7g; ST)

255-F. The Fundamentals of Wire Drawing. Pt. 11. The Size of the Pellet. C. P. Bernhoeft. Wire Industry, v. 28, May 1961, p. 481, 483, 484.

Rules and regulations for wire drawing using brittle tungsten carbide pellet and diamond dies. Relationship between pellet size and wire diameter. (F28)

256-F. Cold Rolling Answers Design Change Demands. Lawrence J. Curran. Tooling and Production, v. 27, June 1961, p. 45-46.

Splines are formed on a universal joint yoke shaft composed of 1035 normalized steel by a cold rolling process in which forming rocks roll the part about its own axis as they move in opposite directions to generate splines. (F23, 1-67; ST)

257-F. Tubing Quality Is Built in--Tests Cannot Produce It. Steel, v. 148, June 5, 1961, p. 90, 93.

Control of melting, heating, rolling and soaking processes permits production of flow-free seamless tube rounds for subsequent piercing. (F26, 9)

258-F. Press-Forging for Higher Strength Steel Castings. J. T. Berry and T. Watmough. Product Engineering, v. 32, June 12, 1961, p. 68-69.

Application of the hybrid process (casting followed by forging) to existing production parts. Cast alloys AMS 5363, 17-4 PH and SAE 4340 are press-forged. AMS 5363 gives best results with an increase in yield strength of 600% and ultimate strength of 250%. (F22, Q23b, Q27a; AY, 5)

259-F. Fabrication of Beryllium Sheet. B. H. Hessler. Light Metal Age, v. 19, Feb. 1961, p. 10-12.

Production of Be sheet from a hot pressed Be slab. Cladding, rolling equipment, rolling temperatures, cladding removal, flattening of sheet, reduction ratios, sheet width, joining and research. (F23, L22, K-general, Ag; Be, 4-53)

260-F. Automation in Extrusion. Edwin E. Clark. Light Metal Age, v. 19, Feb. 1961, p. 15, 18.

Examples of automation in Al extrusion plants. Advantages. (F24, 18-74; Al)

261-F. (German.) Influence of Roll Design on Course of Deformation and Defects in Tube Production. M. Hildebrand. Neue Hutte, v. 6, Apr. 1961, p. 251-257.

Investigation of bite conditions and course of deformation in terms of surface rate of rollings and deformation work and of occurrence of surface defects (formation of chips) as influenced by roll angle during rolling of steel tubes in a piercing mill. (F26s; ST)

262-F. (German.) Measurement of Rolling Force and Starting Moment in Hot Rolling and Computation of Deformation Strength. Winfrid Dahl, Erwin Wildschutz and Jurgen Langer. Archiv fur das Eisenhuttenwesen, v. 32, Apr. 1961, p. 213-219.

Measurement of rolling force and starting moment for three steels (ST 42, X 8 CrTi 17 and X 10 CrNiMoCb 18.10) during rolling from 900-1200° C. from 5-100 sec.$^{-1}$ mean deformation rate and at 10, 20 and 40% deformation. Comparison of results with "Sims theory" of hot rolling. (F23, 1-66; ST)

263-F. Forging Unclad Beryllium. J. P. Denny and J. D. McKeogh. Journal of Metals, v. 13, June 1961, p. 432-433.

Be forgings with improved tensile and yield strengths over those of conventionally hot pressed products are produced by preheating to 1400° F., restricting the starting blank size using a special solid lubricant and maintaining a high (800-900 °) die temperature. (F22; Be, 6-66)

264-F. At 85 MPH, Press Ram Gives Formed Parts Special Properties. Steel, v. 148, June 26, 1961, p. 62-63.

Production of high-quality W, Mo, Ti, Cb and Zr forgings for the aircraft industry on a high-energy rate forming machine designed to create large pressures in the die cavity. Parts have improved grain flow, strength, surface finish and dimensional tolerance. (F22, W22p, T24; Cb, Mo, Ti, W, Zr)

265-F. The Quantity Production of Poppet Valves. Pt. 2. R. E. Green. Machinery (London), v. 98, May 24, 1961, p. 1164-1174.

Roll-straightening, cutting and finishing operations in production of heat treated and tempered automobile valves of austenitic and carbon steel. (F29r, G17, L-general, T21b; CN, SS-e, 17-57)

266-F. Theory and Practice of Flat Rolling. Pt. 9. C. W. Starling. Sheet Metal Industries, v. 38, June 1961, p. 451-457.

Control of physical properties during processing of flat-rolled steel products including width, gage, length, cross section, flatness and surface finish. Regulation of track and firing time to insure constant ingot temperature. (F23)

267-F. Extrusion Die Development--Titanium and Steel. G. A. Moudry. Harvey Aluminum Inc. (Aeronautical Systems Center). U. S. Office of Technical Services, PB 171529, July 1960, 137 p. $2.75.

Program aimed at developing die materials to permit the extrusion of Ti and steel alloy structural sections with the dimensional stability and surface finish of their Al counterparts. Effect of extrusion variables on die wear; minimum strength requirements for prospective die materials. (F24, W24n; ST, Ti)

268-F. Preparing Steel Blanks for Cold Forging. Engineering, v. 191, May 5, 1961, p. 634-635.

Production of preformed and deburred steel blanks for cold forging. Cropping, preforming and chamfering operations with adaptable conveyor system achieve flexibility and versatility for varying production requirements. (F21; ST)

269-F. Copper-Base Extrusions. Precision Metal Molding, v. 19, June 1961, p. 27-30.

Standard commercial tolerances for extruded Cu and Cu-base alloy shapes with physical and mechanical properties given as a guide to material selection. (F24, P-general, Q-general, 17-52; Cu-b)

270-F. Automatic Production of Ring Gears. Metal Progress, v. 80, July 1961, p. 111-112.

Preheating, forging and heat treatment operations for production of 4718 H and 8720 H steel ring gear forgings. Description of rotary hearth furnace and forging press design. (F21, F22, J-general, T7a; ST)

271-F. Formation of Rifling in Small Arms Barrels by a Precision Forging Process. L. R. Beesly. Production Engineer, v. 40, June 1961, p. 382-388.

Precision forging and swaging of a rifle barrel manufactured from a 1% chromium molybdenum alloy steel hardened at 850° C. and tempered at 600° C. Mechanical properties before and after forging. Tolerances and surface finish of the barrel bore. (F22, F25; AY, Cr, Mo)

272-F. Tube-In-Strip and Associated Products. A. A. Blanco. Production Engineer, v. 40, June 1961, p. 389-400.

Casting, rolling and inflation of tubes during production of tube-in-strip, a Cu or Al metal sheet which incorporates a number of parallel tubes integral with the sheet. Methods of jointing, coating, cutting and bending the strip for use in solar heaters, evaporators and cooling screens. (F26s, E-general; Al, Cu)

273-F. Hot Extrusion. R. Cox. Production Engineer, v. 40, June 1961, p. 401-414.

Extrusion of 18-8 stainless steel, high-speed steel, Ti, Zr and Co-base alloys. Design and composition of the die blank and mandrel. Microstructure and physical properties of the extrusions. (F24, 1-66; Co-b, SS, TS-m, Ti, Zr)

274-F. Two Mandrel Forging Methods Shape Aluminum Cylinders. C. H. Maak. Iron Age, v. 187, July 6, 1961, p. 74-75.

Production of forged seamless 7079 Al alloy cylinders using a combination of loose and tight mandrel forging techniques. Improvements in mechanical properties are attributed to the process. (F22; Al-b)

275-F. Forging Tough Metals in One Blow. Rupert Le Grand. American Machinist/Metalworking Manufacturing, v. 105, June 26, 1961, p. 72-73.

Forging of aircraft quality 4130 steel, tough-pitch Cu or Cu powder compacts on a vertical machine having a ram fired by the sudden release of gas compressed to 2000 psi. (F22; Cu, ST, 6)

276-F. (German.) Processes in Semi-finished Nonferrous Metal Products Industry. Pt. 1. Drawing of Tubes by Tube Drawing Machines. N. D. Benson. Zeitschrift fur Metallkunde, v. 52, May 1961, p. 371-373.

Review of development, mechanism and machinery for tube drawing with emphasis on drawing of Al and Cu tubes from very small diameters (capillary tubes) up to 25 mm. diameter. (F26r; Al, Cu)

277-F. (Italian.) Drills Manufactured by Hot Rolling and Twisting. Macchine, v. 16, May 1961, p. 541-543.

A cylindrical steel rod is heated up to 850° C. and given the cross-section characteristic for a drill by multi-stage rolling. Subsequently the still hot drill blank is given a torsional deformation by twisting, then subjected to various heat treatments and grinding operations. (F23, 1-66, W25p; ST)

278-F. Fabrication of One-Inch Thick, Ten-Inch Diameter Welded Inconel Pipe. W. L. Fleischmann and R. F. Gurnea. Welding Journal, v. 40, June 1961, p. 620-628.

Hot forming methods and Tig and Mig welding techniques used in manufacturing Inconel pipe. Effects of successive heating and cooling and forming on mechanical properties and microstructure and base metal fissuring in the weld heat affected zone. (F26p, K9, Q-general; Ni-b, 7-51)

279-F. Fundamentals of Wire-Drawing. Pt. 12. The Drawing of Fine Wire on Slip Machines. C. P. Bernhoeft. Wire Industry, v. 28, June 1961, p. 591-592, 604.

Arrangement of passes and calculation of slip on a fine wire-drawing machine. Tabulation of data includes cone speed, speed difference and die elongation. (F28, 1-52)

280-F. (Russian.) Calculation of Forces Required for Hot Drop Forging. I. Ya. Tarnovskii, O. A. Ganago and P. A. Vaisburd. Izvestiya VUZ--Chernaya Metallurgiya, Feb. 1961, p. 51-61.

Calculation of expansion center of plastic deformation during finish drop forging. Formula found for calculating forces for drop forgings of any configuration. Formulas are simple and take into consideration fundamental drop forging parameters. 13 ref. (F22n, 1-66)

281-F. (Russian.) Experimental Determination of Pressures and the Coefficient of Axial Sliding During Piercing of Large Ingots. V. V. Shveikin, P. N. Ivshin and L. N. Karpenko. Izvestiya VUZ--Chernaiya Metallurgiya, Feb. 1961, p. 62-67.

Determination of the specific pressure during piercing of ingots and comparison with pressure used during rolling of the same size ingots in a blooming mill. When metal enters pressure on rolls is 8-22% greater than when it leaves. New groove design reduces axial sliding without increasing pressure on rolls, reduces the specific energy expenditure and piercing time and improves the outside appearance of the tubes. 2 ref. (F26q, 1-52, 17-51)

282-F. (Russian.) Distribution of Specific Pressure and Specific Friction Along the Contact Arc During Rolling. A. P. Chekmarev and P. L. Klimenko. Izvestiya VUZ--Chernaya Metallurgiya, Feb. 1961, p. 68-76.

Investigation of Pb and square shaped mild steel specimens. Values found confirm theoretically derived formula. (F23; Pb, CN)

283-F. (Russian.) Conditions of Static Equilibrium of Metal During Rolling. Yu. M. Fainberg. Izvestiya VUZ--Chernaya Metallurgiya, Feb. 1961, p. 86-92.

Application of static equilibrium of metal during rolling for calculating forward flow and rolling forces. 9 ref. (F23)

284-F. Precision Tubes for Nuclear Applications. D. F. Waterhouse. Australasian Engineer, v. 52, Apr. 1961, p. 87-91.

Cold drawing, sintering, hot extrusion and impact extrusion to produce gilled tubes of mild steel, stainless steel, Ti, Zr, Ni, Ta, V, Mo, Be, Mg and Al. Ultrasonic testing and eddy current testing to detect variations in thickness and curvature. (F24, F26; SS, Ti, Zr, Ni, Ta, V, Mo, Be, Mg, Al)

285-F. (French.) Effect of Aluminum Nitride on the Forgeability of Steels. Technique Moderne, v. 53, Apr. 1961, p. 159-160.

Torsional cycling and tensile testing of carbon steel containing 0.29-0.35% C, 0.12-0.24% Si, 0.62-0.9% Mn and 0.0045-0.090% Al from 700-1200° C. Dependence of the reduction of area, number of torsional cycles and temperature of low forgeability values on Al content and deformation velocity. (F22, 17-52, Q1, Q27, Q23p, 2-60, 3-68; CN, Al)

286-F. (German.) Representation of Deformation Ratios in Reduction Rolling

by Stress-Strain Diagrams. M. Vater. Materialprufung, v. 3, May 20, 1961, p. 176-179.

Diagrams showing the relationships between the rates of axial, radial and circumferential deformation on one side and the longitudinal rolling stress on the other are constructed for determination of forces and energies needed in the reduction rolling of tubing. (F26s, Q24, Q25n)

287-F. (German.) Improvement of Service Life and Manufacture of Impeller Rotors. M. Pfender. Materialprufung, v. 3, May 20, 1961, p. 181-189.

Design and die forging of impeller blades from an Al-Mg-Si alloy. Evaluation of stresses developing in the forging die and the effect of profile on the fatigue strength of rotor blades. (F22n, Q7a, 3-73, 3-66, T7h; Al-b, Mg, Si, 17-57)

288-F. Forging of Unclad Beryllium. Light Metal Age, v. 19, June 1961, p. 11.

Ultimate strength of 67,300 psi., yield strength of 49,000 psi. and elongation of 5.1% are achieved without excessive oxidation or rupture by hot pressing with blanks preheated to 1400° F. (F22, 1-66, Q27a, Q23b, Q23p; Be)

289-F. Fabrication of Beryllium and Titanium for the Space Capsule. Light Metal Age, v. 19, June 1961, p. 18.

Forging and machining operations on Be used as a heat shield for exposed areas of capsule. Welding of Ti sandwich structures. Increase in structure stiffness achieved by "rigidizing" or beading. Pressure testing. (F22, G17, K-general, Q23, T24e; Be, Ti, 7-59)

290-F. Special Fabrication Techniques. Reactor Core Materials, v. 4, May 1961, p. 51-64.

Review of literature on melting, casting and extrusion of reactive and refractory metals; electroplating, cladding, rolling, swaging, extrusion cladding, canning, welding, brazing and nondestructive testing of nuclear fuel elements; pressure and diffusion bonding of stainless and Zircaloy to UO_2; co-extrusion stainless steel and ZrO_2; coating steel with boron by hydrogen reduction. (F-general, L-general, C5, K-general, T11g; EG-d37, SS, Zr-b)

291-F. (Translation-Brutcher no. 5091.) Study of Titanium Alloyed Free Cutting Steels. I. M. Pavlov, I. K. Suvorov and Yu. E. Fomenko. Izvestiya VUZ--Chernaya Metallurgiya, Nov. 1960, p. 61-65.

Difficulties encountered in the rolling of sulphur bearing free cutting steel. Data on formation of sulphur compounds in steel and other quantitative relationship to Ti in the Fe-Ti-S and Fe-Ti-C-S systems. (F23; ST, S)

292-F. Mass Production Method Scores in Short Runs. Steel, v. 149, July 10, 1960, p. 80.

Chipless machining technique is used to spline and thread shafts ranging in length from 4-40 in. (F23q, G17f, T7j)

293-F. How They Made the US Space Capsule. William Dubusker and Ted Schafers. Metalworking Production, v. 105, June 21, 1961, p. 69-71.

Resistance heating and die forging of components from Ti sheet and Rene 41 alloy together with glass-fibre insulation which are Tig welded, arc welded and spot welded to make up the assembly. (F21b, F22p, K-general, T24e; Ti, SGA-h, 4-53, 17-57)

294-F. (Russian.) Forging Uranium. P. I. Seredin. Kuznechno-Shtampovochnoe Proizvodstvo, Jan. 1961, p. 14-18.

Preparation of alpha uranium ingots and slabs for forging and rolling operations. Heating and deformation technology. Protection of forgings against oxidation. 8 ref. (F22, Q24, R1h; U)

295-F. Post War Progress in the Extrusion of Aluminium and Copper. D. R. Sinton. Australian Institute of Metals, Journal, v. 6, May 1961, p. 99-103.

Improvements in the design of extrusion presses, production of billets for extrusion and preheating of billets. (F24; Al, Cu)

296-F. Modern Developments in the Extrusion of Aluminium Alloys With Particular Reference to Tool Design and Materials. P. G. Dodd. Australian Institute of Metals, Journal, v. 6, May 1961, p. 124-136.

Review of improvements in press and die design with emphasis on dies for hollow and semihollow sections. Tool materials and methods of die manufacturing. 21 ref. (F24, T6r, T6n, 17-51; Al-b)

297-F. (German.) Fundamentals in Theory and Practice of Roll Pass Design. Christian Martin Kruger. Stahl und Eisen, v. 81, June 22, 1961, p. 858-870.

Concept and graphical means for a three-dimensional interpretation of roll pass design rather than conventional two-dimensional approach is discussed for rolling of rail profiles. (F23, 17-51)

298-F. The Hot Extrusion of Pure Aluminium and an Al-Zn-Mg-Cu Alloy. K. Ashcroft and G. S. Lawson. Institute of Metals, Journal, v. 89, June 1961, p. 369-375.

The influence of temperature on the maximum pressure required to extrude 1 in. diameter slugs of Al of 99.5% purity and of an Al-Zn-Mg-Cu alloy at various extrusion ratios from 20-500° C. is investigated with the onset of hot shortness also being studied as a function of temperature. 8 ref. (F24, 1-66, Q26s, 2-62, 3-74; Al-b)

299-F. 535,000 lb. Ingot Forged Into High Strength Rotor. Steel, v. 149, July 17, 1961, p. 130.

A rotor having a yield strength of 70,000 psi. and a tensile strength of 92,000 lb. is produced from a vacuum poured Ni-Mo-V alloy steel ingot with improved soundness. (F22, Q-general)

300-F. Strength and Weight Combine in Vital Steel Structure. Iron Age, v. 188, July 20, 1961, p. 94-95.

Forming, flattening, galvanizing and enameling techniques used in fabricating steel radar antennas. (F-general, G-general, T26; ST, 17-51)

301-F. (Russian.) Heating Previous to Forging Without Oxidation. S. I. Klyuchnikov. Metallovedenie i Termicheskaya Obrabotka Metallov, Apr. 1961, p. 15-19.

Elimination of oxidation and decarburization by heating in reverberatory furnaces with controlled atmospheres equipped with recuperators, regenerators or a complete-combustion chamber serving for air preheating. Description of other furnace types where the steel forging blank is protected by He, vacuum, liquid glass or a salt. 4 ref. (F21b, F22; ST)

302-F. 1700-Ton Extrusion Press Installation. Engineer, v. 211, May 12, 1961, p. 768-770.

Use of induction heaters, an oil-hydraulic extrusion press and special coiling equipment in the production of brass and Cu bar, rod and strip. Plant layout and sequence of operations. (F24, F21b, 1-52; Cu, Cu-n)

303-F. (Russian.) Effect of Jacket Thickness on Plastic Flow During Extrusion. L. N. Moguchii. Tsvetnye Metally, Mar. 1961, p. 75-81.

Cylindric samples of Duralumin D16 are fitted into cups of Al with 3-8 mm. wall and 10-12 mm. bottom thicknesses and extruded together to study the effect of wall thickness on the plastic flow. 8 ref. (F24, Q24, 3-73; Al-b, 8-66)

304-F. (German.) Deformation Forces During Roughening Passes in Rolling. Gustav Zoukar. Neue Hutte, v. 6, May 1961, p. 291-300.

Test rolling of steel (MSt 3 b, CK 45, St 7, St 52, 100 Cr 6, 16 Mn Cr 5, 55 Si Mn 7, 65 Si 7, X 120 Mn 12, X 20 Cr 13, X 10 CrAl 24, 90 WV 48.25, 45 W Cr V 7) from 1140-1260° C. and of Cu and Al in a pilot plant. Measurement of rolling forces and starting moment by piezoelectric gases and inductive meters. 11 ref. (F23, 1-54; ST)

305-F. (Czech.) Heating of Ingots in a Two-Way Gas-Fired Soaking Pit. S. Cernoch, I. Repisky and E. S. Spakovsky. Hutnicke Listy, v. 16, May 1961, p. 335-342.

Use of thermocouples built into the ingot to measure temperature rise and distribution. Temperature of soaking pit walls, roof and waste gases and composition of atmosphere as functions of time. 14 ref. (F21b, S16b; 5-59)

306-F. (Czech.) Principal Computation Methods for Hot Rolling Pressures and Comparison of the Results With Those Obtained by Measuring. Jaromir Jedlicka. Hutnicke Listy, v. 16, May 1961, p. 342-350.

Height-pressure, height-rolling energy, temperature-deformation resistance, temperature-yield point, temperature-tensile strength and forward slip-rolling energy relationships in the rolling of carbon steel ingots, blooms and billets into sheet or blooms and billets respectively. 17 ref. (F23; CN, 5-59, 4-52)

307-F. Planer-Scarfing of Formed Shapes. Kenneth H. Schultz. American Machinist/Metalworking Manufacturing, v. 105, July 10, 1961, p. 90-91.

Machine scarfing of air compressor casings with cam-controlled tools which incorporate air-actuated tool lifters, interchangeable fixtures with adjustable locators and clamp assemblies. (F21e, 1-52; 4-57)

308-F. Forging Progress Anticipates Space Demands. H. W. Bredin. Machinery, v. 67, July 1961, p. 96-107.

Vacuum melting, closed die forging at 1600-2100° F. and spectrographic inspection of superalloys, refractory metals and high-temperature steels to produce aircraft and missile parts with service temperatures from 1000-1800° F. Mechanical properties. (F22n, C25, Q-general, S11k, T24; SGA-h, EG-d37, ST)

309-F. Quality Control in the Rolling and Annealing of 430 Stainless Steel. Industrial Heating, v. 28, July 1961, p. 1342-1344.

Effects of rolling and annealing conditions, stabilizing elements and oxygen content on mechanical properties, number of inclusions, surface "ribbing" and Cr depletion in 430 stainless steel strip. (F23, J23, Q-general, 2-60; SS, 4-53, 9-69)

310-F. (Russian.) Moments and Energy Expenditure During Rolling of Steel in Grooved Rolls. A. P. Chekmarev, V. M. Klimenko and M. P. Toporovskii. Izvestiya VUZ--Chernaya Metallurgiya, Apr. 1961, p. 79-88.

Energy expenditure during the rolling of different profiles on 330 mm. diameter rolls and the distribution of moments between the individual rolls. 4 ref. (F23; ST)

311-F. (Russian.) Dynamics of the Main Line of a Pilger Rolling Mill Taking in Consideration the Blow of the Sleeve Into the Rolls. A. V. Prazdnikov. Izvestiya VUZ--Chernaya Metallurgiya, Apr. 1961, p. 184-191.

Maximum dynamic moments (when the sleeve hits the rolls) developing in a Pilger rolling mill during rolling of 8 in. tubes. (F26q)

312-F. Soaking Pit Expansion and Slabbing Mill Installation at Kaiser Steel's Fontana Plant. Merle L. Gruver. Iron and Steel Engineer, v. 38, July 1961, p. 112-118.

Engineering and production problems associated with the installation of 40 bottom-fired soaking pits of 120-ton capacity which preheats ingots for two primary mills, a modified 46-in. high-life blooming mill and a 46 x 90 in. universal slabbing mill. Soaking pit practice and production statistics. (F21b, W20g, W23a; ST, 5-59)

313-F. Square and Rectangular Structural Tubing Produced by National Tube. Iron and Steel Engineer, v. 38, July 1961, p. 148.

ASTM A7 and ASTM A36 carbon steels are hot rolled into hollow tubing. Ductility and weldability for fixed load-bearing structural applications. (F26s, 1-66, K9s, Q23p; CN)

314-F. Biggest Dynapak in Operation at Brake Shoe. Missiles and Rockets, v. 9, July 31, 1961, p. 28.

Steel, W, Mo, Ti, Cb and Zr are forged and extruded in intricate shapes with close tolerances by a vertical metalworking machine which is based on the principle of pneumatics. Description of machine operation. Products require little machining and have longer fatigue life. (F22, F24, 1-52; ST, W, Mo, Ti, Cb, Zr)

315-F. On-Line Computer Control of Steel Billet Cutting. Metal Treatment and Drop Forging, v. 28, July 1961, p. 295-296.

Use of a digital computer to control steel billet cutting specifications. Billet length measurement, calculation of optimum cutting points, transmission of information to operators and recording of data. (F22h, 18-74; ST, 4-52)

316-F. Helical Welding. Machinery Lloyd (Overseas Edition), v. 33, July 1961, p. 51-52.

Design and operation of a spiral weld pipe mill which produces helical welded tube from stainless steel or Ni alloy flat strip. Sizes and pressure strength of the pipe. (F26p, Q10b; SS, Ni-b, 4-60)

317-F. High Frequency Welder Speeds Up Tube Mills. C. J. Vlahos. Mill & Factory, v. 69, Aug. 1961, p. 71-73.

Electronic device for welding of hot and cold rolled steels, stainless steel, Cu, brass, Al, Zr and Ti strips at high speed into tubing of various diameters and wall thicknesses. (F26p, 1-52; ST, Cu, Cu-n, Al, Zr, Ti)

318-F. Cold Rolling Medium-Width Steel Strip. Metallurgia, v. 63, May 1961, p. 213-216.

Tandem mill rolling, annealing, temper rolling and slitting of low-carbon steel strip. (F23, J23, G2k; CN-g, 4-53)

319-F. The Fundamentals of Wire Drawing. C. P. Bernhoeft. Wire Industry, v. 28, July 1961, p. 671.

Shaving process for overcoming surface defects of wire during drawing operation and methods of lubrication of shaving equipment. Evaluation of shaving loss as related to wire dimensions and shaving volume and weight. (F28, 1-52)

320-F. (Russian.) Work of Pressure Apparatus in Bloom Under Automatic Control. T. M. Golubev, N. A. Chelyshev and N. P. Kaftanov. Izvestiya VUZ--Chernaya Metallurgiya, Dec. 1960, p. 151-160.

Blooming mill operations including roll pressures, movement and speeds are analyzed by oscillograph in both automatic and manual applications. (F23, 18-74)

321-F. (German.) Investigation of Rolling With a Three-Stand Cold Rolling Mill. Paul Funke, Jr., and Werner Lueg. Stahl und Eisen, v. 81, July 6, 1961, p. 909-920.

Measurement of roll forces using strain gages and data for starting moment and characteristics of roll drive in cold test rolling of steel strip. Compensation of fluctuation of strip thickness. (F23; ST)

322-F. Continuous Strip Casting and Rolling. Pt. 2. H. W. Brand. Metal Industry, v. 99, July 21, 1961, p. 45-46.

Production of Al strip by a 6000-lb. melting furnace, a rotary casting machine, a rolling mill (convertible from hot to cold rolling) and ancillary equipment. Consideration of economic factors governing extent of automation. (F23, C5q, 1-52, 18-67; Al, 4-53)

323-F. Wide Extrusions Make Strong Trailer Floors. G. Keith Glaza. Modern Metals, v. 17, July 1961, p. 52-53.

Use of a 13,200-ton press to produce Al floor surfaces and cross members as one extruded shape. Floor surface sections are 2 ft. wide, 8 ft. long and 4 in. deep. The I-beam shaped cross members are spaced 6 in. apart. (F24, 1-52; Al)

324-F. A Review of Metal-Processing Literature--Plastic Working. Francis W. Boulger. American Society of Mechanical Engineers, Paper no. 61-PROD-12, 1961, p. 7-9.

Forging, rolling, sheet forming and extrusion. 27 ref. (F-general, G-general, 11-65)

325-F. British Iron and Steel Research Association. Sheet Metal Industries, v. 38, July 1961, p. 488-92.

Extracts from the annual report, 1960, concerning hot and cold rolling, pickling, annealing, tinning, electrophoretic deposition of Al, finishing processes, a stress level recorder, primary mill automation, annealing, pilot plant control, corrosion, instrumentation, continuous inspection of steel sheet and tinplate, a strip-speed meter for temper-mill control, tandem-mill control and fluid cushioning. (F23, J23, L-general, R-general, S13, W23, 18-74; ST)

326-F. An Introduction to the Theory and Practice of Flat Rolling. Pt. 10. C. W. Starling. Sheet Metal Industries, v. 38, July 1961, p. 528-38.

Quality control in the production of mild steel including teeming, soaking pit, slabbing mill, slab reheating, roughing mill, cold reduction and annealing operations. Chemical composition, grain size, structure and cold work considerations. Effect of crystal size and finishing and coiling temperatures on mechanical properties. Problem of aging and preventive measures. 6 ref. (F23, D-general, Q-general, 2-59, 2-60, 2-61; CN)

327-F. (Japanese.) Metal Flow in Forging. Pt. 15. Rolling Force on Steel Ball Rolling Dies. Taikichi Awano, Massao Ochiai and Masaru Ito.

Government Industrial Research Institute, Reports (Nagoya), v. 10, June 1961, p. 359-368.

Setup and measurements of three rolling force components on steel ball rolling dies under various rolling conditions. Experiments show that rolling force is affected by the position of rolling dies, temperature, diameter of the blank and lubricant used. (F22p, 1-53)

328-F. Strip Rolling in the Ruhr. Iron & Steel, v. 34, Aug. 1961, p. 372-375.

Cold strip rolling of mild steel, carbon steel, Cu, Zn, and tungsten carbide sleeved rolls at several German plants. (F23, 1-67; CN, Cu, Zn, W-b)

329-F. New Installation for Preparation of Steel Blanks for Cold Forging. H. D. Feldmann. Wire and Wire Products, v. 36, June 1961, p. 759, 797.

Production of field blades of uniform mass and shape in three operations: cropping from barstock; flattening or preforming of the cropped blank; and deburring or chamfering of the cropping burr in an automatic sequence. (F21, F22, 1-67; St, 4-53)

330-F. Fabrication Requirements for Balanced Classes of Piping. H. S. Peterson and C. H. Voelker. American Society of Mechanical Engineers, Paper no. 61-SA-60, 1961, 20 p. $1.

Tabular summary of fabrication and inspection requirements for several classes of welded schedule-size steel pipe (24-in. NPS and smaller) including forming and assembling by girth and branch welds. (F26p, W13h; ST, 7-51, 11-62)

331-F. New Brass Rod Mill. Metal Industry, v. 99, July 28, 1961, p. 62-67.

Layout, equipment and operations in a rod mill including melting and continuous casting of billets and sawing, heating and extruding the billets into rod and strip. Transfer and automatic control devices used in the plant. (F24, C5q, G17h, 1-52; Cu-n)

332-F. Hot Ingot Milling Machine. Australasian Manufacturer, v. 46, June 24, 1961, p. 33-34.

Description and operation of a machine for hot peeling steel ingots as they come from the soaking pit at a temperature of 1200° C. to avoid splits or cracks. (F21a, 1-66, 1-52; ST, 5-59)

333-F. High-Volume Aluminum Can-Stock Line Placed in Operation in the Northwest. Western Machinery and Steel World, v. 52, Aug. 1961, p. 42-43.

Description of a line which cleans, inspects, flattens, coats, trims, shears and packages Al in both sheet and coil form for use in food cans. (F29, L-general, 1-52, T29p; AY, 4-53)

334-F. Firm Forges Solid Tungsten Shapes. Steel, v. 149, Aug. 14, 1961, p. 142.

Ingots are heated to 4000° F. in argon in a vacuum-argon furnace, extended and forged under carefully controlled temperatures to form thin sections. Data are given for tensile strength and stress rupture life after forging. (F21b, 2-66, F22, 2-61, Q27a, Q3q, 1-54; W, 5-59)

335-F. Forming, Trimming, and Edge Finishing of Molybdenum-0.5 Per Cent Ti Sheet Material. A. L. Pickrell. American Society of Mechanical Engineers, Transactions (Journal of Engineering for Industry), Paper no. 61-SA-36, 1961, 11 p.

Techniques and equipment for "hot" forming, metal removal and polishing of Mo alloy steel for production parts for airframes. Effect of brittle ductile transition temperature on hot workability. (F22, F24a, Q-general, 2-60, 2-62; Mo-b, Ti, 4-53)

336-F. Forgers Tame Tungsten Alloys. Iron Age, v. 188, Aug. 17, 1961, p. 106.

Forging of tungsten alloys, which melt at 6000° F., into thin structural shapes using a specially designed controlled atmosphere heating furnace and special coatings for the dies. Data are given for tensile strength and stress rupture life of the forgings at 3000° F. (F22, F21b, Q-general; W-b, 4-57)

337-F. Chipless Machining. Pt. 4. How You Can Save Material With Cold-Rolled Splines. Clifford P. Farr. Canadian Metalworking, v. 24, Aug. 1961, p. 47-48.

Cold rolling process for forming serrations and splines with an hydraulically actuated machine. Steel workpieces are held between centers and rolled to full depth in a single pass of a pair of traversing synchronized rack-type forming tools. (F23, 1-67, 1-52; ST)

338-F. Fabrication of Columbium Alloy Castings at Low Temperatures. J. A. DeMastry and E. L. Foster. Paper from "Columbium Metallurgy". v. 10. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 75-83.

Successful initial breakdown of cast structures of consumably melted ingots of Cb-Cr, Cb-Mo, Cb-Zr, Cb-Ti-Cr and Cb-Ti-Mo alloys at 1000° F. by upset forging. Further refinement of the technique has allowed breakdown of cast structures of Cb-Mo and Cb-Ti-Cr alloys at room temperature. (F22j, 2-61; Cb)

339-F. Aluminium Pipework. Pt. 5. Helical-Weld Aluminium Pipe. Pipes & Pipelines, v. 6, Aug. 1961, p. 37-41.

Production of Al pipe 6-28 in. in diameter with up to 1/4 in. wall thickness by continuous forming and welding of Noral D54S (N 5/6) Al-Mg alloy strip. (F26, T26r; Al-b, Mg)

340-F. (Pamphlet.) Flat Rolled Electrical Steel. (Steel Products Manual). Aug. 1961. 36 p. American Iron and Steel Institute, 150 E. 42nd St., New York 17, N. Y.

Manufacturing methods and practices, classes and types, magnetic characteristics and tolerances for dimensions. Relationship between magnetic and mechanical properties. (F23, P16, Q-general; ST-f, 17-55)

341-F. Automatic Slug Line. Australasian Manufacturer, v. 46, July 15, 1961, p. 62, 64.

Automatic transfer of steel blanks through cropping, preforming and chamfering operations prior to forging. Design and construction of equipment. (F21, 18-74; ST)

342-F. Development of Optimum Methods for the Primary Working of Refractory Metals. K. B. Simonson. Harvey Aluminum Inc. (Wright Air Development Div.) U. S. Office of Technical Services, AD 257865, Jan. 1961, 183 p. $3.

Development program and metal working facility at Wright Patterson Air Force Base, Ohio, to provide wrought forms of high-temperature alloys for subsequent physical testing and evaluation. The facility consists of a 600-ton high speed horizontal extrusion press, a 500-ton vertical forge press, a laboratory-type rolling mill and various supporting equipment. (F-general, 1-52; EG-d37)

343-F. Forged Components for the Nuclear Reactor Pressure Vessel at the Senn Power Station, Italy. A. Bartocci and E. Marianeschi. Paper from "Steel for Reactor Pressure Circuits". no. 69. Iron and Steel Institute, London SW 1, England, 1961, p. 257-269.

Manufacture of steel pressure vessels for nuclear reactors with forged components eliminate the longitudinal welded joints which are mainly subject to stress during operation and reduces the total welding length. (F22, T26q; ST, 17-57)

344-F. Vapor-Cooled Transformer Speeds Pipe, Tube Welding. Welding Engineer, v. 46, Aug. 1961, p. 55.

Resistance welding transformer with immersion cooling system using nontoxic fluorocarbon permits increased production speed for steel tubing and pipe with reduced power input and less electrode dressing. (F26p, K3, 1-52; ST)

345-F. New Tube Mill Doubles Welded Steel Tubing Output; Extends Size Range From 3/8-2 1/2 in. Dia. Nat Wood. Western Metalworking, v. 19, Aug. 1961, p. 25-26.

Continuous rolling and welding of square and round, small diameter tubing from coiled steel strip for use in consumer goods. (F26s, F26p, W23h; ST)

346-F. Plate Edge Planer Speeds Production of Line Pipe. Steel, v. 149, Aug. 28, 1961, p. 76.

High-strength steel plates are squared and trimmed by a side planer in preparation for welding into large diameter line pipe. (F21, F26p, G17c; ST, 4-53)

347-F. New Plate Mill Is Built to Broaden Product Line. Steel, v. 149, Aug. 28, 1961, p. 78-80.

Design and operation of mill and auxiliary equipment used in heating, rolling and shearing steel ingots of up to 21,000 lb. (F21b, F23, W23, W24m, 17-51; ST, 4-53)

348-F. (Russian.) Forging and Stamping of Cast Iron. S. I. Kluchnikov. Kuznechno-Shtampovochnoe Proizvodstvo, Mar. 1961, p. 19-22.

Experimental data for optimum working temperature and amount of deformation and optimum amount of inclusions in white and gray cast iron, to produce maximum strength and elasticity. Processes include forging, closed-die stamping and rolling of cutter beads. 4 ref. (F22, G3, 1-52, 2-60, 2-61, 3-68; CI)

349-F. Duplex Gangslitter Cuts Both Ways. E. C. Hall. Metalworking Production, v. 105, Aug. 16, 1961, p. 72-75.

Coupled gang slitter arrangements for cutting 1/8-in. steel sheets up to 84 x 48 in. in size in two directions to produce blanks for domestic cooking stove components at a rate of 200-300 per hr. Automatic sheet feeding equipment is operated in conjunction. (F29n; ST, 4-53)

350-F. Colforg Equipment for the Production of Forging Slugs. Machinery (London), v. 99, Aug. 2, 1961, p. 267-269.

Cropping, preforming and chamfering operations applied to 1, 2 and 3-in. steel bars. Adaptation for cropping and preforming slugs of smaller diameter or for preforming in various ways including the cold forging stage. (F21; ST, 4-55)

351-F. Reflectors Save Forging Heat. Metalworking Production, v. 105, July 12, 1961, p. 47.

Tubular Al reflectors are used to reduce heating time during forging by slowing down the cooling rate. Other applications of the reflecting principle include a reflecting tunnel for use with a reheating furnace, shields for the transportation of hot material and for controlling cooling rates during sheet and bar rolling. (F21, F22, 1-52, 17-57; Al)

352-F. Forgings--Sure Path to Quality. B. J. Flannagan. Metalworking, v. 17, Aug. 1961, p. 48-49.

Design considerations for forgings and forging dies with attention to parting lines, fillet and quarter radii, connecting sweeps and draft angles. (F22p, 17-51)

353-F. (English.) Improved Rolling Techniques for Round Bars of Small Diameter and Changes in Rolling Facilities. Yawata Technical Report, no. 231, June 1960, p. 95-97.

Review of bar and rod mill modernization programs leading to increased capacity for heating, rolling and cutting of steel bars of 9 to 25 mm. in diameter. (F23, W23d, 17-51; ST, 4-55)

354-F. Forgers Extend Their Technology. Steel, v. 149, Sept. 11, 1961, p. 102-108.

Recent developments in forging of Be, Cb, Ta, W, superalloys, die steels, Ni and Mo alloys and other materials. Design of forging presses and other equipment for achievement of close tolerances. (F22, 1-52; ST, SGA-h, EG-d37, Be, Cb, Ta, W, Ni-b, Mo-b)

355-F. Extrusion of Lithium Wires of 1 Mil Diameter. J. Katzenstein and M. Sydor. Review of Scientific Instruments, v. 32, Aug. 1961, p. 989.

Alkali metal wires, in particular Li, are extruded in a CO_2 atmosphere on a die of special design to produce fine diameters with good surface homogeneity. (F24; Li, EG-e41, 4-61)

356-F. The Logarithmic Function of Equi-Reductions in Multiple Drawing Operations. Anton F. Mohrnheim. Wire and Wire Products, v. 36, Sept. 1961, p. 1133-1136, 1193.

Method and calculations for solving wire drawing problems in the processing of steel, Al and Ti wire using Log Log slide rule and use of the "elongation factor" combined with a knowledge of physical phenomena. (F28; ST, Al, Ti, 4-61)

357-F. Fabrication of Stainless Steel Clad Uranium Dioxide Fuel Elements by Tandem Rolling. J. W. Lingafelter. American Nuclear Society, Transactions, v. 4, June 1961, p. 151.

X-ray inspection to determine density of fused UO_2 within a Type 304 stainless steel tube after rolling. (F23, S11p, T11g; SS, 4-60)

358-F. Fabrication of Fuel Elements by Swaging. E. A. Lees. American Nuclear Society, Transactions, v. 4, June 1961, p. 151-152.

Hot swaging (975-1000° C.) with conventional steel dies and differential reduction with nylon dies of stainless steel cladding over fused UO_2 nuclear reactor fuel pellets to obtain maximum fuel rod density. Pellet breakage as affected by dimensional tolerances imposed on the pellets. (F25, 1-66, T11g; SS)

359-F. New Brass Rod Mill. Metal Industry, v. 99 Aug. 4, 1961, p. 87-89.

Straightening testing and pointing of coil stock in an extrusion plant of United Nonferrous Metals, Ltd. followed by drawing, straightening and finishing. (F-general, 1-52; Cu-n)

360-F. (French.) Manufacture of Seamless Tubing. Trempe, no. 39, Sept. 1961, p. 7-16.

Manufacture of seamless tubing used in pipelines, oil refineries and earth drilling equipment from 0.3% carbon steel, pearlitic Mo and chromium-molybdenum steels, ferritic Cr-Mo, 18/8 austenitic and carbon steels containing 0.4-0.5% C and 0.8-1.5% Mn. Cutting of blanks, heating up to 1260° C., piercing, various rolling processes, finish rolling and preparation for thread cutting. (F26, 1-52; CN, SS, ST, Cr, Mo, Mn, 4-60)

361-F. (Japanese.) Studies on the Three-Dimensional Deformation in Rolling. Samon Yanagimoto. Japan Society of Mechanical Engineers, Transactions, v. 27, June 1961, p. 800-808.

Investigation of rolling pressure distribution over the contact arc in the hot rolling process for steel plate. Calculations involve plate width, developing a three-dimensional distribution of rolling stress to the plate edge. 5 ref. (F23, 1-66, 3-73, 3-74; ST, 4-52)

362-F. Forgings Made by High Energy Process. Materials in Design Engineering, v. 54, Aug. 1961, p. 17.

Description and operation of a high energy rate metalworking machine which utilizes gas under pressure as its driving force for forging 4130 steel, tough pitch Cu and Cu powder compact aircraft parts. (F22, T24, W22; AY, Cu, 6)

363-F. Hammer to Strike Mighty Blow. R. H. Eshelman. Iron Age, v. 188, Sept. 14, 1961, p. 159.

Aircraft parts of Udimet, Waspalloy and Inconel die steels are precision forged by a high-speed mechanical press within tolerances of 0.004 in. (F22, 1-52, T24; SGA-h, 17-57)

364-F. (German.) Drawing of Copper and Brass Tubes in Movable Mandrel Rings. Horst Rusch. Neue Hutte, v. 6, July 1961, p. 411-416.

Test drawing of Cu and brass tubes from 27 mm. diameter, 1.25 mm. wall thickness to 17.3 mm. diameter, 0.9 mm. wall thickness using a tensile testing machine. Theoretic investigation of geometric dimensions of drawing tool and evaluation of drawing sequence. (F26r, 1-53; Cu, Cu-n)

365-F. Extrude Ingot Into Spiral Shape. Iron Age, v. 188, Sept. 28, 1961, p. 93.

Extrusion of a rotor with spiraled vanes from 6063 Al alloy using a specially machined die. The spiral effect is obtained by machining lead angles into the die lands. (F24, T7h; Al-b, 17-57)

366-F. Automatic Continuous Copper Rod Mill in New Jersey. Engineer, v. 212, Aug. 25, 1961, p. 346-347.

Production of 5/16 in. Cu rod from 4 in. x 4 in. wire bars at rolling rates up to 17 ton per hr. on an automatic rolling line incorporating gas-fired preheat furnaces and three-high roughing and two-high finish mills. (F23, W24k, 1-52; Cu, 4-61)

367-F. High-Energy-Rate Compacting. Engineer, v. 212, Aug. 25, 1961, p. 347-348.

Compacting, die forging, blanking and extrusion of intricate metal parts using the "Dynopak" pneumatic metal forming process. Shapes with close tolerances are formed from Al, W, Mo, Ti, Co, Zr, Cu powder, tough pitch Cu and 4130, C and stainless steels. Effect of forming velocity on mechanical properties of the materials. (F-general, G-general, H14, Q-general, 1-71, 3-67, 4-57)

368-F. Precision Calls for Clean Rooms. David Fishlock. Metalworking Production, v. 105, Sept. 13, 1961, p. 70-73.

Forging, machining, welding and assembling of precision machinery and nuclear reactor components in dust-free conditions obtained by atmospheric filtration, air conditioning, special clothing and temperature-humidity control. (F-general, G-general, K-general)

369-F. (French.) Study of Blooming Mills With Regard to Automation. C. Roger. Revue de Metallurgie, v. 58, June 1961, p. 513-522.

Screw tightening and the movement of ingots on the roller bed are considered in terms of rolling time and safety measures. (F23n, A7p, 1-52, 3-67, 18-74)

370-F. Republic's New Strip Mill to Roll Variety of Steels. Steel, v. 149, Oct. 2, 1961, p. 62, 64.

Production of standard grades of carbon steel, stainless, Si and high-alloy steel strip at rates up to 2400 ft. per min. with X-ray and infra-red control of thickness and width. (F23q, S14e, 1-52; CN, SS)

371-F. Some Analytical and Experimental Studies of Axi-Symmetric Cold Forging and Extrusion. Pt. 2. H. Kudo. International Journal of Mechanical Sciences, v. 3, Aug. 1961, p. 91-117.

Cylindrical specimens of Al, Cu and brass (30% Zn, 70% Cu) having various initial height-diameter ratios are compressed between two flat and roughened dies. The mean working pressure, fractional height reduction and yield stress are determined at room temperature. Extrusion, piercing and cold forging of Al, Cu and brass specimens at low speed and at room temperature. Experimental results are compared with theoretical results. 21 ref. (F22, 1-67, F24, 1-54; Al, Cu, Cu-n)

372-F. Preheating Titanium and Its Alloys in Bar Mill. Industrial Heating, v. 28, Sept. 1961, p. 1720, 1722.

Preheating furnaces for the treatment of Ti sheet and rod. The electric resistance furnaces used have a capacity for heating 1000 lb. of Ti per hr. to 1000° C. (F21b, W20h, 1-52; Ti, 4-53, 4-55)

373-F. (German.) Stress State in Plane and Rotation Symmetrical Deformation by Drawing and Pushing In Pt. 1. Stresses in the Deformation Zone During Drawing in Plane Distortion. Oskar Pawelski. Archiv fur das Eisenhuttenwesen, v. 32, Aug. 1961, p. 513-520.

Analysis includes computation of uneven stress distribution in deformation zone and of stress distribution in friction-free rod drawing as influenced by die angle and reduction ratio. (F2, F27)

374-F. (German.) Production of Compressor Blades of Light Metals. A. Burkhardt and H. Weisswanger. Werkstattstechnik, v. 51, Apr. 1961, p. 178-182.

Production of compressor blades of AlCuMg alloy and of special CuAl alloy by combination of extrusion, pressing and rolling operations. Design and production of working tools is discussed with technology of shaping and finishing operations. (F-general, 1-52, 17-51; Al, Cu, Mg)

375-F. Boeing Reduces Superthin, Superalloy Tubes. Steel, v. 149, Oct. 9, 1961, p. 118-119.

Rene 41 tubes are forced through tapered die and are reduced from 1.5 to 0.5 in. with wall thickness of 0.010 in. Test results indicate strength to withstand heat and stresses encountered in space flight. (F26r, 1-67, Q-general, T24a; SGA-h, Ni-b, 4-60)

376-F. Developments in the Forging of Materials for Service at High Temperature. Machinery (London), v. 99, Sept. 20, 1961, p. 687-694.

Components for missiles and space vehicles are forged at 1000-5000° F. from medium-high temperature alloys (Inco 901, A286, V57), Ni-base superalloys (Astroloy, Rene 41, Waspaloy) and refractory metals (Mo, Cb, Ta, W). (F22, T24e, 17-57; SGA-j, Ni-b, EG-d37, Cb, Mo, Ta, W)

377-F. Progress in Welding of Boiler Tubes and Pipelines for High Pressure Boilers. R. J. Hardess. Welding Fabrication and Design, v. 4, Aug. 1961, p. 20-30.

Review of tubing materials, welding techniques and nondestructive methods of testing and inspection during the welding and fabrication of tubes and pipelines into high pressure boilers. (F26p, S13, T26q, 17-57)

378-F. Heavy Presses in the Space Age. L. W. Mayer. Mechanical Engineering, v. 83, Sept. 1961, p. 44-45.

Space craft components are forged and extruded on presses from Be, Ti alloys, Ni-base alloys, refractory metals, Mg, Al, low-alloy steel and stainless steel. Effect of chemical composition and forging pressure on ductility and forgeability. (F22, F24, T24e, 1-52, 1-60; ST, Be, Ti-b, Ni-b, EG-d37, Al, Mg, 17-57)

379-F. Cold Rolling Mill for Steel Strip at Brinsworth. Engineer, v. 211, Apr. 7, 1961, p. 554-556.

Pickled steel coils received from an adjacent hot mill are rolled to strips 0.010-0.160 in. and up to 18 in. wide using automatic gage control equipment with subsequent annealing, tempering and slitting of the strips. (F23, J23, J29, W23c, 1-52; CN, 4-53)

380-F. Forgings for Missiles and Space Vehicles. William C. Kunkler, Jr., and Jose R. Canal. Mechanical Engineering, v. 83, Sept. 1961, p. 45-49.

Die forging, roll forming, extruding and machining of Be, Ti, Ni-base alloys, refractory metals and low-alloy steel. Tensile and stress-rupture properties are given for Be and Ni-base forgings. (F22, F24, G11, G17, T24e; Be, Ti, Ni, ST, 4-51, 17-57)

381-F. Aspects of Heavy Press Utilization. Jacob Brayman. Mechanical Engineering, v. 83, Sept. 1961, p. 50-51.

Die forging and deep drawing of Ti, Al, Be, V, Mo, W and stainless steel into panels used in space craft, missiles and tanks. Data are given for rigidity and tensile strength of the metals. (F22p, G4b, T2h, T24e, 4-53; Ti, Al, Be, V, Mo, W, SS, 17-57)

382-F. Cold Extrusion--A Review of Some Technical Information and Current Practice. D. F. Galloway. Microtechnic, v. 15, June 1961, p. 85-103.

Brief historical review of nonferrous and ferrous metals and alloys currently being extruded from the point of view of resistance to plastic flow. Effect of material condition and degree of required deformation on extrusion load and the influence of cold working on tensile strength, hardness and ductility. Tooling for cold extrusion and methods of producing extrusion slugs or billets. 18 ref. (F24, 1-52, 10-54, Q-general)

383-F. Intricate Forgings Are No Problem. Steel Horizons, v. 23, Fourth quarter 1961, p. 14-15.

Processing of stainless steels including superalloys, by forging, plating, soldering and electrochemical machining to produce parts with corrosion resistance and high temperature strength. (F22, G24d, K7, L17, 1-52; SS, SGA-g, SGA-h)

384-F. (Russian.) New Technological Process for Producing Blanks for Hollow Railroad Car Axles. A. I. Tselikov, S. P. Granovskii and V. I. Efanov. Kuznechno-Shtampovochnoe Proizvodstvo, May 1961, p. 4-5.

Production of blanks from a steel blooming billet, piercing and finishing on a three-high rolling mill. (F26, T23p, 1-52; ST)

385-F. New Electric Resistance Welder Increases Production Up to 60%. Western Machinery and Steel World, v. 52, Sept. 1961, p. 78-79.

Welding by an improved vapor-cooled machine that increases pipe and tube production. Use with fluid dielectrics, pertinent information on transformer cores and operating advantages. (F26p, 1-52)

386-F. Is There a Cold War in Cold Forging? K. W. Hords. Metalworking Production, v. 105, Sept. 27, 1961, p. 63-67.

Cold extrusion with a simple hydraulic ram, the cylinder extended to accommodate well-guided tooling to form metals within tolerances competitive with those produced by hot forging. Parameters for equipment, materials, design and operating sequence. (F24, 1-52, 1-67)

387-F. Planer-Scarfing Formed Shapes. Kenneth H. Schultz. Metalworking Production, v. 105, Sept. 27, 1961, p. 72-73.

Preparation of joint edges for continuous full-penetration welds made with automatic submerged-arc equipment by cam-controlled tools which machine-scarf the edges more accurately than conventional hand-chipping methods can do. (F21e, K1e, 1-52)

388-F. (German.) Precision Forging of Turbine Blades. H. Tarmann. Radex Rundschau, no. 4, Aug. 1961, p. 664-669.

Technological features and operation details for close-tolerance forging of steam and gas turbine blades of heat resistant metals such as 13% Cr steel, CrNiCo steel and Co-Ni alloys. (F22, T7h, 1-52, 17-55; SS, Co, Cr, Ni, SGA-h)

389-F. (German.) Mechanical Flame Scarfing of Semifinished Products in Manufacturing Seamless Tubes. Egon Ritter and Heinz-Gunter Schmitt. Stahl und Eisen, v. 81, Sept. 14, 1961, p. 1274-1283.

Mechanical flame scarfing of steel using square and round scarfing machines. Design of machines and comparison of scarfing technology in terms of scarfing depth as influenced by oxygen pressure, scarfing rate, ingot temperature and grade of oxygen. (F21e, F26, 1-52; ST)

390-F. (German.) Mechanical Cold Flame Scarfing of Slabs. Kurt Tschirschwitz. Stahl und Eisen, v. 81, Sept. 14, 1961, p. 1284-1287.

Design and mode of operation of a cold flame scarfing machine with stationary burners and semi-automatic control. Scarfing tests at constant burner angle with varying rates and pressures on steel slabs. Mean scarfing depth and oxygen consumption as influenced by oxygen grade. (F21e, 1-52; ST, 4-53)

391-F. Developments in Cold Rolling and Wire Mesh Production. British Steelmaker, v. 27, Sept. 1961, p. 279-280.

Production of strip and wire mesh from hot rolled steel rods at rolling speeds up to 400 ft. per min. Rods from 0.08-0.5 in. in diameter are drawn into wire at 400-800 ft. per min. (F23, 1-52, 1-67; ST, 4-53, 4-55, 4-61)

392-F. (German.) Processing Operations in Nonferrous Semifinished Products Industries. Pt. 7. New Development in Continuous Brass Strip Heating. Franz Deutz and Rudolf Jansen. Zeitschrift fur Metallkunde, v. 52, Aug. 1961, p. 503-507.

Design and operation of a two-story brass strip drawing unit with continuous gas radiant-tube heating which permits processing of heavy coils of up to 3000 kg. wt. (F23, 1-52, 1-66; Cu-n)

393-F. A Machine for Correcting the Shape of Strip. P. Brock, J. E. Bowers and D. D. Smith. Institute of Metals, Journal, v. 90, Sept. 1961, p. 1-6.

Design and application of a stretching device which consists of a number of small rods, followed by a series of progressively larger straightening rolls, over which metal strip can be pulled under tension resulting in correction of bad strip shape and the inherent tendency to edgeweise bow on subsequent slitting. Application in straightening and flattening bronze, brass, Be-Cu, Al and mild steel. Soft material is slightly hardened by treatment in the machine but the properties of half-hard, or harder, material are not significantly affected. (F29, 1-52; CN, Al, Be-b, Cu-b)

394-F. Roll Forging Speeds Ring Making. Iron Age, v. 188, Oct. 19, 1961, p. 146.

Forging of alloy, stainless or carbon steel blanks into rings with 15-80 in. OD for rocket and jet engines to tolerances of 1/16-1/4 in. Speed, load limit, rolling pressure and size of equipment. (F22p, T24b, 17-55; AY, CN, SS)

395-F. Sheet and Tube Starts Enlarged Hot Mill. Blast Furnace and Steel Plant, v. 49, Oct. 1961, p. 984.

Rolling steel slabs into 20-ton coils at a rate of 2250 ft. per min. Hot strip mill layout includes electronic inspection and closed-circuit TV which follows each slab through the mill. (F23, 1-66, 18-67; ST, 4-53)

396-F. Progress in Steelmaking--Automatic Flame Scarfer Finishes Bloom. Steel, v. 149, Oct. 16, 1961, p. 150.

Multiple orifice heads spray oxygen on steel to remove surface defects. Removal depth is determined by preset bloom speed and oxygen flow rate. (F21e, 1-52; ST)

397-F. Electric Billet Heater Replaces Oil-Fired Furnaces. Wild-Barfield Heat-Treatment Journal, v. 8, Sept. 1961, p. 13-14.

Manganese-molybdenum steel billets are induction heated to forging temperature using a heater arranged as two independent units. (F21b, W27k; AY, 4-52)

398-F. Large Die-Forged Propeller Blade. Metal Industry, v. 99, Sept. 15, 1961, p. 209-210.

Scalping, soaking, stamping, removal of flash and machining of Al alloy stock are followed by further soaking, upsetting, solution heat treatment and polishing. Final machining is followed by anodizing. (F21, F22, G17, J27a, L19, T24, 7-52, Al-b)

399-F. (German.) Stress State in Plane and Rotational Symmetric Deformation by Drawing and Pushing-In. Pt. 2. Stresses in Drawing and Pushing-In of Rods. Oskar Pawlewski. Archiv fur das Eisenhuttenwesen, v. 32, Sept. 1961, p. 607-616.

Approximate mathematical solution of the statically undetermined stress state in drawing and pushing of the blank into the drawing die. Computation of the external deformation forces--tool pressure, drawing force and pushing-in force. (F2, F27)

400-F. Processing Long Lengths of Superconductive Columbium-Tin Wire. K. M. Olsen, E. O. Fuchs and R. F. Jack. Journal of Metals, v. 13, Oct. 1961, p. 724.

Procedure achieves superconductivity at average current densities exceeding 150,000 amp. per sq. cm. in 88,000 gauss magnetic field. Application to construction of solenoid magnets. (F28, 1-52, 17-57; Cb, Sn, SGA-q)

401-F. (German.) Processing Technology in the Nonferrous Semifinished Products Industry. Pt. 8. Electronic Control. Fritz Orttenburger. Zeitschrift fur Metallkunde, v. 52, Sept. 1961, p. 592-595.

Review of development of control of electric roll drives from the Leonard transformer to current electronic systems. Design and operation of electronic control using transistors. (F23, 18-74; EG-a38)

402-F. (Czech.) Built-In Safety Units in Rolling Stands. Milan Hajduk and Antonin Fiala. Hutnicke Listy, v. 16, Aug. 1961, p. 539-545.

Protection of rolling stands against sudden excessive mechanical loads, set up from time to time under certain circumstances in rolling, by building in hydraulic safety units, safety components of cast iron steel or wedge-shaped components in places exposed to the main stress. (F23, 1-52, 1-66, A7p)

403-F. Flame-Cutting Goes Numerical. Machinery, v. 68, Sept. 1961, p. 122.

Fully automatic flame cutting operation is provided by control system receiving instructions on paper tape. (F22g, 18-74)

404-F. The Cold Extrusion of Steel. R. A. P. Morgan. Metal Treatment and Drop Forging, v. 28, Oct. 1961, p. 393-400.

Summary of annealing, pickling, rinsing, phosphating and lubricating operations and process parameters before cold extrusion. Description of backward and forward extrusion operations and the draw operation. Consideration of process economies and punch material selection including nominal composition, hardening and tempering. (To be continued.) (F21, F24, 1-67; ST)

405-F. Propeller Production. Aircraft Engineering, v. 33, Oct. 1961, p. 288.

Preheating, stamping, upset forging and machining of Noral 17S Al alloy cylinders for propeller blades. (F-general, G17, T24a; Al-b, 17-57)

406-F. (French.) Rolling Billets of Special Steels Manufactured by Continuous Casting. M. Cabane. Revue de Metallurgie, v. 58, Aug. 1961, p. 661-665.

Study of external and internal soundness, segregation, obtained during heating and rolling of carbon steel, stainless steel, toolsteel, high-speed toolsteel and heat resistant steel billets. Effect of degree of deformation during rolling on forgeability, density and homogeneity. (F23; ST)

407-F. (French.) A New Rolling Mill Line for 1 M. Wide Copper Strip. B. Lecry and C. Lachaud. Cuivre Laitons Alliages, no. 62, Aug. 1961, p. 9-17.

Process and equipment in which a slab of 700 x 135 mm. cross section is manufactured by continuous casting of induction melted Cu and is reduced to 8 mm. thickness by hot rolling with subsequent planing, descaling, washing, brushing, cutting to size and cold rolling to the final thickness--0.40 mm. minimum with annealing at 500° C. for 5 hr. after finish rolling or between two cold rolling passes. (F23, 1-52; Cu, 4-53)

408-F. Special Planing Equipment Squares Plate for Welded Pipe. Iron and Steel Engineer, v. 38, Sept. 1961, p. 227-228.

A heavy-duty planer with auxiliary equipment produces high squares, bevel or any shape desired on the ends of high-strength steel plates for large diameter expanded welded pipe. (F21, F26; ST, 4-53)

409-F. Wire Drawing--"Boundary" Lubrication Is Important. Digest of "Mechanisms of Boundary Lubrication--Boundary Lubrication of Copper, Mild Steel and Stainless Steel During Severe Cold Deformation". Paper 61-LUBS-5 presented at the Lubrication Symposium, A.S.M.E., Miami, Fla., May 1961. P. R. Lancaster and G. W. Rowe. Metal Progress, v. 80, Nov. 1961, p. 162-163.

The amount of lubricant carried through the die has an important bearing on the amount of reduction possible in drawing. Reductions of over 55% can be accomplished in ore pass if proper lubricating practices are employed. (F28, 1-52; NM-h)

410-F. Welding Molybdenum Tubes. Digest of "The Fabrication of Thin-Wall Molybdenum Shapes by Welding". Paper 60-WA-53 presented at the Winter Annual Meeting of A.S.M.E., N.Y. W. F. Brown and M. A. Pugacz. Metal Progress, v. 80, Nov. 1961, p. 178.

Techniques for welding tubes from thin-walled Mo sheet. (F26p, 1-52; Mo, 4-53)

411-F. (German.) Investigation of Heating of Forging Blanks. Eberhard Plaume. Neue Hutte, v. 6, Aug. 1961, p. 486-495.

Estimation of heating temperature and rate in preheating of carbon and alloyed steel in terms of thermal conductivity of steel and susceptibility to hot tearing as influenced by the carbon equivalent. Comparison with production results. 14 ref. (F21b, P11h, 2-60; ST, C)

SECTION G

SECONDARY MECHANICAL WORKING

1-G. The Cold Extrusion of Steel. S. C. Poulsen. Machinery (London), v. 97, Oct. 19, 1960, p. 876-886.

Use of adapted or modified deep-drawing presses. Advantages of cold extrusion as a first-stage operation followed by cold drawing. Parameters and applications. (G5; ST)

2-G. Machine Makes Smooth Cuts in Honeycomb Materials. Iron Age, v. 186, Nov. 17, 1960, p. 141-143.

Quenched-arc cutting of stainless steel, Zr, Ti and Al honeycomb structures using an Electro-Band machine which supplies a current through a cutting band immersed in a coolant. (G22h; Al, Ti, Zr, SS, 7-59)

3-G. Tungsten-Arc Welding Torch Cuts Light-Gage Metals. Iron Age, v. 186, Nov. 17, 1960, p. 152-153.

Arc cutting of Al, Mg, Cu and stainless steel workpieces using a heliarc welding torch operating at increased current density. (G22h, W29d, 1-52; Al, Cu, Mg, SS)

4-G. (German.) Explosive Cutting. K. H. Muller. Stahlbau, v. 29, Sept. 1960, p. 294-295.

Cutting of structural steel shapes by hollow charges during the removal of obsolete steel constructions. 4 ref. (G22; ST, 4-57, NM-k34)

5-G. How to Machine Molybdenum. Metalworking Production, v. 104, Oct. 26, 1960, p. 73-78.

Problems in machining; lubrication; special machining methods. (G17; Mo)

6-G. (German.) Automatic Punch Press for Sheet-Metal Caps With Tool Control. H. K. Werkmeister. Werkstatt und Betrieb, v. 93, Oct. 1960, p. 679.

Punching of 0.7 mm. thick steel or brass sheet using a fully automatic machine with eight oil greased and cooled punches. Pneumatic control instrument indicates puncher defects. (G2j, 1-52; Cu-n, ST, 4-53)

7-G. (German.) Flame and Electric Cutting of Steel and Nonferrous Metal Sheets. Hans H. Reinsch. Schweisstechnik, v. 14, Aug. 1960, p. 90-93.

Flame and electric cutting of unalloyed and alloyed steel, cast iron, Al and Cu. Operational parameters of current, voltage and cutting rate for varying sheet thickness. 6 ref. (G22; Al, Cu, AY, ST, 4-53)

8-G. New Technique Promises Faster Magnesium Forming. Steel, v. 147, Nov. 21, 1960, p. 101.

Drawing of Mg alloys at 400° F. in a 100 ton mechanical press at drawing speeds up to 50 ft. per min. Drawn cups of ZE10A-O and AZ31B-O alloys compare favorably in earing tendency, wall thinning and eccentricity with Al test sheets. (G4c; Mg-b, 4-53)

9-G. Automatic Grinder Line Upgrades Stainless Strip. Steel, v. 147, Nov. 21, 1960, p. 116-117.

A regeneration process for low grade coils in which the coils are passed through drag wipe, doctor roll and two grinding units with abrasive belts until defects are removed. Adjustable backup rolls and variable line speeds control stock removal. (G18k; SS, 4-53)

10-G. Hydraulic Bulge Tester Determines Sheet Drawing Quality. W. N.

Lambert, E. S. Madrzyk and F. E. Gibson. Journal of Metals, v. 12, Nov. 1960, p. 857-860.

Drawability of brass, Cu, Al and killed steel measured by a hydraulic bulge tester using the instability point of the metal under biaxial tension as a criterion. 19 ref. (G4, 17-52, Q10a, Q27g; Al, Cu, Cu-n, ST-c, 4-53)

11-G. Explosive Forming in the Missile Industry. L. C. Stuckenbruck and C. H. Martenez. Machinery, v. 67, Nov. 1960, p. 99-105.

Explosive forming of rocket engine components composed of Al, Cu, Ni, Ta, Zr, Cb and stainless steel. (G-general, T24c; Al, Cb, Cu, Ni, Ta, Zr, SS, NM-k34)

12-G. Steam Turbine-Bucket Increases Numerical Profiling Efficiency. Lawrence W. Collins, Jr. Machinery, v. 67, Nov. 1960, p. 112-117.

Milling of turbine buckets from hot forged 13% Cr-0.30% C steel by tape-controlled profiling machines. (G17b, 18-74, W25r; SS)

13-G. Pearlitic Malleable Iron--an Engineering Alloy of New Significance. Machinery, v. 67, Nov. 1960, p. 142-146.

Machinability in unhardened state and wear resistance, hardness and tensile strength after heat treatment of pearlitic malleable Fe. Applications. (G17k, Q-general, 2-64; CI-s)

14-G. (German.) Belt Grinding of Red Brass. G. Pahlitzsch and G. Becker. Metall, v. 14, Nov. 1960, p. 1077-1080.

Red brass containing 5-6% Sn, 3-5% Pb and 0.6% Zn is ground with various oil additions at various cutting speeds. Metal removal as a function of cutting speed, grinding time and contact pressure. 8 ref. (G18k; Cu-n, Sn, Pb, Zn)

15-G. Tapping High Tensile Strength Alloys With Carbide. J. F. McAuliffe. Carbide Engineering, v. 12, Nov. 1960, p. 15-18.

Tapping of high strength steels and alloys (Rockwell c 30-57) using solid WC taps or steel taps with WC tips. Effect of the ratio of tool hardness to workpiece material hardness on tool life. Data for tool geometry, hole depth, surface speed and torque requirements. Prevention of chipping and tap breakage. (G17f, T6n; ST, SGB-s, 6-69, 17-57)

16-G. Threading With Carbides. Horace Frommelt. Carbide Engineering, v. 12, Nov. 1960, p. 26-28.

Threading of SAE 1120 and SAE 1130 steel bushings, a stainless steel flange and a welded steel drill bit assembly using WC cutting tools. (G17f, T6n; SS, ST, 6-69, 17-57)

17-G. (German and French.) Modern Large-Size Flame Cutting Machines. M. Maier. Zeitschrift fur Schweisstechnik (Journal de la Soudure), v. 50, Sept. 1960, p. 268-272.

Cutting of steel plates and sheets for pressure boilers by an electron controlled three-flame cutting machine. (G22g, W29d; ST, 4-53)

18-G. (English.) Investigation of the Elementary Processes Occurring in Electric Spark Machining. Margit Toth-Bitskey and Jeno Pocza. Acta Physica, v. 12, no. 1, 1960, p. 77-83.

Spark machining using steel and brass anodes. Erosion is measured as a function of current frequency, voltage and electrical energy. 8 ref. (G24a; Cu-n, ST)

19-G. (German.) Cold Bulging and Cold Impact Extrusion Using Multiple-Step Cold Presses. B. Hatebur. Fertigungstechnik und Betrieb, v. 10, Oct. 1960, p. 574-582.

Mass production of screws, bolts and small machine parts by multiple-step presses of varying design. (G5, G14, 1-67)

20-G. (German.) Adjustment of Level Planes by Honing. Heinz Strey. Fertigungstechnik und Betrieb, v. 10, Oct. 1960, p. 619-620.

Comparison of surface quality of hand and machine scraped gray cast iron surfaces. Economics of machine honing. (G19n; CI-n)

21-G. The Cold Extrusion of Steel. S. C. Poulsen. Machinery (London), v. 97, Nov. 2, 1960, p. 988-995.

Examples of components produced by combining cold extrusion as a first-stage operation with cold drawing for supplementary working. Research

techniques include a plasticine analogy method for studying cold flow phenomena and the use of photo-elastic models for the investigation of tooling stresses. Tests on various lubricants. (G5; ST)

22-G. The Role of Friction in Metal Cutting. S. Kobayashi and E. G. Thomsen. Journal of Engineering for Industry, Series B (American Society of Mechanical Engineers, Transactions), v. 82, Nov. 1960, p. 324-332.

Friction mechanisms in cutting tests on SAE 1112 free cutting steel and SAE 4135 alloy steel in the as received condition with artificially controlled tool-chip contact areas and flank contact areas. 15 ref. (G17, Q9; AY, TS)

23-G. A Critical Comparison of Metal-Cutting Theories With New Experimental Data. S. Kobayashi, R. P. Herzog, D. M. Eggleston and E. G. Thomsen. Journal of Engineering for Industry, Series B (American Society of Mechanical Engineers, Transactions), v. 82, Nov. 1960, p. 333-347.

Orthogonal metal-cutting tests at varying cutting speeds, rake angles and feeds are made on annealed and as received SAE 1112 steel, SAE 1020 steel, SAE 4135 steel, 6061-O and 6061-T6 Al alloy and alpha brass. 20 ref. (G17, 10-51; ST, Al-b, Cu-n)

24-G. New Developments in the Theory of the Metal Cutting Process. Pt. 1. The Ploughing Process in Metal Cutting. P. Albrecht. Journal of Engineering for Industry, Series B (American Society of Mechanical Engineers, Transactions), v. 82, Nov. 1960, p. 348-358.

Theoretical development of force diagrams separating the ploughing force, which occurs because of the finite sharpness of the cutting edge, from other forces of the cutting process. Effect of cutting velocity upon tool forces, built-up edge, chip curling and residual stresses in the work surfaces. Real value of coefficient of friction on the chip-tool interface is related to rake angle. (G17, 10-51)

25-G. Impact Extruded Aluminium Beer Cans. Australasian Manufacturer, v. 45, Sept. 24, 1960, p. 44-46, 48-49.

Melting, casting and impact extrusion of Al cans on a slug production line. (G5; Al)

26-G. Tooling Tips for High Energy Rate Forming. F. A. Monahan. Western Metalworking, v. 18, Nov. 1960, p. 43-45.

Tooling for use in three new high energy forming processes, a hydropneumatic method which produces complex forgings and extrusions, a method using electrical shock wave energy and a method using electromagnetic field forces. (G-general; NM-k34)

27-G. Magnesium: New Cost Cutter From Tooling. Western Metalworking, v. 18, Nov. 1960, p. 46-47.

Machinability, weldability and dimensional stability of Mg tooling plate. Applications. (G17k, K9s, P10d; Mg, 4-53)

28-G. Cold Extrusion of Steel Parts From Wire. Alfred Braun. Wire and Wire Products, v. 35, Nov. 1960, p. 1538-1539.

Preparation and cold heading of slugs or billets to overcome inconsistancies in hardness, composition and pattern in the original rimmed steel wire. Degreasing and annealing of slugs. Equipment and techniques for extrusion. (G5, G10, 1-67; ST-d, 4-61)

29-G. Machining Thermal-Resistant High-Strength Materials. Pt. 1. Machining Steel Honeycomb Core With Disc Slicers and Hard Wheel Grinding. Western Machinery and Steel World, v. 51, Nov. 1960, p. 54-58.

Machining of stainless steel honeycomb cores using disk slicers and hard wheel grinding. Data for feed rate, cutting depth and cutter geometry. (G18; SS, 7-59, SGA-h, SGB-a)

30-G. Auto Expert Stresses Color on Steel Buildings. Steel, v. 147, Nov. 28, 1960, p. 114-115.

Application of mass production methods to manufacture of metal buildings. Fabrication of roof and wall panels from galvanized steel or Al strip by forming, cutting, bond coating, painting and baking in a continuous operation. (G-general, T26n; Al, ST, 4-53, 8-65)

31-G. (Russian.) Stamping of Clad Sheet Material. B. N. Shelevkin. Khimicheskoe Mashinostroenie, no. 2, 1960, p. 33-36.

Heat treatment and cutting, die forging, bending and drawing of clad austenitic Cr, steel, brass, Ti, Cu, Ag, Mo and Ni. 4 ref. (G3, F22n, J-general; Ag, Cu, Mo, Ni, Ti, Cu-b, SS-e, 8-66)

32-G. Some Controlled Metal-Cutting Studies With Resulfurized Steels. E. G.

Thomsen, S. Kobayashi and M. C. Shaw. American Society of Mechanical Engineers, Transactions, Paper no. 60-WA-115, 1960, 10 p.

Dynamic shear stress during cutting is determined from compression tests on hot rolled resulphurized steels with similar tensile properties. 12 ref. (G17, Q2j; ST)

33-G. Manipulation of Metals. Pt. 1. R. Tilsley, F. Howard, E. W. Peel, John Arnold and W. S. Hollis. Metal Industry, v. 97, Nov. 4, 1960, p. 381-384.

Abstracts of papers presented at a conference held at Brighton, England. Topics include extrusion of ferrous and nonferrous materials; close-to-form and close tolerance forgings; spline and thread rolling; and the process of explosive forming of metal. (G5, G12, G-general; NM-k34, 4-51)

34-G. Stretch-Forming. J. F. Wallace. Metal Industry, v. 97, Nov. 11, 1960, p. 395-398.

Stretch-forming of Al, Ti 130 and FV 520 stainless steel sheet. Determination of stress-strain and spring-back curves. Calculation of bending moment and longitudinal relaxation strain. (G9; Al, Ti-b, SS, 4-53)

35-G. Diamond-Wheel Grinding of Tool Steels. L. P. Tarasov. Tool Engineer, Oct. 1959, p. 109-117.

Grinding of high vanadium-high speed steels and high carbon-high Cr die steels using diamond wheels. Comparison of grinding costs when using diamond or Al_2O_3 wheels and of surface finish obtained when using natural or synthetic diamonds. (G18k, W25c; TS, C, Cr, V, NM-k37, 17-57)

36-G. Basic Formation of Chips. S. N. Agrawal, R. D. Harris and B. H. Amstead. American Society of Mechanical Engineers, Paper no. 60-WA-282, 1960, 8 p.

Orthogonal cutting of brass, Al and beeswax cold rolled 1018 steel and hot rolled A755T steel is studied by high speed motion pictures. Photographic and test data are given for chip formation, stress patterns, tool forces and edge build-up, compression phenomena and crack initiation and propagation. 11 ref. (G17, G25, M27; Cu-n, Al, ST)

37-G. An Analysis of the Mechanism of Orthogonal Cutting and Its Application to Discontinuous Chip Formation. Keiji Okushima and Katsundo Hitomi. American Society of Mechanical Engineers, Paper no. 60-WA-79, 1960, 11 p.

The concept of flow region, a fairly large transitional deformation zone which exists between the rigid region of work and the plastic region of steady chip, is developed. Mechanics of orthogonal cutting and discontinuous chip formation are analyzed and theoretical equations for angles of boundary lines of the flow region and for strain in chip are deduced and substantiated in cutting tests for Pb and carbon steel. 22 ref. (G17; CN, Pb)

38-G. Can Expolsive Forming Solve Your Design Problems? E. L. Armstrong. Iron Age, v. 186, Nov. 24, 1960, p. 85-87.

High energy forming applied to the fabrication of exacting parts for airframes and missiles. (G-general; NM-k34)

39-G. (French.) Determination of the Possibilities of Cylindrical Deep Drawing of Aluminum and Aluminum Alloys. Robert Chopin. Revue de l'Aluminum, v. 37, July-Aug. 1960, p. 881-888.

Since conventional testing of mechanical properties provides unreliable information regarding deep drawability of light alloys, full-scale practical tests on a hydraulic press are carried out on A-G3, A-U4G, A-G5, A5, A-SG and A-G1 cylindrical alloy blanks in various cold worked and heat treat states. Influence of metal thickness and condition, drawing speed, entering radius of die, pressure of blank clamp and clearance between sides of die and punch on deep drawability. (G4, 17-52, 2-64, 3-60; Al-b, 4-60)

40-G. Spinning Makes Stronger Rocket Cases. Lewis E. Zwissler. Metal Progress, v. 78, Dec. 1960, p. 71-77.

When many early rocket cases failed in weld zones, designers attempted to minimize the number of welds. Shear spinning appears to be a good method for fabricating surfaces of revolution which would require a minimum of welding for rocket cases. (G13, T2p; AY)

41-G. Constricted-Arc Process Cuts Metals Under Water. C. H. Wodtke. Metal Progress, v. 78, Dec. 1960, p. 91-93.

Torches of special design are being used successfully in the maintenance of nuclear reactors. Cutting is rapid and because the torch and work are completely submerged, spatter is confined and release of radioactivity to the air is reduced to a safe level. (G22)

42-G. Color Finishing of Galvanized Steel. Metal Progress, v. 78, Dec. 1960, p. 105-109.

Panels for prefabricated metal buildings are formed from galvanized strip and then primed with a bond coat which anchors a pigmented vinyl coating to give a long-lasting finish. (G11, L26n; ST, Zn, 8-65)

43-G. Flow Turning. Production, v. 1, Dec. 1960, p. 76-77.

302 stainless steel disks are formed into one piece, high tensile strength utensils by turn flowing, a process in which the machine flows the metal into the extended shape. Surfaces can then be polished smooth without grinding. (G17a, L10b; SS)

44-G. Fundamental Machinability Research in Japan. Katsundo Hitomi. American Society of Mechanical Engineers, Paper no. 60-WA-78, 1960, 12 p.

Review of studies on the mechanics of orthogonal cutting; cutting temperatures; tool wear processes; ceramic tooling; chatter; surface roughness and ultrasonic and silver-white chip cutting techniques. 38 ref. (G17k, A9)

45-G. Aluminum Cylinder Blocks Revolutionize Machining Procedure. Laurence W. Collins. Machinery, v. 67, Dec. 1960, p. 111-118.

One of the most noticeable differences in the shift from cast iron to the Al block is the absence of broaching in manufacturing. The Al block is milled by a transfer machine on the pan rails and starter pads at speeds of 1500-2000 sfm. Carbide tipped milling cutters are used. (G17b, T21b; Al)

46-G. Inside Chipless Machining. Laurence W. Collins, Jr. Machinery, v. 67, Dec. 1960, p. 122-125.

Placed over a mandrel and squeezed from the outside by rapidly pulsating dies, cold tubular blanks of M2 and M3 high-speed toolsteels are made to move by metal flow. The Intraform method accurately and rapidly produces complex inside profiles with extremely low-cost tooling, improves hardness, tensile strength and surface finish to a marked degree. (G17; TS-m)

47-G. Titanium Billets Turned With Increased Know-How. Machinery, v. 67, Dec. 1960, p. 141-144.

For optimum performance, carbides should be ground with a diamond wheel without further lapping. Use of carbide tools is not recommended if any slack or wear is evident in the machine tool. High speed tools should be used at lower cutting speeds and feeds. For continuous rough turning of Ti, grades C1 or C2 carbide are best, with cast nonferrous alloy tools and T-5 high speed steel tools as second and third choices, respectively. (G17a; Ti, 4-52)

48-G. Cold-Heading Stainless Steels and High-Temperature Alloys. S. E. Tyson and J. W. Keegan. Machinery, v. 67, Dec. 1960, p. 149-158.

The relative cold headability of a group of austenitic stainless and heat resisting steels determined by their respective work hardening rates. The relationship between tensile strength and percentage of cold work for several stainless steels is shown. The degree of cold work is determined from the reduction in area by wiredrawing. (G10, 1-67; SS, SGA-h)

49-G. New Processes Challenge Old. Iron Age, v. 186, Dec. 8, 1960, p. 110-111.

A review of new machining techniques such as electrolytic grinding, electromachining, chemical milling, electrodischarge machining to keep pace with the development of tool and die steels, refractory metals, cermets, ceramics and other materials. (G17, G24b)

50-G. Ultrasonic Vibration Paves Way to Greater Design Freedom. Iron Age, v. 186, Dec. 8, 1960, p. 112-114.

Basic principle of ultrasonic machining is that power is transferred through

a metal punch to a hard abrasive. This action makes cavities in materials that are harder than the tool tip. Vibration of the tool, at frequencies above the sonic range, drives the abrasive particles into the workpiece at a rapid rate. The process permits the machining of materials such as toolsteel, tungsten carbide, ferrites and magnesium oxide refractories. (G24c)

51-G. Have You Considered All Forms of Electrical Machining. Iron Age, v. 186, Dec. 8, 1960, p. 115-117.

Basic principals and applications of electro-discharge machining and electrolytic grinding. Typical parts that can be machined with little difficulty include carbide die blade roots and other hard workpieces. (G24)

52-G. How Heat Contours Metals. Iron Age, v. 186, Dec. 8, 1960, p. 118-119.

Advantages and application of tungsten-arc, electron-beam and plasma-jet flame cutting. (G24)

53-G. When Weight Creates a Problem Turn to Chemical Milling. Iron Age, v. 186, Dec. 8, 1960, p. 120-122.

The outstanding asset of the process is its inherent ability to remove weight in a controlled manner while holding strict structural tolerance. Al sheet can be chemically milled to within 0.001 in. or less in regular production. With other alloys, variation runs in the 0.002-0.005 in. range. (G24b; Al)

54-G. Each New Process Fills a Gap. Iron Age, v. 186, Dec. 8, 1960, p. 123-124.

Pointers to aid in the selection of new machining techniques such as electrolytic grinding, electromachining, ultrasonic machining, plasma-jet cutting, electron beam machining and chemical milling. (G17)

55-G. Closer Tolerance Stainless Strip for Aircraft, Missiles and Space Vehicles. Modern Machine Shop, v. 33, Dec. 1960, p. 112-115.

Grinding of stainless steel strip to precise tolerances using an abrasive belt grinding line. (G18k, T24e; SS, 4-53, 17-57)

56-G. Match Grinding to Millionths in Minutes. W. M. Stocker. American Machinist/Metalworking Manufacturing, v. 104, Nov. 28, 1960, p. 142-143.

Match grinding of 52100 alloy steel to produces fuel pump barrel and plunger assembly. Air gage holds tolerance to 0.00008 in. (G18; AY)

57-G. Diamond-Coated Bandsaws Do Impossible Jobs. L. H. Barron. American Machinist/Metalworking Manufacturing, v. 104, Nov. 28, 1960, p. 151.

Contour cutting of carbon steel, carbides, ceramics, ferrites, cerametes, Pyroceram and Ge using a diamond-coated steel bandsaw blade. (G17; CN, 6-69, 6-70)

58-G. Screw Machine Work on Aluminum. M. B. Baker. American Machinist/Metalworking Manufacturing, v. 104, Nov. 28, 1960, p. 169-171.

Methods for preventing breakage, chipping, chatter, edge buildup, cratering and chip clogging when using single-point, flat and circular form tools for screw machine operations on Al. (G17a, W25, 1-52; Al)

59-G. Bending Aluminum Strip, Plate, Shapes, Tubes. Modern Metals, Nov. 1960, p. 42-46.

Procedure for continuous roll forming; data on roll, draw and ram bending. (G6; Al)

60-G. A Study of Shear-Spinnability of Metals. Serope Kalpakcioglu. American Society of Mechanical Engineers, Paper no. 60-WA-187, 1960, 6 p.

The deformation zone in shear-spinning is idealized for a two-dimensional process and maximum permissible thickness reduction without fracture is predicted in terms of the stress system in this zone. Effect of deviation from the sine law on the maximum reduction before fracture is shown analytically to be due to the influence of distortions of the upspun flange on the state of stress under the roller. Comparison with experimental data obtained on stainless steels, Cu, cast iron and Al alloys. 6 ref. (G13, Q26r, 3-66; Al-b, CI, Cu, SS)

61-G. (French.) Electro-Erosion Machining. H. Robert. Revue de la Societe Royale Belge des Ingenieurs et des Industriels, Sept-Oct. 1960, p. 420-434.

Spark machining of stainless and alloy steels in a dielectric liquid using a tool-electrode as the cathode and an anode workpiece. (G24a; AY, SS)

62-G. (German.) Influence of Microsurface on the Behavior of Sheets in Deep-Drawing. Frith Fischer, Karl-Heinz Schmitt-Thomas and Vincent Seul. Stahl und Eisen, v. 80, Oct. 27, 1960, p. 1524-1531.

Deep-drawing tests of steel sheets of varying surface roughness using a 800 ton press at deformation degrees of 40-60%. Development of a process and apparatus for measuring surface roughness. 26 ref. (G4, S14; ST, 4-53)

63-G. Operation Bootstrap Aids Wire Plant. Steel, v. 147, Dec. 5, 1960, p. 117-118.

Drawing of stainless steel and Ni alloys using diamond dies, precision slitters and a Sendzimir mill. (G4; Ni-b, SS, 4-61)

64-G. Ferrous, Nonferrous Metals Yield to Plasma Torch. Steel, v. 147, Dec. 5, 1960, p. 121.

Cutting of stainless steel, Al, Cu, cast iron, W, Mo and Ta by a plasma cutting torch operating on Ar, N and H mixtures. Torch can be used for die shaping, scarfing, skinning, beveling for welding and piercing. (G22g, W29d, 1-52; Al, CI, Cu, Mo, SS, Ta, W)

65-G. European Aerospace Firms Push Advanced Production Methods. Christopher Dawson. Space/Aeronautics, v. 34, Nov. 1960, p. 66-67.

Machining and spot welding of Al and stainless steel materials for heat exchangers and missile components. (G-general, K3n, T24e, W13b; Al, SS, 17-57)

66-G. Expanded Theory Explains Paradoxes of Metal Cutting. Paul Albrecht. Space/Aeronautics, v. 34, Nov. 1960, p. 79-80, 83, 85, 87, 89, 91-92.

Theory of metal cutting taking into account ploughing action, rounding of the tools' cutting edge and chip removal and deformation processes as they are affected by thrust and cutting force and coefficient of friction. 3 ref. (G17, 10-51)

67-G. Machining for Mach 3+ Structures. Alfred G. Jones. Space/Aeronautics, v. 34, Nov. 1960, p. 97, 99, 101, 103.

Chipless and conventional machining splice-welding, etching, pocketing by electrolytic, electric discharge and chemical milling of high strength materials for aircraft structural components to improve tolerances and surface finish. (G17, G24b, K-general, T24a; SGB-a, 17-57)

68-G. Pressure Blanking and Piercing With Die Cushions. D. A. Rogers. Tooling and Production, v. 26, Dec. 1960, p. 37-39.

Effect of clearance between the blanking or piercing punch and the die opening on the blank contours or pierced holes. A hydraulic jack is used to reduce shaving operations to a minimum. (G2h, G2j, W24n)

69-G. Breakthrough in Electrochemical Machining. Tooling and Production, v. 26, Dec. 1960, p. 47-48.

Machining of steels for turbine blades using an electroshaping process in which direct current removes electrons from the workpiece to two electrodes through a rapidly moving electrolyte. (G24b, T7h; ST)

70-G. Belt Grinding Betters Stainless Tolerances. Iron and Steel Engineer, v. 37, Nov. 1960, p. 159-160.

Crown and imperfections are removed from stainless steel strip by an abrasive belt grinding line composed of two vertical belt grinders driving cloth belts. (G18, W25c; SS, 4-53)

71-G. (Czech.) Repair of Defects in Medium Alloy Cast Chromium-Nickel-Steels by Flame or Arc Cutting Prior to Welding. Karel Mazanec and Lubomir Huvar. Slevarenstvi, v. 8, Oct. 1960, p. 347-351.

Material in the vicinity of cracks is removed by oxy-acetylene flame cutting or arc cutting with a carbon electrode, prior to repair welding. Microstructure of heat affected zone. 3 ref. (G22g, G22h, K-general, M27; AY, Cr, Ni)

72-G. Cold Extrusion of Steel. A. G. Thompson. Machinery Lloyd (Overseas Edition), v. 32, Oct. 1960, p. 37.

Cold extrusion of Armco iron, alloy steel and carbon steel billets using a 150 ton crank press. (G5; AY, CN, Fe-a, 4-52)

73-G. Review of Some Unconventional Methods of Machining. Francis W. Boulger. Defense Metals Information Center, Battelle Memorial Institute, DMIC Memo. 75, Nov. 29, 1960, 20 p. (Available as PB 161225 from U. S. Office of Technical Services, Washington 25, D. C.)

Review of methods used for processing high strength and temperature resistant materials, including electrical-discharge machining, electrolytic grinding, electrolytic machining, chemical milling, ultrasonic machining, electron-beam machining, plasma-arc cutting. Most of these methods develop low mechanical forces and are useful for processing fragile of flimsy workpieces also. 60 ref. (G24)

74-G. Moving Rather Than Removing by Roll Forming. Engineering, v. 190, Oct. 21, 1960, p. 550.

A chipless machining process in which a hollow cylindrical tube is placed over a mandrel and squeezed by a number of rapidly pulsating dies, the mantle profile being reproduced in the inside diameter of the tube. (G11)

75-G. The Dollar Sense of Using Leaded Steel. Gerald X. Diamond. Metal Removing, Nov. 1960, p. 15-18.

Machinability of alloy steels (30-35 Rockwell C) improved by the addition of 0.15-0.43% Pb. Increased cutting speeds, improved finishes and extended tool life with no adverse effects on mechanical properties of steel are attributed to the Pb addition. (G17k, 2-60; AY, Pb)

76-G. (French.) Possibilities of Local Heating in Bending Flats and Shapes. A. Heydacker. Pratique des Industries Mecaniques, v. 46, Aug. 1960, p. 200-205.

Expansion and contraction resulting from local heating and subsequent cooling of structural steel prior to bending operations. Examples, with sketches, of heating procedure and areas to be heated for bending sheet, plate, pipe, angle irons, U, T and I bars. (G6, F21b; ST, 4-57)

77-G. Chip Formation During the Turning Operation in the Presence of a Built-Up Nose. B. W. Shaffer. 3rd. U. S. National Congress of Applied Mechanics, Proceedings, 1958, p. 655-664.

Chip formation during turning, when some of the workpiece adheres to the base of the cutting tool forming a built-up nose, is analyzed as a plane strain problem of a perfectly plastic material. Expressions are also derived for the machining force and chip-thickness ratio. (G17a)

78-G. Disc Grinding the Right Way Saves Money. W. A. Fazioli. Mill & Factory, v. 67, Dec. 1960, p. 85-90.

Pressure, speed, angle and motion of the grinder and choice of lubricants. Abrasives and backup pads for effective disk grinding. Examples of tests performed on mild steel, stainless steel and aluminum samples. (G18; Al, Cn, SS)

79-G. Chipless Machining Goes Automatic. Ben C. Brosheer. American Machinist/Metalworking Manufacturing, v. 104, Nov. 14, 1960, p. 109-112.

Use of intraforming, a new chipless machining process in which rapidly pulsating forming dies squeeze the workpiece blank to the shape of the mandrel, to machine bore contours of starter motor clutch housings cold formed from 1018 steel blanks. (G23, T21b; ST)

80-G. Precision Forging Firm Develops Electrochemical Methods. American Machinist/Metalworking Manufacturing, v. 104, Nov. 14, 1960, p. 113.

Tungsten, Waspalloy and other very hard, tough and heat sensitive materials are drilled, trepanned and contour shaped electrolytically using new electrolytic equipment which maintains a high current density and forces a pressurized flow of electrolyte between the anode (work) and cathode (tool). (G24d; Co-b, W, SGB-q, SGB-r)

81-G. Forming of Magnesium Alloys. American Machinist/Metalworking Manufacturing, v. 104, Nov. 14, 1960, p. 145.

Hot forming of Mg alloys using a heat resistant drawing lubricant such as graphite. Data for forming characteristics of wrought Mg alloys. (G-general, 1-66; Mg-b)

82-G. Clearance for Cupping Dies. Ferenc J. Kuchta. American Machinist/Metalworking Manufacturing, v. 104, Nov. 14, 1960, p. 147.

Nomograph giving clearance to use with iron and steel, Cu, soft brass and Al sheets of various thicknesses. (G4c, W24n; Al, Cu-n, Fe, ST, 4-53)

83-G. (Translation-PERA.) The Effect of Cutting Heat on Turning Accuracy. I. G. Baskakov. Russian, Nov. 1959, p. 43-46.

Cutting tests on U7A and ST5 steels using ceramic, carbide and high speed tips, using the buried thermocouple method to measure cutter and workpiece temperatures. Effect of cutting speed, feed and depth on temperature deformation of the workpieces. (G17a, 2-61; ST)

84-G. Explosive Forming of Metal Plates. Australasian Manufacturer, v. 45, July 30, 1960, p. 36.

Explosive forming of 20 gage bright mild steel plate for the dome end of a pressure vessel using a mild steel die, pressure plate, vacuum pump and thin sheet metal cylinder. (G-general, NM-k34, T26q; CN, 4-53)

85-G. Cutting Fails With Chemicals. David Fishlock. Metalworking Production, v. 104, Nov. 30, 1960, p. 54-56.

Chemical milling of Cu, brass, phosphor bronze, beryllium copper, Ni, steels, Stalloy and Permalloy fails 0.010 in. or thicker using $FeCl_3$ solution as the etchant. (G24b; Co-b, Cu-b, Ni-b)

86-G. Hot Milling Superalloy Boosts Tool Life. Metalworking Production, v. 104, Nov. 30, 1960, p. 58-60.

Tool life tests on 4340 steel, Thermold J die steel and 17-7 PH and 17-4 Mo stainless steels at 950-1080° using carbide cutters to show the effectiveness of face milling at these temperatures. (G17b, 1-66; SGA-h, SS, TS)

87-G. How GMC Approached Cold Forming. F. Griffiths. Metalworking Production, v. 104, Nov. 30, 1960, p. 63-67.

Cold forming of steel billets to produce automobile engine components using a hydraulic press and a nearly closed die. (G-general, 1-67; ST, 4-52)

88-G. Electrochemical Machining at Economic Speeds. Metalworking Production, v. 104, Nov. 30, 1960, p. 68.

Contouring of hard tough metal forgings by an electrochemical machining process in which the work is positioned as the anode between conforming cathodes, electrolyte is pumped into the interelectrode spacings and a very heavy current is passed. (G24d; SGB-q, 4-51)

89-G. Machining in Miniature by Electron Beam. Machinery Lloyd (Overseas Edition), v. 32, Oct. 1960, p. 36-38.

Use of intense energy of a concentrated electron beam for drilling and milling metals or nonmetals. Design of drilling and milling machines. (G17, 1-52)

90-G. New Method Selected to Cut Tough Alloys. Metalworking, v. 16, Dec. 1960, p. 17.

Electrolytic maching of jet engine turbine blades made from heat resisting alloys such as S-816, Nimonic and Udimet 700. Blades are electroshaped to 0.003 in. tolerances in only 5-10 min. whereas this operation previously required 1-2 hr. by grinding. (G24d; Ni-b)

91-G. (Italian.) Practical Suggestions for Finish Machining of Rolling Mill Rolls. S. Sirio Leporatti. Macchine, v. 15, Sept. 1960, p. 795-805.

Grinding and superfinishing of rolls. Roll grinding machines and their characteristics; operating hints. Peripheral speeds of grinding wheel and roll, traverse speed, grinding wheel specifications, lubricants and coolants for various grades of ground finishes. Principal surface defects resulting from improper grinding practice and ways to avoid them. Superfinishing equipment. (G18k, G17, 1-52, W23k)

92-G. Why We Chose Roll Forming. Fred J. Emmons. Metalworking, v. 16, Dec. 1960, p. 72-73.

Fabrication of brake formed, cold rolled steel sheet for furnace casings. Casings are formed from sheet stock cut to the required size. The edges are roll formed. Roll formed lock strips in a variety of patterns are used to assemble the panels. Jigs and screws are almost completely eliminated. (G11; ST, 4-53)

93-G. (German.) Difficulties in Punching Thick and Hard Steel Sheets. G. Oehler. Werkstattstechnik, v. 50, Nov. 1960, p. 582-586.

Evaluation of proper cutting gap and analysis of deposits on punchers to eliminate defects such as crack formation in the steel sheet and stamping tool and incomplete punching. 14 ref. (G2j; ST, 4-53)

94-G. (German.) Threading With Automatic Lathes. H. Jager. Werkstattstechnik, v. 50, Nov. 1960, p. 600-608.

Processes and machinery for automatic threading by drilling, cutting and milling and by rolling. Selection of process and tool. Comparison of surface quality of rolled and cut threads. (G17f, G12, 1-52)

95-G. (French.) Electro-Erosion Machining. H. Robert. Societe Royale Belge des Ingenieurs et des Industriels, Revue, Sept-Oct. 1960, p. 420-434.

Theory of spark cutting. Design and operation of equipment and manufacture of Cu electrodes for electro-erosion cutting. Machining of hard metal cutting and forming tools; miscellaneous applications. (G24a; SGB-q)

96-G. Why Wait? Ceramics Are Practical Now. D. H. Joyce. Carbide Engineering, v. 12, Dec. 1960, p. 12-15.

Improvement in tool wear by use of ceramic tools instead of carbide in operations such as turning, facing and boring of cast iron , hardened and mild steels; improved finish and higher operating speed. (G17, T6n; CI, ST, NM-a34, 17-57)

97-G. Problems in Production. A. Incardona and H. H. Poett. Carbide Engineering, v. 12, Dec. 1960, p. 22-23, 25.

Tabular guide to machining operations for using throwaway carbides on various ferrous and nonferrous alloys; recommended speeds and feeds, depending upon type of cut, workpiece material and machine horsepower and rigidity. (G17, T6n; 4-69)

98-G. Screw Machine Work on Aluminum III and IV. M. Bryan Baker. American Machinist/Metalworking Manufacturing, v. 104, Dec. 12, 1960, p. 133-134.

Data sheets are presented for possible defects and corrective measures in drilling and counterboring including drill breakage and chipping of cutting edge; variation in chilled hole depth and size; hole eccentricity; roughness; poor finish and lack of tolerance maintenance. (G17; Al)

99-G. High-Velocity Metalworking Processes Based on the Sudden Release of Electrical Energy. H. J. Wagner and F. W. Boulger. Defense Metals Information Center, Battelle Memorial Institute, DMIC Memo. 70, Oct. 27, 1960, 13 p. (Available as PB 161220 from U. S. Office of Technical Services, Washington 25, D. C.)

Machining and forming methods in which a high-amplitude, short-duration current pulse is used to create an underwater shock wave, either by causing a spark to jump across a submerged spark gap or by exploding a submerged filament wire in the vicinity of the workpiece. In a third method, the current pulse produces a rapidly changing magnetic field in a coil. 27 ref. (G24a, G-general; NM-k34)

100-G. A Hot Tapper for Cold Headed Parts. Automatic Machining, v. 22, Dec. 1960, p. 45-46.

4000 pieces of cold headed steel nut blanks are tapped per hour by a modified four-spindle lead screw tapping machine with a 3.6 sec. cycle time. (G17f, T7f; ST)

101-G. Hot Turning Superalloy. Metalworking Production, v. 104, Nov. 23, 1960, p. 85-90.

Orthogonal turning tests performed at 73-1200° F. on tubes of 4340 and AM350 steel, Thermold J alloy and 17-7 pH and 17-4 Mo stainless steel to determine tool life, mechanical properties and surface finish of the workpiece and efficiency of metal removal. (G17a, Q-general; SS, ST, 4-60)

102-G. (English.) Correlation Among Experimental Values Obtained in Various Formability Tests. Shinji Fukui, Kiyota Yoshida and Kunio Abe. Institute of Physical and Chemical Research (Japan), Scientific Papers, v. 54, June 1960, p. 199-205.

Press forming tests on cold rolled mild steel sheets to correlate data for the limiting drawing ratio, limiting bulge depth and stretch-flangeability as indications of formability. (G4d, Q23q; CN, 4-53)

103-G. Don't Overlook Explosive Forming, It's Now Applied to Common Metals. Machine and Tool Blue Book, v. 55, Dec. 1960, p. 95-96.

Explosive forming of Ni and 20 Cb steel thrust chamber tubes to close tolerances. Application of process to Rene 41, Ti, stainless steel and Al alloys. (G-general; NM-k34, Al-b, Ni, SS, ST, Ti, 4-60)

104-G. New Electroshaping Process Machines Toughest Alloys. Machine and Tool Blue Book, v. 55, Dec. 1960, p. 106-111.

A new electrochemical shaping process machines hard, high-strength metals such as Waspalloy, W, Mo and stainless steel by passing direct current between the workpiece and an electrolyte causing surface atoms to dissolve into solution. (G24d; SGB-q, SGB-a, Mo, SS, W)

105-G. A Break-Through in Machining With Wide-Belt Coated Abrasives. Machine and Tool Blue Book, v. 55, Dec. 1960, p. 122-125.

Grinding of stainless steel strip in oil to exacting tolerances by an all-resin bonded cloth abrasive belt. (G18k, W25c; SS, 4-53)

106-G. Manipulation of Metals. Pt. 2. A. M. Cooper, A. A. Blanco, Melvin D. Verson and Hugo Moller. Metal Industry, v. 97, Nov. 11, 1960, p. 399-401.

Abstracts of papers presented at a conference at Brighton, England. Topics include basic features of the cold forging process; pressure economy in cold extrusion; the fluid-form process; tube-in-strip and associated products. (G-general, F22, 1-67)

107-G. Developments in Electrolytic Machining. Mechanical World and Engineering Record, v. 140, Dec. 1960, p. 501.

Single point grinding, carbide-tipped grinding, high-speed steel tool grinding and cavity sinking of tough materials using an electrolytic process. (G24d; SGB-a)

108-G. Tools and Methods for Drawing Sheet Metal. John Waller. Mechanical World and Engineering Record, v. 140, Dec. 1960, p. 514-519.

Methods for deep drawing, reverse drawing and necking down of Al, brass, Cu, steel, Sn and Zn sheets. Recommended values for drawing pressure and speed, blank size and amount of initial reduction. (G4; Al, Cu-b, ST, Sn, Zn)

109-G. (German.) Effect of MoS_2 on the Total Service Drilling Depth of Twist Drills. G. Polzin. Werkstatt und Betrieb, v. 93, Nov. 1960, p. 709-711.

Experimental drilling of 40 mm. thick plates of a steel containing 0.475-0.48% C, 0.18-0.22% Si, 0.51-0.65% Mo, 0.029-0.033% P and 0.015-0.020% S using alloy steel drills. Effect of drilling emulsions containing MoS_2 on the total depth achieved. (G17e, 18-73; Al, 4-53)

110-G. (Japanese.) Pressure Lubrication in Deep Drawing. Japan Society of Mechanical Engineers, Transactions, v. 26, Sept. 1960, p. 1290-1297.

Calculation of fluid pressure and control. Changes in pressure are related to deformation. (G4b)

111-G Belt Grinding... Assures Precision Gage of Strip. Tool and Manufacturing Engineer, v. 45, Dec. 1960, p. 79-80.

Stainless steel strip is produced to exacting tolerances required for space-age applications using abrasive belts resin-bonded with Al_2O_3 or silicon carbide abrasives. Tolerances of 0.00003 in. can be obtained. (G18, W25c; SS, 4-53)

112-G. Improving Reliability of Ground Parts by Avoiding Residual Stress. J. E. Price. Tool and Manufacturing Engineer, v. 45, Dec. 1960, p. 75-78.

To investigate the residual stress induced by grinding, specimens of Mn oil-hardening toolsteel are prepared to various levels of hardness. Stress is induced by grinding on a reciprocating table surface grinder. The amount and kind of stress is determined as a function of wheel grade, steel hardness and gut size by a deflection measurement technique. (G18, 3-66; TS, Mn)

113-G. Chemical Milling of Honeycomb Core Blanket. R. G. McCue. Tool and Manufacturing Engineer, v. 45, Dec. 1960, p. 60.

Chemical milling of honeycomb core composed of Rene 41, Ni alloy, hot work die steel and Ti alloy to fit contoured facing sheets. A plaster cast is made of the facing sheet surface, then a negative cast is formed from this and cured. The honeycomb core is pressed into the plaster cast which is then washed away from the exposed cell walls. (G24b; Co-b, Ni-b, Ti, TS, 4-57)

114-G. Unit Shear-Forms Big Cylinders From Small Preformed Blanks. Iron Age, v. 186, Dec. 29, 1960, p. 54-55.

Steel, stainless steel, aluminum or brass components for the Minuteman missile are cold extruded to desired wall thickness, mechanical properties and dimensional tolerance by a "Floturn" process using a single or dual-roller horizontal shear-forming machine at pressure of 70,000 lb. (G5, T24e; Al, Cu-b, SS, ST)

115-G. (Dutch.) Lead in Free-Cutting Steels. B. L. ten Horn and R. A. Schurmann. Metaalbewerking, v. 26, Oct. 13, 1960, p. 139-146.

Machining of steels containing 0.2-0.3% S and approximately 0.2% Pb and, for comparison, of steels without Pb. Correlation cutting speed, cutting depth, cutting force and Pb content. Favorable effect of Pb on the service life of cutting tools. 5 ref. (G17; ST, Pb)

116-G. The Machining of Steel. F. C. Lea and Eric N. Simons. Edgar Allen News, v. 39, Dec. 1960, p. 269-270.

Design and operation of a planer and lathe for roughing and finishing operations on steel. (G17, W25; ST)

117-G. Manipulation of Metals. Metal Industry, v. 97, Nov. 18, 1960, p. 419-421.

Techniques for forming metal by extrusion, explosive forming, precision and cold forging, rolling and sheet forming processes. (G-general)

118-G. Machining the Unmachinable. F. J. McGee. Tool and Manufacturing Engineer, v. 45, Oct. 1960, p. 79-82.

Pure tungsten, considered unmachinable except by grinding, is cut by SiC cutoff wheels and WC tools. Blanking and shearing of the metal at 500-700° F. (G17, G2; W-a)

119-G. Hot Roll Spinning Controls Wall Thickness. P. C. Sun. Tool and Manufacturing Engineer, v. 45, Oct. 1960, p. 93-94.

Diameter of Al shell is reduced while wall thickness is increased by hot roll spinning under conditions of high spindle speeds, controlled temperature and rapid transverse tool movement. (G13; Al, 4-59)

120-G. (German.) Explosion Working of Metals. R. M. Cavanaugh. Technische Mitteilungen, v. 53, Oct. 1960, p. 427-434.

Detonation characteristics of EL-506-A explosive material (pentaeritrol tetranitrate and binder), and application to metal processing including hardening of Hadfield's steel; compression of powders (graphite, MgO, Al_2O_3, TiC, WC, Ti, Nb, Fe, Ni, Cu); shaping of metals with water or air as buffer between die and explosive material; and metal to metal plating (e.g. stainless steel on ordinary steel plate). (G-general, H-general; NM-k34)

121-G. Cold Extrusion of Ferrous and Nonferrous Metals. R. Tilsley and F. Howard. Machinery (London), v. 97, Dec. 7, 1960, p. 1286-1293.

Extrusion of Al, Zn, Cu, Mg, Be, Mo, Sn, Pb, EC-60 steel, low carbon and toolsteel and nodular cast iron using high carbon, high Zr-Cr toolsteel punch and die. Yield stress and tensile stress of extruded material. 8 ref. (G5; Al, Be, Cu, CN, CI, Mo, Pb, Sn, TS, Zn)

122-G. Cold Forming of Steels. F. Griffiths. Machinery (London), v. 97, Dec. 7, 1960, p. 1315-1321.

Processes, requirements and economics of operations necessary to cold form steel. Production of pellets, solid and hollow billets and preforms. (G-general, 1-67; ST)

123-G. BeO at National. Ceramic Age, v. 76, Dec. 1960, p. 25-26.

Accurate and dust free methods of machining BeO, metal-ceramic combinations and high-purity Hf, Al and Th oxide shapes after fusion and ultrasonic cleaning. (G17, L10f; Al, Be, Hf, Th, 14-68)

124-G. Design Techniques for Metal Spinning. J. F. Whittingham. Design Engineering, v. 7, Jan. 1961, p. 25-27.

Forming of symmetrical metal shapes from disks of rolled sheet metal composed of Al, Cu and Ni alloys, low alloy and stainless steels, Ta, Mg, Mo and Ti. (G13; Al-b, AY, Cu-b, Mg, Mo, Ni-b, SS, Ta, Ti, 4-53)

125-G. Longer Machining Time. Metal Removing, v. 5, Dec. 1960, p. 7-9.

Bronze castings are poured with excess metal, with the excess, containing most of the defects, being machined

away. This procedure results in fewer rejects than attempting to produce a perfect casting directly. (G17; Cu-b, 5)

126-G. Belt Grinding Development Scores Major Breakthrough in Stainless Steel Production. C. C. Porter. Grits and Grinds, v. 11, Oct. 1960, p. 11-15.

Grinding of cold rolled stainless strip to remove high crown and improve surface finish with vertical grinders using resin bonded belts with Al oxide or Si carbide as the cutting medium. Surface profile and thickness are measured by X-ray gage. (G18; SS, 4-53)

127-G. Electrochemistry Machines A 286. Warner W. King. American Machinist/ Metalworking Manufacturing, v. 104, Dec. 26, 1960, p. 61-62.

A cavity-making machine operating on the electrolytic process in which electrodes are used as tools and there is a continuous electrolytic flow is used to machine turbofan blades made integrally with the buckets of the machine and composed of A 286 superalloy. (G24d, T7h; SGA-h)

128-G. How to Machine Steels Hardened to 50 Rc. American Machinist/ Metalworking Manufacturing, v. 104, Dec. 26, 1960, p. 64.

Machinability of superalloys 4340 and Vasco Jet 1000 hardned to Rockwell 50. Recommendations for cutting and tool geometry. (G17k; SGA-h)

129-G. Roll-Forming Stainless Ceilings. American Machinist/ Metalworking Manufacturing, v. 104, Dec. 26, 1960, p. 66-67.

Mass production system for the manufacture of structural shapes used in assembling 800,000 sq. ft. of luminous ceiling. Roll forming, cutting, piercing and polishing methods. (G11, F22h, L10b; SS, 4-57)

130-G. Keyslotting Tool for Extra Large Castings. Chris J. Toonen. Machinery, v. 67, Jan. 1961, p. 140.

Design of a circular keyseating cutter rotated by a drilling-machine spindle and used to cut keyways in large 1020 steel castings. (G17c; ST, 5)

131-G. (Japanese.) Transitional Phenomena in Metal Cutting. Japan Society of Mechanical Engineers, Transactions, v. 26, Sept. 1960, p. 1216-1222.

Development of an equation to represent the transition of friction angle between the chip and the tool face at the beginning of cutting. Equations relate friction angle to cutting forces, cutting ratio and contact length of chip. (G17)

132-G. Forming of Magnesium Alloys. Metalworking Production, v. 104, Dec. 14, 1960, p. 75.

Hot forming of wrought Mg alloys at 360-650° F. using a heat resistant drawing lubricant such as graphite. Graphs are given to show minimum metal thickness and minimum vertical corner radius as a function of depth of draw. Tables give minimum radii for 90° bend in tubing and forming characteristics of wrought Mg alloys. (G-general, 1-66; Mg-b)

133-G. Impact Extrusion Added to B & P Services. Magnesium Products, Nov. 1960, p. 3.

Extrusions of 2011, 2024 and 7075 Al alloys, Mg alloys, carbon steel, oxygen-free Cu, brass alloys and Ti at Brooks & Perkins, Inc. Advantages of the process. (G5; Al-b, Mg-b, CN, Cu, Cu-n, Ti)

134-G. Chemical Milling. C. Conner Shepherd. Paper from "American Electroplaters' Society, Technical Proceedings", 1960, p. 51-54.

Review of applications, etchants and maskants. Although the process was initially restricted to Al it is now successfully applied to Mg, steel, Ti and Mo. Materials once considered impossible to mill in acid solutions, such as the 300,000 psi. low alloy steels, can now be successfully processed by chemical milling. 4 ref. (G24b)

135-G. Practical and Economic Problems of Machining Cavities by Spark-Erosion. W. Ullman and T. G. Traube. Metal Treatment and Drop Forging, v. 27, Dec. 1960, p. 493-501.

Requirements for machining molds and dies. Examples of applications. (G24a)

136-G. Hot Machining. Which Heat Source Is Best? Metalworking Production, v. 104, Dec. 7, 1960, p. 84-87.

High-frequency induction heating is satisfactory for controlling and maintaining heat but is limited in the extent of concentration. Radio-frequency resistance heating can localize and control heat without many of the disadvantages of induction, flame or arc heating. (G17)

137-G. Hot Dimpling With Electronic Temperature Control. Metalworking Production, v. 104, Dec. 7, 1960, p. 88-89.

Dies are electrically heated with the temperature being controlled by a built-in thermocouple. The dimple cannot be completed until the metal has been heated to the correct temperature to insure the desired ductile state. (G3)

138-G. CO_2 Coolant Makes Stainless Steel Behave. E. C. Hall. Metalworking Production, v. 104, Dec. 7, 1960, p. 91-93.

Use of CO_2 as a coolant in routing and milling operations on a high and ultra high tensile steels particularly those in the 86-120 ton range. The only heat not extracted by the CO_2 remains in the chips. (G17; NM-h, SS)

139-G. What Electrochemical Machining Can Do. David Fishlock. Metalworking Production, v. 104, Dec. 7, 1960, p. 94-98.

The four primary applications are superfinishing, deburring, grinding and contouring. Examples, applications and limitations of the removal of metal by electrolytic dissolution. (G24d)

140-G. Electrochemical Machining--What It Can Do. David Fishlock. Metalworking Production, v. 104, Dec. 21, 1960, p. 53-58.

Electrolytic contouring and gravity sinking of superalloys, nimonics, tungsten and Mo. Economic rates of cut have now been attained. (G24d; Ni-b, W, Mo)

141-G. Hot Machining. Pt. 4. Metallurgical Effect of Hot Machining. Metalworking Production, v. 104, Dec. 21, p. 60-63.

Tests on 4340 steel, Thermold J, 17-7 Mo and 17-7 PH stainless steels. No detectable change is observed in microstructure, but tempering, which varies with the material and duration of heating occurs when the tempering temperature is exceeded. Surface finish is as good as, or better, at elevated temperatures than at room temperature, although some surface oxidation takes place at the higher temperatures. (G17; SS)

142-G. Cold Heating and Cold Extrusion of Wire. J. C. McMurray. Wire and Wire Products, v. 35, Dec. 1960, p. 1649-1652.

Forward and backward extrusion and upsetting of mild steel wire to produce rivets, slugs, bolts and screws, using strain gages to measure tooling loads and working pressures. Lubrication is by mineral oil, sulphur and phosphate coatings. (G10, G5)

143-G. Are You Losing on Diamond Dressing? Christopher H. Hill, Sr. Grinding and Finishing, v. 6, Dec. 1960, p. 19-21.

Criteria for selection of diameter and process parameters for achieving maximum wear in dressings and truing grinding wheels, including turning, adjustment to proper drag angle and proper use of coolants. Rules for proper lapping procedure, including choice of abrasive grain, lap, speed and pressure. (G18; NM-k37)

144-G. Using Full Grinding Power Increases Belt Efficiency. H. L. Weisbecker. Grinding and Finishing, v. 6, Dec. 1960, p. 22-25.

A planned method for increasing the horsepower used on an abrasive belt grinder as the belt wears. Application in grinding stainless steel and Ti sheet to demonstrate increases in belt efficiency and rate of production. (G18, W25c; SS, Ti, 4-53)

145-G. What Are the Grinding Characteristics of Tool Steels? John A. Mueller. Grinding and Finishing, v. 6, Dec. 1960, p. 30-32.

Summary of the machinability of high speed, cold work, shock resisting, hot work, water hardening and low alloy toolsteels in terms of ease of metal removal, finishing and form generation and resistance to checking and cracking. Optimum grinding conditions for each type, including speed, feed, grinding fluid, size and shape of the material ground and size and type

of the grinding wheel. (G18, 17-52; TS)

146-G. While Carbide Tool Use Increased, Tool Room Grinding Cost Decreased. Grinding and Finishing, v. 6, Dec. 1960, p. 40-41.

Use of electrolytic methods for grinding carbide tools to decrease wear on the grinding equipment and allow complete processing in one operation on one machine. (G24, T6n; 6-69)

147-G. Machining Thermal-Resistant High-Strength Materials. Pt. 2. Western Machinery and Steel World, v. 51, Dec. 1960, p. 32-35.

Operation and design of a surface grinder and a skin mill converted to electrolytic machining and electrical spark discharge cutting of stainless steel honeycomb care used in aircraft structures. Testing of the machines to determine the maximum removal rates and current requirements. (G24, T24; SS, 4-57)

148-G. (Czech.) Flame Cutting of Low Carbon Self-Hardening Steels. J. Maly, V. Janosikova and K. Mazanec. Zvaracsky Sbornik, v. 9, Mar. 1960, p. 325-344.

Low alloy openhearth steel containing Ni, Mo and Cr is cut with a neutral oxy-acetylene flame. Effect of cutting on structure, composition and microstress is studied by micrographs, spectrography and back-reflection X-ray diagrams. 14 ref. (G22g; CN-g)

149-G. (Russian.) Improvements in Stamping of Automobile Parts and Deformability of Sheet Steel. V. M. Chirkin. Kuznechno-Shtampovachnoe Proizvodstvo, Mar. 1960, p. 8-10.

Prevention of stamping defects by selection of steel sheets of proper grain size, yield point, elongation, tensile strength and hardness. Results of tests on defect control with stamping of large numbers of automobile parts of steel of various mechanical properties. 4 ref. (G3, Q-general, T21; ST, 4-53)

150-G. British Developments in Explosive Forming. W. S. Hollis. Metalworking Production, v. 104, Nov. 9, 1960, p. 78-80.

Mechanical testing of explosively formed mild steel components to determine tensile strength, elongation and hardness. Methods of controlling direction and application of the impulsive force in explosive forming. (G-general, Q27a, Q23p, Q29n; NM-k34, CN)

151-G. Broaches Yield Tight Finishes. Iron Age, v. 187, Jan. 12, 1961, p. 65.

Strip broaching of wrist-pin bushing-assembly holes in forged steel connecting rods to tolerances of 0.0007 in., using broaches with a straight-line push of 4700 lb. (G17d, T21c; ST, 4-51)

152-G. (French.) Testing for Definition of Drawability. J. Pomey, A. Royez and P. Dhez. Memoires Scientifiques de la Revue de Metallurgie, v. 57, Oct. 1960, p. 741-754.

Use of simple tension, biaxial hydrostatic tension, compression and cupping tests to determine drawability of steel sheet for auto body parts, choice of test depending on the shape of the part. Test procedures and evaluation of results. (G4, 17-52, Q-general, T21a; ST, 4-53)

153-G. (German and French.) Finish Machining of Light Metals With Diamond-Tipped Tools. P. Frey. Aluminium Suisse, v. 10, Nov. 1960, p. 287-289.

Final turning or milling with diamond tools eliminating need for conventional final polishing operation. Work norms; types of diamond tools and work they perform, including decorative, on Al alloys. (G17a, G17b; Al-b, EG-a39, NM-k37, 17-57)

154-G. Pressure Economy--A Review of Extrusion Techniques. Melvin D. Verson. Wire Industry, v. 27, Nov. 1960, p. 1091-1095.

Cold extrusion of low carbon steel, boron steels and steel of the 4600, 5000, 5100 and 8600 series. Pressures of 180,000-400,000 psi. are obtained using a new lubricant consisting of a $Zn_3(PO_4)_2$ crystalline deposit coated with Zn stearate soap. (G5, 18-73; CN, ST, B)

155-G. (Russian.) Stamping of Large Elliptical Bottoms (Bilges). L. S. Amarian and B. L. Muravich. Kuznechno Shtampovochnoe Proizvodstvo, June 1960, p. 40.

Stamping large bottoms for tanks using a hydraulic press. Influence of the

diameter to thickness rates of the ellipsoid bottom on its strength at 800-900° C. Relationship between temperature and applied pressing force during the deformation. (G3, Q27a, T26q; ST)

156-G. (German.) Shaping Techniques for Large-Size Light Metal Forgings in the USA. E. Kursatz. Industrie-Anzeiger, v. 82, Nov. 22, 1960, p. 1615-1622.

Production of high precision aircraft parts up to 1360 kg. on 7200-50,000 ton presses by one and multistep forging. Chemical composition and mechanical properties of Al forging alloys. Processing of forgings by machining and deep etching. (G17c, M20q; Al, 4-51)

157-G. (Russian.) Using Explosive Energy for Metalworking. V. H. Kononenko. Kuznechno Shtampovochnoe Proizvodstvo, July 1960, p. 1-4.

Use of explosive energy from gaseous, liquid and powdered mixtures for shearing, stamping, pressing, forging, bending and piercing heavy metal blocks and slabs. Methods of controlling the supply of explosives to the combustion chambers or cylinders. (G-general, NM-k34; 4-52)

158-G. (Russian.) Stamping of Connecting Rods for Automobiles. H. S. Zaykovsky, M. I. Dytynenko and I. A. Fomenko. Kuznechno Shtampovochnoe Proizvodstvo, July 1960, p. 15-17.

Continuous production of connecting rods from 45 steel blanks by heating, reducing on a roll-forging machine and stamping on a crankshaft press. (G3, F22, T21b; ST)

159-G. (Russian.) Effect of Ultrasonic Vibrations on the Maching of Heat Resistant Alloys. A. A. Voronin. Stanki i Instrument, Nov. 1960, p. 15-17.

Application of ultrasonic vibration during surface grinding and cutting of U8A and R18 steels and Ei437B, EB60S2K and EB60SMIK alloys to reduce cutting temperature and eliminate roughness and cracking on the surface. (G24c; ST, SGA-h)

160-G. Spline and Thread Rolling. John Arnold. Wire Industry, v. 27, Dec. 1960, p. 1205-1208.

Production of steel precision threads and splines requiring no further finishing at 20° C. by cold working under compressive forces. Material is forced to flow upward within the die space to form the upper portion of the teeth. (G12, 1-67; ST)

161-G. Processing and Painting Aluminum Siding. Louis Hirsch. Industrial Finishing, v. 37, Jan. 1961, p. 22-24, 26.

Pretreatment, priming, enameling, baking and roll forming of coiled Al strip to produce siding, window channels, starter strips and inside corners. (G11, L26n; Al, 4-53)

162-G. Improving Diamond Wheel Performance in Electrolytic Machining. Tool and Manufacturing Engineer, v. 46, Jan. 1961, p. 80-82.

Selection and maintenance of diamond wheels for electrolytic maching, a process in which a low-voltage current passes through a conductive fluid flowing between the workpiece and the wheel. Diamond particles act as insulators and spacers and do not actually cut metal. (G24d, W25c)

163-G. Turning Hardened Tool Steels With Ceramic Tools. Fenton L. Bagley, Jr. Tool and Manufacturing Engineer, Jan. 1961, p. 99-101.

Use of tools designed with large negative rakes to cut Mn toolsteel and other extremely hard materials at high speeds. This geometry minimizes initial breakdown, strengthens cutting edge and improves tool life. (G17a, T6n; TS)

164-G. Improving Tap Life. Tool and Manufacturing Engineer, v. 46, Jan. 1961, p. 117-118.

Relationships between chip load and chamfer angle and between tool life and thread height are calculated for high speed steel taps cutting high strength alloys such as Rene 41, S-816, 4340 steel and Ti. (G17f, T6r; Co-b, ST, Ti, SGB-a)

165-G. New Ways of Cutting Metals. D. Fishlock. New Scientist, v. 8, Dec. 8, 1960, p. 1535-1537.

Shaping of modern high-duty alloys composed of Al, Cu and W by etching with chemical fluids. Different machining processes are done also by electrolysis, spark erosion, controlled explosive forming, spark forming by a focused electron beam and plasma arc torch cutting at a temperature of 17,000° C. (G24; Al-b, Cu-b, W-b)

166-G. (Russian.) Surface Quality of Parts Produced by Flow Turning. V. G. Kononenko. Kuznechno-Shtampovochnoe Proizvodstvo, Feb. 1960, p. 11-13.

Surface quality as affected by lubrication, composition of tool and material, rate of the tool feed, thickness of product, hardness of the tool and process parameters. (G17a)

167-G. The Impact Methods of Extrusion. Claude E. Pearson and Redvers N. Parkins. Chapter from "Extrusions of Metals", 2nd Edition. John Wiley & Sons, Inc., New York, N. Y., 1960, p. 297-318.

Preparation of cold blanks for high pressure, high velocity, explosive impact extrusion of metal tubing without rupture. Method is largely employed in extruding soft Al, Zn and Mg. (G5; Al, Mg, Zn)

168-G. Cold Extrusion of Small Symmetrical and Asymmetrical Components. O. May. Machinery, v. 97, Dec. 14, 1960, p. 1375-1380.

Mathematical determination of extrusion parameters for forward or backward extrusion processes in which the material flow is simultaneously at right angles to the tool axis and also parallel or at some other angle to it. (G5)

169-G. Cutting and Coolant Oils. Australasian Manufacturer, v. 45, Nov. 19, 1960, p. 60-61, 64-65.

Viscosity of cutting oils for machining brass, bronzes and high tensile steels. Use and effect of extreme pressure additives such as sulphur and sulphur compounds, phosphorus compounds and chlorinated hydrocarbons. (G17, 18-73; Cu-b, ST)

170-G. Sulphur Aids Copper Machining. E. E. Frisk. Iron Age, v. 187, Jan. 25, 1961, p. 74-75.

Mechanical and physical properties of Cu alloys containing 0.3% fine, high-purity sulphur. Sulphide particles dispersed through the Cu matrix produce short chips that give good machinability. (G17k, Q-general, P-general; Cu-b, S)

171-G. How CSF Produces Quality Turbine Blades. M. Novak. Canadian Metalworking, v. 23, Dec. 1960, p. 43-45.

Casting, shot blasting, heat treatment and flame cutting of steel turbine blades with variations between gage and turbine blade checked at 200 points to maintain 1/16 in. tolerance. (G22g, L10c, J-general, T7h; ST, 5)

172-G. Jet Engine Hot Parts Cleaned by Peening. Canadian Metalworking, v. 23, Dec. 1960, p. 46-47.

Chemical cleaning of jet turbine blades by glass bead blasting to increase fatigue life 20-75% and obtain an improved surface finish which simplifies defect detection. The layer of cold worked metal produced at the surface of the blades is in a state of residual compression which affects the tensile stress, thus retarding fatigue cracking. (G23n, T7h, T24b)

173-G. The Electroshaping Process. Charles L. Faust. Modern Machine Shop, v. 33, Jan. 1961, p. 122-127.

Electrochemical machining of high-temperature, high-strength alloys by a new process in which metal workpiece and another conductor are submerged in a chemical solution connected to a d-c. source. (G24d; SGA-h, SGB-a)

174-G. Sawing by Electro-Erosion. Metalworking Production, v. 104, Dec. 28, 1960, p. 57-59.

Design of electro-erosion sawing machines using a rotating disk as the electrode and cutting element. Machines are used for cutting bars and sections of high tensile alloy steels, stainless steels, heat resisting and magnetic alloys. (G24a; SGA-h, SGA-n, SGB-a, AY, SS)

175-G. 30 Ft.-Bed Press Blanks Transformer Core Plates. Metalworking Production, v. 104, Dec. 28, 1960, p. 60-61.

Cutting and piercing transformer core-plates on a specially designed press. (G17, G2j; SGA-n)

176-G. Breakthrough in Mold-Making Electro-Erosion. Frank Jacques and Joseph Schmidt. Modern Plastics, v. 38, Dec. 1960, p. 109-114, 196-197.

Electrical discharge machining of mold cavities of high precision in steel hardened to Rockwell 60. Relationship between current and frequency of erosion arc. Rate of material removal and surface finish. (G16, G24a; ST)

177-G. Spark Erosion Machining of Mold Cavities. Kenneth Birch. SPE Journal, v. 16, Dec. 1960, p. 1311-1312.

Methods in diemaking using brass electrodes having a wear ratio of 3:1 for machining square, rectangular, triangular, half round and oddly shaped die steel or carbide cavities. (G24a; TS, 6-69)

178-G. Higher Quality, Half the Cost of Lathe Work. Grinding and Finishing, v. 7, Jan. 1961, p. 15-17.

Requisite conditions for use of grinding instead of turning. Case study provides data for locating break point between the two processes. (G18, G17a)

179-G. Fittings Are Hot Formed From Seamless Tubing. Steel, v. 148, Jan. 23, 1961, p. 56-58.

Bends from 45-180° are formed in cut lengths of seamless steel tubing on a forming mandrel to produce welding fittings with closely controlled size and uniform wall thickness. Heavy duty lathes level and face ends in preparation for welding. (G6, 1-66; ST, 4-60)

180-G. (Dutch.) Spark Machining of Forging Dies and Stamping Punches. Thomas G. Traube. Metaalbewerking, v. 26, Nov. 11, 1960, p. 187-193.

Dependence of the spark length on the electrode and workpiece composition and the applied voltage. Importance of the rigidity in the apparatus-electrode system for the precision of work. Manufacture of Cu electrodes by forging, extrusion, casting, metal spraying and sintering. (G24a, W22a, W24p; ST)

181-G. Computer Controlled Oxygen-Cutting Machine. Welding and Metal Fabrication, v. 29, Jan. 1961, p. 22.

Automated oxygen-cutting used in profiling steel plate for ship construction. Tape controlled heads cut two plates at once, each up to 40 ft. long by 12 ft. wide and up to 3 in. thick. (G22g, T22g; ST, 4-53)

182-G. (German.) Experiences With L-D Steel in Wire Production. Erwin Fogy and Ottokar Kramer. Berg- und Huttenmannische Monatshefte, v. 105, Nov. 1960, p. 261-268.

Comparison of mechanical properties and resulting drawing behavior number of necessary intermediate annealing operations, cross section reduction, drawing rate and die wear in wire drawing of L-D, openhearth and basic Bessemer steel. (G4, 17-52, Q-general, 2-64; ST)

183-G. Tape Slashes Hole Costs on Structurals. Steel, v. 148, Feb. 6, 1961, p. 76.

Drilling structural members composed of high strength, low alloy heat treated steel using a tape controlled, beam and column machine. (G17e, 18-74; SGB-s, AY)

184-G. Explosives in Metal Working. R. E. Leyman. Machinery Lloyd (Overseas Edition), v. 32, Nov. 19, 1960, p. 41-44.

Underwater forming of sheet Al and steel with high explosives. Shock hardening of metals not suitable for rolling, especially austenitic manganese steel. Discussion of metallurgical effects. Advantages and disadvantages of these methods. (G-general, NM-k34; Al, SS, 4-53)

185-G. New Approaches to Machining. Wm. Pentland, W. L. Carr and R. L. Vaughn. Aircraft Production, v. 22, Dec. 1960, p. 456-463.

Machining of various steel alloys, especially 4340 steel, at elevated temperatures, at low temperatures with subzero coolants and at ultra-high speeds. Effects of these techniques on tool life, mechanical properties of the products, rate of metal removal and machinability. (G17, 1-66, 1-67; AY)

186-G. Explosive Forming. W. S. Hollis. Aircraft Production, v. 22, Dec. 1960, p. 446-451.

Observation on FV. 520 steel, N75 steel and Ti alloy steel to determine stress/strain, stress/time and strain/time relationships, as well as tensile characteristics of test pieces subjected to explosive forming. 8 ref. (G-general, NM-k34, Q25; AY, ST, Ti)

187-G. (Czech.) Anisotropy of Deep Drawing Sheet. S. A. Valijev. Strojirenstvi, v. 10, Nov. 1960, p. 842-846.

Cylindric cups are deep drawn from steel sheet, brass sheet, Al sheet and steel strip. Variation of wall thickness caused by anisotropy of the starting material. 6 ref. (G4b, 3-72; Al, Cu-n, ST, 4-53)

188-G. Extrusion of Hard Alloys. A. B. Graham. Metal Industry, v. 97, Dec. 30, 1960, p. 535-538.

A new method of producing extruded products using less unit pressure and a single stroke operation as compared to the old method of using steadily increasing pressure and repeated blows. Reference is also made to coating of metal cylinders with another metal by extruding both the cylinder and the coating. (G5; SGB-q)

189-G. Mechanics of Explosive Forming. Metalworking Production, v. 104, Nov. 16, 1960, p. 75-78.

Relative absence of springback and work hardening during explosive forming is explained in terms of the uniformity of applied stress. (G-general, NM-k34)

190-G. (English.) Plastic Flow of Chips in Steel Cutting. Keiji Okushima and Katsundo Hitomi. Bulletin of JSME, v. 3, Nov. 1960, p. 556-560.

Effect of rake angle, cut depth and cutting angle on chip structure, cutting ratio, thickness ratio and orientation angle are interpreted in terms of a flow region. (G17; ST)

191-G. Forming Techniques for Titanium Alloys. J. Pody. Metal Industry, v. 98, Jan. 6, 1961, p. 3-6.

Hand binding, brake pressing, furnace heating followed by power pressing on a cold tool and electric resistance heating with subsequent brake pressing are outlined as methods for hot and cold forming of 318A and 011 Ti alloys. Data are given for effect of heat treatment on mechanical properties. (G-general, Q-general, 2-64; Ti-b)

192-G. Plasma Flame Cutting of Mild Steel Seen as Competitive With Oxy-Fuel Process. Herman C. Phelps. Welding Engineer, v. 45, Dec. 1960, p. 33-36.

Flame cutting carbon and stainless steel, Al, Cu and its alloys, W, Mo and other difficult to cut materials, using a plasma torch which produces a high-velocity jet through arc heating of gas. The heated gas expands as it leaves the torch nozzle, achieving velocities of thousands of feet per sec. (G22g; Al, CN, Cu-b, Mo, SS, W)

193-G. Machine Tools: The Importance of Climb Milling. J. H. Meehan. Machine and Tool Blue Book, v. 55, Jan. 1961, p. 81-83.

Comparison of conventional and climb milling as to need for deburring, tendency of cutter to hold work down and rotation of cutter and its effect during cutting of castings with a hard scale. (G17b)

194-G. Tracer Machining Beryllium. Lincoln S. Magor. Modern Machine Shop, v. 33, Feb. 1961, p. 130-133.

Tracer turning of Be using hydraulic tracer attachments for use with engine lathes and vertical turret lathes. (G17a; Be)

195-G. Electrical Discharge Machining Cuts Die Production Costs. Modern Machine Shop, v. 33, Feb. 1961, p. 144, 146.

Electrical discharge machining is used to produce slots in precision piercing dies composed of high-speed steel. (G24a, T6r; TS-m)

196-G. (German.) Cold Extrusion Die With Hydraulically Controlled Back Pressure on Both Sides. G. Oehler. Werkstatt und Betrieb, v. 93, Dec. 1960, p. 782.

Design and operation of a die which provides uniform material flow during cold extrusion of nonferrous metals and steel in varying cross sections. (G5, W24n; ST, EG-a38)

197-G. Chipless Machining--What It Is and What It Is Not. Charles H. Wick. Chapter 1 from "Chipless Machining". Industrial Press, New York, 1960, p. 1-9.

Brief cost analysis and description of chipless cold working processes applicable to steel. (G-general, 1-67; ST)

198-G. Metallurgical Considerations of Plastic Deformation. Charles H. Wick. Chapter 2 from "Chipless Machining". Industrial Press, New York, 1960, p. 10-33.

Simplified metallurgical description relating to the cold plastic forming of steel by various chipless production processes. Data are given for stress-strain relationships, crystalline structure of metals and effects of alloying elements in steel and cold working on yield strength. 22 ref. (G-general, 1-67, Q24, Q25n, Q23b, M27; ST)

199-G. Cold-Heading. Charles H. Wick. Chapter 3 from "Chipless Machining". Industrial Press, New York, 1960, p. 34-71.

Description of cold heading, a process for manufacturing bolts, screws and rivets in which metal is gathered in certain sections along lengths of wire or rod stock by causing the metal to plastically flow between dies without preheating. 10 ref. (G10, 1-67, T7f)

200-G. Thread-Rolling. Charles H. Wick. Chapter 4 from "Chipless Machining". Industrial Press, New York, 1960, p. 74-113.

Economical method for production of close-tolerance fasteners in which a cylindrical blank is rotated between dies with the reverse contour of the thread form specified on reciprocating, hand-fed or planetary machines. Production rates and design information are given for rolling of carbon and stainless steels. 10 ref. (G12, T7f; CN, SS)

201-G. Rolling of Serrations, Splines and Gears. Charles H. Wick. Chapter 5 from "Chipless Machining". Industrial Press, New York, 1960, p. 115-144.

Advantages and applications of two new cold working processes for manufacturing toothed parts, the Roto-flow process in which workpieces are held between centers and rolled to a full depth in a single pass of a pair of traversing, rack-type forming tools and the Grab process in which a pair of identical, opposed, planetary rollers repeatedly and simultaneously contact a rotating cylindrical blank. 7 ref. (G-general, 1-67, T7a)

202-G. Cold Extrusion of Steel. Charles H. Wick. Chapter 9 from "Chipless Machining". Industrial Press, New York, 1960, p. 257-278.

Development, advantages, limitations and applications of cold extrusion, a process performed at low enough temperatures so that metal never reaches the recrystallization temperatures. Effect of process of the physical properties. 16 ref. (G5; ST)

203-G. Selecting Materials and Designing Parts for Cold Extrusion. Charles H. Wick. Chapter 10 from "Chipless Machining". Industrial Press, New York, 1960, p. 279-293.

Work hardening, structural tensile and physical properties of steels as they affect cold extrusion. Design of parts. Comparison of cold extrusion processes with stamping and drawing. (G5, Q23a, Q27a, P-general; ST)

204-G. Applications of Cold Extrusion. Charles H. Wick. Chapter 11 from "Chipless Machining". Industrial Press, New York, 1960, p. 294-330.

Applications of cold extrusion to production of cartridge cases, shells, rocket heads, other ordnance equipment and automotive components. (G5, T2, T21)

205-G. Production of Slugs and Secondary Operations. Charles H. Wick. Chapter 12 from "Chipless Machining". Industrial Press, New York, 1960, p. 331-346.

Blanking, sawing, cutting-off, shearing and cold heading as cold extrusion processes for producing steel slugs. Description of secondary operations including ironing, machining and annealing. Economic considerations. (G5; ST)

206-G. Phosphate Coating and Lubricating for Cold Extrusion. Charles H. Wick. Chapter 13 from "Chipless Machining". Industrial Press, New York, 1960, p. 347-366.

Use of zinc phosphate coatings as lubricants during cold extrusion of steel. Vapor and alkali degreasing, pickling and rinsing of slugs prior to coating. Comparison with Cu or Pb coatings. (G5, 18-73, L14b; ST, Zn)

207-G. Explosive and Other High-Energy-Rate Forming Methods. Charles H. Wick. Chapter 16 from "Chipless Machining". Industrial Press, New York, 1960, p. 435-485.

Explosive, shock wave and gas pressure forming methods as applied in aircraft and missile industry on high-temperature, high-strength materials. Data are given for critical impact velocity and formability and work hardening capacity of materials. Tooling for explosive forming. (G-general, NM-k34; SGA-h, SGB-a)

208-G. Quenched Arc Process Cuts Honeycomb Foil at High Rate. Machinery Lloyd (Overseas Edition), v. 32, Dec. 3, 1960, p. 36-37.

Electro-band machine utilizes quenched arc for cutting Al, Zr, Ti and stainless steel honeycomb and other thin, difficult to support materials. (G22h; Al, SS, Ti, Zr, 4-57)

209-G. Phosphating Aids Cold Extrusion. R. F. Drysdale. Mass Production, v. 36, Nov. 1960, p. 86-90.

Use of phosphate coatings for lubricating carbon and alloy steel blanks during deep drawing, cold shaping and cold extrusion operations. (G5, G4b, G17c, 1-67, 18-73)

210-G. H-11 Ultra-High Strength Steel Finds "New Look" in Supersonic B-70 Bomber. Nat Wood. Western Metalworking, v. 19, Jan. 1961, p. 19-22.

Fabrication of structural aircraft components from H-11 toolsteel (5% Cr), with description of machining, Tig welding and heat treatment operations. (G-general, K1d, J-general, T24a; TS)

211-G. Accuracy of Milled Surfaces. Pt. 1. Effect of Cutter Diameter, Number of Teeth, Runout and Feed. Metal Cuttings, v. 9, Jan. 1961, p. 2-11.

Influence of tool geometry and cutting variables on the tooth path cusp height, surface accuracy and surface profile in conventional and climb milling of mild steel. (G17b, CN)

212-G. Blank and Forming Can Lids and Drum Ends. John Waller. Australian Machinery and Production Engineering, v. 13, Dec. 1960, p. 29-31.

Blanking and forming steel plate and strip with a single press stroke using a compound tool consisting of forming punch, die and rubber pad. (G2h, G-general; ST, 4-53)

213-G. Forming Techniques for Titanium Alloys. J. Pody. Metal Industry, v. 98, Jan. 13, 1961, p. 27-28.

Cold forming, stretch forming, blast descaling and chemical cleaning of Ex. 011 and 318A Ti alloy. Flatness requirements for sheet materials. (G-general, 1-67, L10c, L12; Ti-b)

214-G. Electro-Machining Beryllium. Metalworking Production, v. 105, Jan. 25, 1961, p. 56.

Electrical discharge machining of Be by a process in which the work is the anode and a spark is created between it and the cathode, the latter being a low-density tungsten electrode infiltrated with Ag. Trepanning techniques as a means of salvaging Be as solids rather than chips. (G24a, G19r; Be)

215-G. Pot Broaching Produces External Forms. James R. Cypher. Metalworking Production, v. 105, Jan. 25, 1961, p. 59-62.

Cast iron clutch plates for automatic transmissions are machined by pot broaching, a technique using a heavy steel shell (pot) fitted with broaching tools that cut on the periphery of the part and complete irregular surfaces such as gear teeth in one stroke. (G17d, T21b; CI)

216-G. Quenched Arc...the Latest Way to Cut Honeycomb. Metalworking Production, v. 105, Jan. 18, 1961, p. 65-66.

Cutting of stainless steel, Ti or Al honeycomb by a quenched arc which is generated by a band electrode and suppressed by sprayed coolant. (G22h; Al, SS, Ti, 4-57)

217-G. Reversing of Heat-Treat Cycle Trims Machining Costs. W. J. Lavigne. Iron Age, v. 187, Feb. 9, 1961, p. 114-116.

Manufacture of gun components in the yield-strength range 160,000-190,000 psi. from forgings and castings of 240 Bhn by a cycle in which machining comes first and heat treatment later. An immersion heat treatment reduces distortion while maintaining the as-machined surfaces in their original condition. (G17, J-general, T2m; SGB-a, 4-51, 5)

218-G. New Methods Pace Tool Design. Iron Age, v. 187, Feb. 9, 1961, p. 118-119.

Techniques for machining with positive angles, single pass machining and duplex, face and straddle milling of stainless steel and other work hardenable metals. (G17; SS)

219-G. (Russian.) Precise and Flashless Stamping. I. F. Holovnev. Kuznechno-Shtampovochnoe Proizvodstvo, Apr. 1960, p. 23-24.

Hot stamping of conical and cylindrical steel gears for cars and farm machinery by using a crankshaft press.

Methods of preventing decarbonization of the gear surface. 11 ref. (G3, 1-66, T7a; ST)

220-G. Accuracy, Economy Stressed in Filtermaking Method. Steel, v. 148, Feb. 13, 1961, p. 119.

Steel, Cu, brass, Al, cloth, felt and paper are produced in pleated form by a close tolerance process, using a machine that forms materials into corrugated shapes by folding rather than drawing. (G6; Al, Cu-b, ST)

221-G. Flame Gouging Is Fast and Cheap. Engineer and Foundryman, v. 26, Nov. 1960, p. 46-47.

Description of flame gouging, a flame machining process depending on specially designed nozzles which deliver relatively large oxygen flows at low velocities. Process is used to cut U-grooves in steel plates, forgings and castings and to remove surface defects and defective welds. (G22g; ST, 4-51, 4-53, 5, 7-51)

222-G. Grinding Wide Stainless Strip. A. J. Taylor. Production, v. 47, Feb. 1961, p. 67.

Stainless strip is ground to controlled thickness variations of less than 0.0005 in. on a line having two grinding units with coated abrasive belts running in oil. (G18; SS, 4-53)

223-G. Machining Thermal-Resistant High-Strength Materials. Western Machinery and Steel World, Jan. 1961, p. 34-37.

New development in the electrical discharge machining of stainless steel honeycomb core, Ti and Rene 41 for aircraft components. Described are a step-cutting core with slipper-shoe electrodes, a skate unit to adapt the slipper electrode for milling and a unit for machining holes in sandwich materials. (G22h; Co-b, SS, Ti, SGB-a, 4-57)

224-G. Intricate Thin-Gage Stampings Made Without Dies. E. Altholz. Machinery, v. 67, Feb. 1961, p. 93-96.

Etching or chemical milling of photochemically treated surfaces of nickel-silver, Al, Al alloy, Fe, high and medium carbon steel and alloy steel to produce small thin gage parts with tolerances held to ± 0.0005 in. (G24b; Cu-b, Al-b, Fe-b, ST, 4-53)

225-G. Oldsmobile Turns to Aluminum for Rockette V-8. R. H. Spiotta. Machinery, v. 67, Feb. 1961, p. 98-103.

Milling, drilling and boring of 356-T5 Al permanent mold castings with carbide tools on a 400 ft. production line to produce engine cylinder heads. Flaw testing with compressed air and sealing with sodium silicate in cases of porosity or air leakage. (G17, S13b, T21b; Al-b, 5-63)

226-G. Forming Stainless Steel Percolators at 4000 a Day. P. J. Kircher. Machinery, v. 67, Feb. 1961, p. 116-121.

Drawing and forming operations on type 302 stainless steel blanks at 9000 psi. pressure on a hydroform press using castor oil lubrication, with annealing at 1950° F. in an ammonia atmosphere between drawings. Fabrication by brazing with Eutec no. 157 wire and embossing on a pneumatic drop press. (G4, T10a; SS)

227-G. Die-Sinker Generates Forms Without a Mold. L. W. Collins. Machinery, v. 67, Feb. 1961, p. 122-125.

Machining of Al, brass and steel on a universal pantograph die sinker to produce dies and mold cores for investment casting. Application of the metal cores with wax cores and patterns in producing intricate metal parts. (G16, E15; Al, Cu-b, ST, 17-57)

228-G. Cold-Hobbing of Hot-Working Steels. W. Haufe. Machinery (London), v. 98, Jan. 11, 1961, p. 70-77.

Comparison of various hot working steels which can be cold hobbed to determine resistance to forming as a function of hobbing depth, susceptibility to heat cracking and hardness occurring during heat treatment. Cold hobbing methods for producing pressure die casting dies, hot brass stamping dies, forging and coining dies. (G17b, 1-67, T6r; ST, 17-57)

229-G. Phosphate-Coating and Lubricating of Steel for Cold Extrusion. D. James. Machinery (London), v. 98, Jan. 11, 1961, p. 84-98.

Development of a lubrication system based on phosphate coatings impregnated with various lubricants. Comparison of Mn/Fe phosphate, Fe phosphate, Zn/Fe phosphate and Zn phosphate as phosphatizing solutions and sulphonated tallow and sodium stearate as lubricating agents. (G5, 18-73)

230-G. (Pamphlet.) Machining Characteristics of High Strength Thermal Resistant Materials. Pt. 2. Machining Characteristics of Molybdenum-0.5% Titanium Alloy. L. J. Nowikowski. Metcut Research Assoc., Inc. (Air Material Command, U. S. A. F.) May 1960, 70 p. (Available as PB 161775, U. S. Office of Technical Services, Washington 25, D. C.) $2.

Evaluation for turning, face milling, drilling, reaming and tapping operations. Graphs compiled from the machining tests show relationships between tool life, cutting speed, feed, tool geometry, tool material and cutting fluids. Effect of machining variables on unit power, coefficient of friction and tool forces. (G17; Mo-b, Ti)

231-G. (Pamphlet.) Survey of the Broaching Process. B. Hanna and C. E. Eppinger. University of Denver (AMC Aeronautical Systems Center, U. S. A. F.) Jan. 1960, 122 p. (Available as PB 161776, Office of Technical Services, Washington 25, D. C.) $2.75.

Methods of extending broaching to high temperature alloys. Data on broach cutting and tool life, materials and surfaces, economic and design factors. Additional information on cutting tooth geometry and gullet design as possible partial remedies to the heat friction problem. (G17a; SGA-h)

232-G. (Book.) Chipless Machining. Charles H. Wick. 502 p. 1960. Industrial Press, 93 Worth St., New York 13, N. Y. $10.

Methods of cold forming ferrous metal to finished shapes without producing chips. Description of processes, equipment design, tooling and applications, the latter including heading, rolling, spinning, swaging, extruding and high-energy-rate forming. (G-general, 1-67)

233-G. (Book.) Machining Characteristics of High Strength Thermal Resistant Materials. 180 p. 1960. AMC Aeronautical Systems Center, U. S. A. F. (Available from Wright Aeronautical Div., Curtiss-Wright Corp., Wood-Ridge, N. J.)

Machining characteristics in turning, milling, drilling and tapping of martensitic low alloy steel, hot worked die steel, austenitic stainless steel, martensitic stainless steel, precipitation hardening stainless steel, Ni base and Co base, high temperature alloys and Ti. Relationships between tool life, cutting speed, feed, tool geometry, tool materials and cutting fluids. Effect of grinding condition on wheel wear. Influence of grinding and milling variables on workpiece distortion and residual stresses. (G17; AY, Co-b, SS, Ti, TS)

234-G. (Translation-PERA.) The Use of Spark-Erosion Machining in the Manufacture of Carbide Dies. A. N. Kamorkin. Russian, Nov. 1959, p. 48-52.

Factors in the selection of machining conditions in terms of shape and dimension of profile to be machined, required accuracy and surface finish and the selection of electrode and working fluids for manufacturing blanking dies. (G24a, T6r; 6-69)

235-G. Metal Cutting Forces. Automatic Machining, v. 22, Feb. 1961, p. 39-43.

Effect of tool geometry on cutting forces and tool speed-life. Factors influencing production rate, cutting power, surface finish, tool wear and tool corrosion. Tool wear as influenced by type of chip formed during cutting. (G17)

236-G. Cross Drilling, Straddle Milling. Automatic Machining, v. 22, Feb. 1961, p. 44-45.

Machining of tapered 303 stainless steel parts in one cycle, using an automatic machine equipped with cross-drilling and milling attachments. Secondary roughing out and finishing operations are avoided. (G17e, G17b; SS)

237-G. Centerless Grinding. Automatic Machining, v. 22, Feb. 1961, p. 69.

Form and through-feed grinding of soft metals and carbide materials on a conventional surface grinder equipped with a centerless grinding fixture. (G18h)

238-G. Electro-Chemical Machining. Machinery (London), v. 98, Jan. 25, 1961, p. 218-221.

Electrolytic machining of Ni alloy airfoil surfaces of turbine blades, tungsten carbide and a W-Mo alloy by a new process in which the tool (cathode) is placed approximately 0.003 in. from the work and a special electrolyte is pumped through the space at high speeds. Current densities up to 1500 amp. per sq. in. may be applied. (G24d, T7h; Ni-b, W-b, Mo)

239-G. Cold Deforming. H. J. Merchant. Metal Treatment and Drop Forging, v. 28, Jan. 1961, p. 14-18.

Review of cold deforming processes such as cold heading, extrusion, impact extrusion, drawing, coining, embossing and cold forging. Advantages of material utilization efficiency, material improvement, dimensional tolerances and production efficiency are compared with conventional forging. Disadvantages and product design restrictions. (G-general, 1-67)

240-G. (German.) Use of Electroerosion in Industry. H. Rossa. Elektrie, v. 14, Nov. 1960, p. 407-410.

Machining of tools, machine parts, rolls and dies of hardened and alloyed steel, cast iron and Al by electro-erosion at local temperatures of up to 10,000° C. (G24a, W25; Al, CI, ST, SGB-q)

241-G. (German.) Production of Small Metal Parts by Spark Erosion. Werner Wendrich. Feinwerktechnik, v. 64, Dec. 1960, p. 427-430.

Method and apparatus for production of small Cu parts for microwave tubes by spark erosion in a nonconductive solution of benzine with additions of methyl-alcohol. Measurements of crater diameter, working gap and roughness depth as influenced by capacity and voltage. (G24a, T1; Cu)

242-G. Make It for Less and Better... From Tubing. Tooling & Production, v. 26, Feb. 1961, p. 52-56.

Application of stamping processes to production of ball flex-joint, air spring piston and shell from Al and welded steel tubing. (G3; Al, ST, 4-60)

243-G. (German.) Machines for Strip, Profile and Tube Processing. Draht, v. 11, Dec. 1960, p. 761-763.

Automatic and semi-automatic machines for rolling sectional steel into rings, fine and very fine grinding of cold rolled strip, working sheet into structural shapes, bending and stamping parts from steel strip and bending and cutting steel tubes. (G-general, 1-52, 17-51; ST, 4-53, 4-60)

244-G. (German.) Spark Erosion, Ultrasonic and Electrolytic Machines for Tool Production. Draht, v. 11, Dec. 1960, p. 775-779.

Design of machines for spark machining of forging and drawing dies, electrolytic grinding of hard metals and steels and for ultrasonic drilling and welding of thin sheets, foils or wires composed of Al, Cu, brass, Au, Ni, Zr or steel. (G24, K-general, 1-52, 17-51; SGA-j)

245-G. Drawing Aluminum Cans From Precoated Strip. Automation, v. 8, Feb. 1961, p. 79-81.

Production of Al cans by a draw and redraw process on an automated can line consisting of rotary redraw press, combination trimmer and flanger and rotary curling machine. (G4; Al, 4-53, 8)

246-G. Pressure-Forming Ups Reliability of Welded Rocket Cases. G. K. Schmitz and J. E. Benawa. Space Aeronautics, v. 35, Feb. 1961, p. 83-84, 90, 92, 94, 96.

Production of welded solid propellant rocket cases composed of steel using pressure forming to reduce discontinuity stresses in the weld transition zone and to reduce ignition boss bending stress. Weld mismatch and other contour distortions as they affect maximum stresses. Strain at proportional limits as a function of strain-pressure slope. (G14, K-general, T2p; ST)

247-G. Quantity Production of Laminations for Transformer Cores. Machinery (London), v. 98, Feb. 1, 1961, p. 250-252.

Cold rolled, grain oriented, coiled steel strip is pierced and cropped on a fully automatic installation with an overall length of 60 ft. (G2j; ST, 4-53)

248-G. Metal Shaping Process. Metal Removing, v. 5, Jan. 1961, p. 10-12.

Description of a new electrochemical metal-shaping process which removes metal at rates of 0.05-0.1 in. per min. The process is noiseless and because there is no pressure on the workpiece, eliminates deburring costs. (G24d)

249-G. Single Point Threading. Metal Removing, v. 5, Jan. 1961, p. 13.

4130 steel forgings heat treated to 180,000-250,000 psi. tensile strength are threaded with a triangular insert tool using throw-away inserts in place of brazed tips. (G17f; ST, 4-51)

250-G. Influence of Cold Working Carbon Steels on Their Machinability. E. Bodart and L. Czaplicki. Microtechnic, v. 14, Dec. 1960, p. 255-257.

Determination of the increase of tensile strength due to cold working. Machinability of 0.30 carbon steel is improved during cold working by drawing. (G17k, Q27a, 3-68; CN)

251-G. Electro-Chemical Machining. Machinery (London), v. 98, Jan. 18, 1961, p. 161-162.

Development of a new electroforming technique in which speed is increased by circulating a special electrolyte through a space 0.002-0.003 in. between the component to be shaped, which forms the anode, and the electrode. Method is applied to machining of aerofoil surfaces. (G24d)

252-G. Electroshaping. Metal Industry, v. 98, Jan. 27, 1961, p. 63-65, 71.

Applications of electroshaping for cutting, electrolytic broaching, drilling and electrolytic trepanning of difficult-to-machine metals such as W, Mo, Waspalloy, 700 Udimet, pearlitic and austenitic stainless steels, Nimonic, A-286 alloy and V-57 alloy. (G24d; SGA-h, Mo, Ni-b, W)

253-G. Automatic Abrasive Cut-Off Halves Screw Machine Costs. Richard L. McKee. Grinding and Finishing, v. 7, Feb. 1961, p. 11-12.

Production of 52100 steel and hardenable stainless steel aircraft roller bearing blanks by cutting, tumble deburring and centerless grinding operations performed on an abrasive cutoff machine. (G18h, T24b; SS)

254-G. Why Surface Grinding Is Replacing Cutter-Type Machining. Arthur M. Mattison. Grinding and Finishing, v. 7, Feb. 1961, p. 24-27.

Advantages of surface grinding are illustrated through cost comparisons obtained from machining of cast Meehanite hopper tables, cast iron roll housings and Meehanite chain block. (G18k; CI)

255-G. Propane Flame Cuts Steel Quickly. Petro and Chem Engineer, v. 33, Feb. 1961, p. E-16.

Cutting five foot thick slabs using a newly designed gas gun with nozzles which stabilize the flame and inhibit flashback. (G22g; ST, 4-52)

256-G. Boeing Flowspins the Superalloys. Steel, v. 148, Feb. 20, 1961, p. 62-64.

Flowspinning of X2219, Vascojet 1000, 4340 steel, 321 stainless steel and X200 alloys using tooling consisting of a roller, spin block and special tailstock adapter or follower. (G13; SGA-h)

257-G. Electron Beam Welder Cuts Metal. Steel, v. 148, Feb. 20, 1961, p. 68.

Cutting of stainless steel, Nimonic and carbon steel with an electron beam generated by a conventional Zeiss welder. Application of electron beam processing to spot alloying and spot bleeding. (G17; CN, Ni-b, SS)

258-G. (German-French.) The "Arcair" Process. G. Doneux and Otto Frey. Zeitschrift fur Schweisstechnik (Journal de la Soudure), v. 51, Jan. 10, 1961, p. 2-12.

Surface erosion to produce deep grooves, cutting and boring of carbon steel, stainless steel, heat resistant austenitic 14% Mn steel and nonferrous alloys by arc melting of metal using a graphite electrode with simultaneous removal of melted metal by compressed air. (G22h; CN, SS, EG-a38)

259-G. (German.) Thermal Processing by Electron Beams. Hellmut Droscha. Metall-Reinigung + Vorbehandlung, v. 10, Jan. 1961, p. 4-6.

High-precision small dimensional machining, welding, cutting, drilling and milling of metallic materials including alloy steels and high-melting metals

(W, Mo, Ta) and nonmetals such as glass and ceramics, by electron beams of high energy density. Examples of application: milling of spinning die and metal evaporated ceramic plate; butt welding of 15 mm. thick X12 CrNi 18-8 steel plate and butt welding of thick walled Zr tubes for reactor fuel elements. (G24; AY, Mo, Ta, W, NM-k)

260-G. Columbium Curbs Wrinkling in Forming Stainless Strip. C. T. Evans, Jr. Iron Age, v. 187, Feb. 23, 1961, p. 96-97.

Addition of Cb to 430 stainless steel to prevent formation of ridges on the surface during stretch forming. (G9; SS, Cb, AD-g40)

261-G. Automatic Spinning Solves Tough Forging Problems. Steel Horizons, v. 23, no. 1, 1961, p. 14-15.

Automatic spinning of high strength stainless steels and other alloys simplifies operation, eliminates inside machining and combines mass production with low unit cost. The process is applicable to a variety of missile, industrial and consumer products. (G13; SS, SGB-a)

262-G. (English.) Study on Wear in Shearing Process by Means of Irradiated Tools. Toshio Sata, Kunio Abe and Kiyoshi Nakajima. Scientific Papers of the Institute of Physical and Chemical Research (Japan), v. 54, Sept. 1960, p. 307-312.

Study of tool wear on high speed steel punches and dies during shearing of low-carbon steel, stainless steel and Si steel in dry or lubricated states. (G2, 18-73; CN-g, SS)

263-G. Revolution in Structural Fabrication. American Machinist/Metalworking Manufacturing, v. 105, Feb. 6, 1961, p. 89.

Use of drilling and reaming under numerical positioning control, automated welding and conveyorized painting in the construction industry. (G17, K-general, L26n, 18-74; SGB-s)

264-G. Screw Machine Work on Aluminum VII, VIII. M. Bryan Baker. American Machinist/Metalworking Manufacturing, v. 105, Feb. 6, 1961, p. 109, 111.

Causes and corrective measures for problems of damaged chasers, rough threads, tapered threads and pitch variation during threading and of work and tool edge breakage, chatter and poor finish during skiving. (G17a, G17f; Al)

265-G. The Development of Production Processes for Use With Titanium Sheet. A. T. Carse and W. T. Ardis. Welding and Metal Fabrication, v. 29, Feb. 1961, p. 50-56.

Blank preparation, die blanking, hot, cold, stretch and wheel forming, drilling and hot dimpling procedures for production of aircraft components. (G-general, T24)

266-G. Fluid-Form Hydraulic Forming Attachment for a Power Press. H. Moller. Machinery (London), v. 98, Jan. 4, 1961, p. 34-37.

Drawing of Numonic 75, 18-8 stainless steel, car body steel and Mg-Si-Al base alloy to form deep intricate components using a fluid form hydraulic forming attachment. The pressure for blank holding and forming is exerted by a plunger mounted on the drawing slide through a quantity of hydraulic fluid. (G4d, 1-52; Al-b, Ni-b, SS)

267-G. High-Energy Processes Shape Space-Age Parts. C. W. Gipe. SAE Journal, v. 69, Mar. 1961, p. 44-45.

Shaping of SAE 30321 stainless steel, 5086 Al alloy, AM355 stainless steel and 6Al-4V-Ti alloy by electric arc, high-energy impact and explosive forming. Little or no machining is necessary for finishing. Applications. (G-general, NM-k34; Al-b, SS, Ti-b)

268-G. New Machining Methods Needed for Heavier Space-Age Metals. Ken Sparling. SAE Journal, v. 69, Mar. 1961, p. 74-76.

Machining of Ti, Mo, Be, Ta, W, L-605 Co alloy, R-235 Ni alloy, A-286 alloy, H-11 toolsteel, 17-4 Mo steel and Thermold-J by electric spark discharge, electron beam machining, electrolytic grinding, ultrahigh speed machining, chemical milling and thermal machining. High precision finish is obtained in all cases. (G24; SGA-h, Mo, Ni-b, SS, Ta, Ti, TS)

269-G. Can Hot Machining Techniques Keep Pace With New Alloys. Iron Age, v. 187, Mar. 2, 1961, p. 98-100.

Results of machinability tests on low-alloy martensitic and semi-austenitic precipitation hardening stainless and hot work die steels in the hardness range 350-600 Bhn. Hot machining methods used include turning, face milling and drilling. (G17, 1-66; SS, TS)

270-G. Electropolishing Moves Into the Machine Shop. Electroplating and Metal Finishing, v. 14, Feb. 1961, p. 57, 59.

Development of a new high speed electrochemical machining process using very high current densities and a new fast plating process in which special electrolytes are pumped at high pressures through a perforated anode. (G24d, L17)

271-G. Experiences in the Commercial Production and Application of Cold Extruded Components. R. E. Okell. Machinery (London), v. 97, Dec. 28, 1960, p. 1457-1460.

Selection and design of suitable parts for cold extrusion. Determination of the various pressing stages and tooling required. Preparatory treatments for billets such as annealing and phosphate coating. (G5)

272-G. Tooling for Cold Steel Extrusion. Melvin D. Verson. Metalworking Production, v. 105, Feb. 1, 1961, p. 49-53.

Cold extrusion of low carbon steel (C = 0.008-0.3%) with AISI, M2, M3 or M4 type toolsteels. Improvements in physical properties, ultimate strength and elongation are attributed to the process. Tables show composition and optimum heat treatment temperatures for the various toolsteels. (G5, Q-general; CN-g)

273-G. Making Metal Bellows Is a Precision Job. Metalworking Production, v. 105, Feb. 1, 1961, p. 57-58.

Production of stainless steel, brass, phosphor bronze, Ti or Ni alloy bellows by hydraulic forming, in which metal is forced to flow uniformly around collapsible dies by internal and end pressure. (G-general, 1-70; Cu-b, Ni-b, SS, Ti)

274-G. Producing Aluminum Alloy Pistons. Cy La Tour. Modern Machine Shop, v. 33, Mar. 1961, p. 100-103.

Description of drilling, boring and inspection operations used in manufacturing strong, lightweight pistons from No 2018 F, 100% virgin Ni base Al alloy. (G17, T21b; Ni-b, Al)

275-G. High-Production Gun Drilling. Carl Christen. Tool and Manufacturing Engineer, v. 46, Feb. 1961, p. 83-84.

Use of gun drilling to machine the cam-follower holes in the cylinder heads for two diesel engine models. Castings are alloyed gray cast iron, 163-207 Bhn. (G17e, CI)

276-G. Wet-Belt Grinding Combines Accuracy, Speed. O. Mark de Michele. Tool and Manufacturing Engineer, v. 46, Feb. 1961, p. 111-112.

Grinding metal from a steel tube at a rate of almost 2 lb. a min. generates enough heat to stress and expand a workpiece unless the heat is removed. The large area of a belt offers an ample surface for heat transfer; floods of coolant carry it away. Result is that heavy removal rates can be maintained without loss of accuracy. (G18; ST)

277-G. Special Shop Machines Subway Liners. Clifford P. Farr. Canadian Metalworking, v. 24, Feb. 1961, p. 23-25.

Sand casting, milling, machining and bolting of curved gray iron segments to form subway liners. (G17b, E11, K13p; CI-n)

278-G. Better Machining From New Free-Cutting Steel. Australasian Manufacturer, v. 45, Aug. 6, 1960, p. 32-34.

New Pb bearing free-cutting Australian steel gives improved performance on all machining operations and increased tool life. 0.15-0.35% Pb exists as a fine dispersion of soft, submicroscopic particles in liquid or solid Fe. Steel also contains 0.10-0.17% C, 1.10-1.40% Mn, 0.05% P and 0.20-0.30% S. (G17, W25; ST, Pb, 17-57)

279-G. Spark Machining. Australasian Manufacturer, v. 45, Dec. 10, 1960, p. 87-90.

Spark machining of soft or hardened die steel and WC by a process which removes metal from workpiece with highly energized electric sparks delivered from an electrode, the shape of which matches the form required in the workpiece. (G24a; TS, W, 14-68)

280-G. Explosive Forming of Metal. W. S. Hollis. Machinery Lloyd (Overseas Edition), v. 33, Jan. 7, 1961, p. 45-47.

Production of hollow ware and tubular components from sheets of difficult to form materials. (G-general, NM-k34)

281-G. (Japanese.) Ultrasonic Processing. Yoshitaka Tani and Jiroh Miyajima. Ohm, v. 47, Nov. 1960, p. 44-47.

Ferrite, Ge, toolsteel, silicon, steatite and jewel stones are machined with ultrasonic cutters composed of Cu, mild steel, silver steel, stainless steel, brass or super hard alloys. Data are given for cutting velocity and surface roughness. (G17, 1-74; Ge, Si, TS)

282-G. How to Get the Most Out of Metalcutting. Jens L. Wennberg. Tool and Manufacturing Engineer, v. 46, Mar. 1961, p. 81-84.

Equations showing relationships between optimum cutting speed, optimum tool life and cast per piece are used to determine these variables during milling and turning. (G17)

283-G. Putting Plasma Jets to Work. R. L. Hockman. Tool and Manufacturing Engineer, v. 46, Mar. 1961, p. 85-89.

Applications of plasma-arc torches in metal cutting, plating and welding operations. Torch design and specifications. (G22h, K6, L29n)

284-G. Turning With Throwaway Inserts--Speeds and Feeds for Carbides. Tool and Manufacturing Engineer, v. 46, Mar. 1961, p. 99-100.

Data are given for turning carbon, alloy and stainless steels, cast iron, Al, Mg, Ti alloys, brass, Ni alloys and nonmetallics. (G17a; Al, AY, CI, Cu-b, CN, Mg, Ni-b, SS, Ti-b)

285-G. The Machining of Steel. F. C. Lea and Eric N. Simons. Edgar Allen News, v. 40, Jan. 1961, p. 15-17.

Method of setting up parts for rough and finish planings and of overcoming effects of internal stresses released during planing. Detailed description of design and operation of shapers. (G17c; ST)

286-G. Problems of Machining Space-Age Metals. L. A. Hauser and M. C. Metzger. Metal Progress, v. 79, Mar. 1961, p. 97-101.

As hardness increases, machining super-alloys and ultra-high-strength steels becomes progressively more difficult. This article offers suggestions on machining alloys with hardness in some instances over C-50. (G17, AY, Ni-b, Co-b, TS, SS, SGA-h)

287-G. Forming Corrugations to Close Tolerances. Arthur Morefield. Metal Progress, v. 79, Mar. 1961, p. 132-134.

Featuring a clamping and folding method of forming instead of the conventional drawing and bending, a new machine makes pleats one at a time. When compared to brake forming, tolerances that can be maintained are about five or six times closer and forming is four times as fast. (G6)

288-G. Electrochemical Machining of Metals. Aircraft Engineering, v. 33, Feb. 1961, p. 46-47.

Electrochemical machining of compressor or turbine blades composed of pearlitic and austenitic stainless steels, S-816, Waspalloy, Udimet 700, Nimonic alloy, A-286, V-57, W and Mo by a process in which there is no physical contact between tool and workpiece so that thin sections can be produced free from burs. (G24d, T7h; SGB-a, SGA-b)

289-G. Broaching Specified for Savings. J. Haydock. Metalworking, v. 17, Mar. 1961, p. 9-11.

Broaching forged rifle parts of 8620 steel to produce smooth surfaces that are square and parallel. (G17d; ST)

290-G. Electrochemical Machining. Aircraft Production, v. 23, Feb. 1961, p. 68-72.

Stainless steel turbine and compressor blades are electroshaped by a process which uses a rapidly circulating electrolyte to induce a high amperage to pass between cathode tool and anode workpiece. Dislodged surface atoms are attracted into dissolving electrolyte. (G24d, T7h; SS)

291-G. Controlled Belt-Grinding. Pt. 2. H. J. Pearson. Aircraft Production, v. 23, Feb. 1961, p. 42-46.

Grinding of turbine blades composed of Al and Ni alloys and heat resisting materials such as stainless steels and Ti by an abrasive belt machining technique. (G18, T7h; Al-b, Ni-b, SS, Ti, 17-57)

292-G. Economics of Cutting Processes. J. Cherry. Production Engineer, v. 40, Feb. 1961, p. 122-131.

Comparison of automatically controlled and manually controlled machining for various combinations of 1020, 1030, 1040, 1050 and 1060 steels with Stellite, tungsten carbide or H. S. S. 5% Co tool materials. 5 ref. (G17; ST)

293-G. (French.) Means for Increasing the Fatigue Resistance of Welded Naval Structures. H. de Leiris. Association Technique, Bulletin, 1960, p. 441-456.

Series of tests with von Arx 3B pistol as a high-speed, high-impact hammer on welded steel specimens to determine the value of hammer-treating welded structures in order to eliminate stresses in the welded seam and increase its fatigue resistance. 5 ref. (G23, Q7; ST, 7-51)

294-G. Cold Steel Impacting. Thomas A. Dickinson. Production, v. 47, Mar. 1961, p. 61-63.

An extrusion process involving the forming of unheated 4130 steel slugs in ambient temperature dies. Products are closed-end tubes and tubes with flanges requiring no machining to meet tolerances and having surface finishes to 8 micro-in. (G5; ST)

295-G. Super Precision Machining and Checking. Production, v. 47, Mar. 1961, p. 64-67.

Machining, grinding, gaging and cleaning methods used in manufacture of precision ball bearings. Measurement of radial play, geometric irregularities, waviness and starting torque of assembled bearings. (G17, G18, T7d)

296-G. The Real Reason for Superfinishing. J. B. Pond. Machine and Tool Blue Book, v. 56, Mar. 1961, p. 102-107.

Controlled finishing of metal surfaces by application under light pressure of an abrasive stick that is reciprocated at low speed on a revolving workpiece. Neither the microstructure nor the microscopic surface of the metal is altered. (G19q)

297-G. Titanium Sheet Forming. A. T. Carse and W. T. Ardis. Metal Industry, v. 98, Feb. 17, 1961, p. 131-132.

Hot forming and wheel forming of 22 gage ICI. 130 Ti alloy sheet. Blanks for hot forming are heated to 430° C. and the formed parts are subsequently stress relieved at 500° C. (G-general; Ti-b)

298-G. Titanium Sheet Forming. A. T. Carse and W. T. Ardis. Metal Industry, v. 98, Feb. 10, 1961, p. 103-107.

Forming of ICI. 317, ICI. 130, 318A, Ex. 011, Ti. 75A and RC. 55 Ti alloys. Brake and rubber forming tests show that, at 20° C., ICI. 130 Ti alloy forms satisfactorily, RC. 55 Ti alloy forms without fracture but requires heating to overcome springback and Ti. 75A fractures when formed. (G-general; Ti-b)

299-G. Production of Bolt-Head Trimming Dies by Intraforming. Machinery (London), v. 98, Feb. 22, 1961, p. 435-437.

Cylindrical hollow blanks of steel, Zr, Inconel, Hastelloy, Cu alloy and Al alloy are internally formed on a machine with pulsating dies which squeeze the work and cause the bore to conform to the cross-sectional shape of a mandrel. (G-general; Al-b, Cu-b, Ni-b, ST, Zr)

300-G. High Velocity Forming of Tungsten for Structural Applications. Machinery (London), v. 98, Feb. 22, 1961, p. 438.

Extrusion and forging of W at high speed to obtain extensive grain refinement and therefore improve ductility and hardness. (G-general; W)

301-G. (German.) Patterns for Flame Cutting With Magnetic Roller Control. H. Wyrich. Mitteilungen der BEFA, Nov. 1960, p. 6-7.

Automatic control of distance of burner, cutting rate, angle between burner and workpiece and cutting contour is achieved with patterns and magnet rollers during flame cutting. Emphasis on construction and use of steel patterns. (G22g)

302-G. Electrolytic Grinding Slashes Tool Finishing Cost. Metalworking Production, v. 105, Feb. 15, 1961, p. 65.

Machining of tough, hard or heat resistant materials such as brazed carbide-tipped steel blades with an electrolytic grinder to obtain continuous, single-pass machining and high stock removal rate. (G18, T6n; ST)

303-G. The Machining of Steel. F. C. Lea and Eric N. Simons. Edgar Allen News, v. 40, Feb. 1961, p. 38-39.

Discussion of optimum clearance and rake angle to use with single edge cutting tools on lathes, planers and boring machines. (G17; ST)

304-G. (Italian.) Grinding and Turning of Rolls Rotating About Roller Bearings. Macchine, v. 15, Nov. 1960, p. 1007-1014.

Rolls used in the manufacture of 0.002-0.003 mm. thick foil are ground or machined to perfect roundness while rotating about their service bearings to compensate for unroundness of bearing components. (G17, G18, W23k)

305-G. (Italian.) Machinability of Case Hardening Pb Alloyed Steels. Ezio Massa. Macchine, v. 15, Nov. 1960, p. 1025-1026.

Increase of machinability by addition of Pb. Unfavorable effect of ferrite and cementite. (G17k, 2-60; AY, Pb)

306-G. (Russian.) Vibration Tests With Welded Plates. Z. K. Lesnyak. Svarochnoe Proizvodstvo, Nov. 1960, p. 11-15.

Stress distribution in parts welded or cut from solid sheets of metal is studied with brittle varnish. Determination of stress concentration coefficient. Fatigue strength of various types of welds tested under vibrating loads. 5 ref. (G25; 7-51)

307-G. Cryogenic Sizing. C. H. Jung. Indian & Eastern Engineer, v. 102, Nov. 1960, p. 615-617.

Removing distortion from aircraft parts made of PH 17-7 and PH 1507 Mo stainless steel by a process based on constraining parts to desired configurations during a momentary pliable phase created by heat treatment. A heat treated part is cooled to slightly above 200° F. and forced into a sizing die prewarmed to 200° F. Part and die are cooled to -110° F. Process tolerances. (G23, 1-63, T24; SS)

308-G. Electroshaping Combines Forming and Finishing in One Operation. Industrial Finishing, v. 13, Feb. 1961, p. 30-31.

Outline of a new electroshaping process in which a workpiece is held in a special jig near electrodes which exactly reproduce the contours required for the finished article. Electrolyte is circulated rapidly to permit use of high current densities. (G24d)

309-G. Converted Milling Machine Makes Short Work of 3-D Cam Grooves. J. E. Laibach. Machinery, v. 67, Mar. 1961, p. 112-113.

Milling of 440 stainless steel bar stock on a three dimensional profiler milling machine followed by induction hardening, stress relieving and vapor blasting to produce aircraft drag chute release cam shaft. (G17b, 1-52, T24; SS)

310-G. Multiple Press Bending Speeds Tubular-Frame Production. Machinery, v. 67, Mar. 1961, p. 131-133.

Combined bending and coining of steel tubing on bending press with multiple groove dies to produce tubular steel frames. (G6, G3n; ST, 4-60)

311-G. Probing the Ultrasonic Cutting Process. Lucjan Kops. Metalworking Production, v. 105, Feb. 8, 1961, p. 51-57.

Influence of the abrasive slurry, vibration amplitude, balancing system and length wear and shape factor of the tool on metal removal rate of the transducer-amplitude transformer-tool system or ultrasonic machining process. (G24c)

312-G. (German-French.) Deep Drawing of Aluminum. John W. Lengbridge. Aluminium Suisse, v. 11, Jan. 1960, p. 19-33.

Study of material flow by a system of radial lines and parallel circles engraved on the blank. Advisable deformation degrees for each of several deep drawing steps. Formation of cracks and folds. (G4b; Al)

313-G. Hints on Turning Beryllium. Metalworking Production, v. 105, Feb. 22, 1961, p. 56.

Techniques and equipment used in turning or threading Be metal with carbide-tipped single-point tools. (G17a, G17f; Be)

314-G. Aluminum in Stainless Alloy Improves Machinability. Iron Age, v. 187, Mar. 16, 1961, p. 118-119.

Development of a new free-machining stainless containing 0.7% Al addition in place of sulphur eliminates reduced corrosion resistance and splitting which

occur with sulphur additions. (G17k, R-general; SS, Al)

315-G. (German.) Short-Time Testing of Machinability of Free-Cutting Steel by the Balance Weight Feed Method. Heinz Becker. Stahl und Eisen, v. 81, Jan. 1961, p. 46-50.

Machining of cold drawn 9 S 20 steel, 9 SMn 23 steel and 9 SMnPb 23 steel on a lathe using a weight as feeding force. Obtained feeding speed is taken as a measure of machinability. Automatic measurement of feeding distance and revolutions per second. Influencing factors such as toolwear and friction. Comparison with long time tests. (G17k, 1-54; ST, SGA-k)

316-G. Short-Run Blanking by the Rubber-Die Process. E. J. Hills. Product Engineering, Design Work Sheets, 14th Series, 1961, p. 63-65.

Sheet metal parts made economically by rubber die blanking. Limitations on complexity, dimensions and tolerances of blanks. (G2h; 4-53)

317-G. Eight Ways to Design Economy Into Malleable Iron Castings. Herbert L. Kee. Product Engineering, Design Work Sheets, 14th Series, 1961, p. 122-123.

Sizing, coining, punching, straightening, staking, bending or roll forming of malleable Fe castings for economical production of parts. (G-general; CI-s, 5)

318-G. Spiroid Gearing. Pt. 3. Materials, Mounting Details, Lubrication. Woodrow D. Nelson. Machine Design, v. 33, Mar. 16, 1961, p. 165-169.

Production of spiroid gears and pinions from soft and hardened steels and steels in combination with brass, bronze, nylon and Al by hobbing and thread milling. Design considerations for material selection, optimum heat treatment parameters, tolerances, mounting and backlash adjustments and resolution of tooth loads. (G17g, T7a; ST, Cu-b, Al-b, NM-d31, 7-59, 17-51, 17-57)

319-G. How to Avoid Common Shortcomings in Machining. Steel, v. 148, Mar. 20, 1961, p. 96-99.

Effect of tool composition and shape, cutting speeds and feeds, machine rigidity and other factors on metal removal rates. Suggestions for improving machining efficiency. (G17)

320-G. (Japanese.) Chemical Machining. Pt. 8. Machining of Aluminum (No. 8), Roughness of Machined Surface Produced by HCl Solution. Toshikazu Sato and Kazuo Kodaira. Government Industrial Research Institute, Reports, Nagoya, v. 10, Jan. 1961, p. 1-7.

Evaluation of HCl as a working solution in machining Al. Effect of various machining conditions such as temperature and HCl concentration on the surface roughness. 5 ref. (G24b; Al)

321-G. Precision Tapping With EDM. S. A. Hoffman. American Machinist/Metalworking Manufacturing, v. 105, Mar. 6, 1961, p. 72-73.

Electrical discharge machining is used to cut threaded holes in tungsten carbide and hardened steel punch and die parts. Precision tapping is obtained primarily by lead screw control of electrode advance. (G24a, T6n; TS, W, 14-68)

322-G. Hydraulics Aid Precision Holding. Karl Grimm and Rodney Schultz. American Machinist/Metalworking Manufacturing, v. 105, Mar. 6, 1961, p. 76-77.

Finish turning of small tubular beryllium copper cylinders. Precision workholding is accomplished with a hydraulically expanded mandrel filled with a light grease or heavy oil. It exerts even pressure throughout the bore of the beryllium copper workpiece which it supports and drives. (G17a; Cu-b, Be, 4-60)

323-G. Spark Forming Works on Stainless. American Machinist/Metalworking Manufacturing, v. 105, Mar. 6, 1961, p. 80.

Flat blanks or tubes of Al, Ti, stainless steel, mild steel, high-strength steel, Cb, Be-Cu alloy and epoxy are shaped into dies by electrospark forming under water. A high-voltage spark creates a shock wave which forms the workpieces. (G24a; Al, Cb, Cu-b, CN, SS, Ti)

324-G. Explosive Forming of Missile Components. L. C. Stuckenbruck and C. H. Martine. Machinery (London), v. 98, Mar. 1, 1961, p. 486-490.

Explosive forming of Cu, Ni, Ta, Zr, Co, Al alloys, Mo alloys and stainless steels in dies of Kirksite, plastic,

concrete, epoxy resin and fiberglass. (G-general, NM-k34, T24e; Al-b, Co, Cu, Mo, Ni, SS, Ta, Zr)

325-G. Rohr Puts Electroforming on the Line. Steel, v. 148, Mar. 27, 1961, p. 168-169.

Stainless steel tubing 2 1/2 in. O. D. is expanded to 3 1/4 in. by an underwater process in which electrical energy moves as a shock wave through the water to force into an Al die. (G24a; SS)

326-G. High Speed Cutting Betters Nonferrous Finish, Output. Steel, v. 148, Mar. 27, 1961, p. 184-185.

Data are given for cutter speed, chip load, feed speed and choice of coolant for high speed machining of Al and other nonferrous metals. (G17; Al, EG-a38)

327-G. Explosive Forming: Where Does It Go From Here? Edward Howard. Western Metalworking, v. 19, Mar. 1961, p. 39-41.

Applications of high energy forming processes to production of Al, Ni and steel rocket and missile components. (G-general, NM-k34, T24e; Al, Ni, ST, 17-57)

328-G. (Russian.) Stamping of Bevel Gears. A. D. Matveev, A. R. Krause and M. Yu. Salman. Kuznechno Shtampovochnoe Proizvodstvo, Jan. 1960, p. 14-17.

Stamping, heat treating and machining of toothed steel bevel gears using a 1000 ton crankshaft punch press. (G3, T7a; ST)

329-G. High-Energy-Rate Forming of Close-Tolerance Parts. Aircraft Production, v. 23, Mar. 1961, p. 80-86.

Complex forgings and extrusions of refractory metals and superalloys are produced by the Dynapak process accurately in which the required forming pressures are obtained by gas pressure. (G-general, F22, F24; EG-d37, SGA-h)

330-G. Electroshaping. Aircraft Production, v. 23, Mar. 1961, p. 88-96.

Electrochemical machining of difficult to machine aircraft materials by a new process in which an electrolyte is used to pass a high-amperage current between a profiled cathode tool and an anode workpiece, the surface of which is electrolytically dissolved. (G24d, T24)

331-G. (German.) Explosive Forming of Metals. R. M. Cavanaugh. Technische Mitteilungen, v. 53, Oct. 1960, p. 427-434.

Review of explosive forming techniques of metal compacts, metal powders and graphite powder. Applications in shaping, welding metal-to-metal plating and production of laminated materials. Comparison of mechanical properties of explosive formed and cold rolled steel. Reaction mechanisms. (G-general, NM-k34)

332-G. (English.) Research on Single Grain Cutting. Yukio Tanaka and Muneo Hitomi. Kansai University, Technology Reports, Sept. 1960, p. 49-62.

Experimental results obtained during single grain cutting of model grains are used to determine the effect of the contact angle between work and grain on the cutting mechanism. 7 ref. (G17)

333-G. Space Age Material Requires Abrasive Cut-Off. Grinding and Finishing, v. 7, Mar. 1961, p. 47.

Cutting of high-temperature steels and alloy rounds with diameters up to 22 in. on an abrasive cut-off machine. Determination of cutting time and the ratio of wheel wear to material wear. (G17; SS, SGA-h)

334-G. Why Not Broach It? Joseph A. Psenka. Cutting Tool Engineering, v. 3, Mar. 1961, p. 8-15.

Advantages and limitations of internal and external broaching processes. Comparison of steels, cast iron, brass, bronze, Al and Mg as to broachability. Applications to splined holes, flat surfaces, irregularly shaped holes, gears and shells. (G17d)

335-G. (Italian.) Machining of Metals. Tommaso Bruzzone. Ingegneria Meccanica, v. 11, Dec. 1960, p. 7-13.

Investigation of the correlation between cutting depth, feed, cutting speed and tool life for turning, milling and drilling operations. (G17)

336-G. (French.) Machinability of Gray Iron Castings. A. de Sy, E. Bodart, J. Van Eeghem and L. Czaplicki. Fonderie Belge, v. 30, Dec. 1960, p. 313-325.

Testing of gray cast iron bars to determine the relationship between machinability and Brinell hardness.

Possibilities for improving machinability by alloying with Cu or, to a lesser extent, with Ni. 6 ref. (G17k, Q29; CI-n, 5)

337-G. Further Studies of Iron-Oxygen Combustion in Gas Cutting. A. A. Wells. British Welding Journal, v. 8, Mar. 1961, p. 79-85.

Effect of preheating steel plates before gas cutting on ease of maintaining an ignition temperature at the top face of the cut. Greatest oxygen efficiency is obtained when the cut width times the cutting speed is equal to or less than 4-5 times the thermal diffusivity of the cut material. 11 ref. (G22g; ST)

338-G. Oxygen Cutting. A. A. Wells. British Welding Journal, v. 8, Mar. 1961, p. 86-92.

Gas cutting of Cu, Al, Ni, Pb, Mg, Zn, V, Ti, Armco iron and steels using oxygen, acetylene and fluorine gas. Influence of oxygen purity on the consumption of gas in cutting and on cutting speeds is explained by the boundary layer mechanism. (G22g; Al, Cu, Fe-a, Mg, Ni, Pb, Ti, V, Zn)

339-G. Fast Cutting With Carbon Dioxide Coolant. L. L. Arundel. Engineering, v. 191, Feb. 17, 1961, p. 266-267.

Machining of S96 high tensile steel and Cr-Ni-Ti alloy on a turret lathe using liquid CO_2 as a coolant enables cutting speed and feed to be greatly increased using proper tool geometry. (G17, 18-73; ST)

340-G. (German.) Boring of Cast Iron With Hard Metal Spiral Drills - An Approved Novel Technique. H. Drees and A. Jentsch. Maschinenbau, v. 9, Dec. 1960, p. 362-365.

Measurements of lifetime of hard metal spiral drills in boring GG 18 gray cast iron. Methods of drill production, regrinding and mounting; selection of drilling machines. (G17e, W25p, 1-52; CI)

341-G. A Comparison of Lubricants and Coatings for Cold Extruding Titanium. Alvin M. Sabroff and Paul D. Frost. ASLE (American Society of Lubrication Engineers) Transactions, v. 3, Apr. 1960, p. 61-68.

Graphite, Mo and other experimental and commercial surface coatings and lubricants are investigated as part of an over-all program on cold extrusion of solid and hollow Ti shapes. 3 ref. (G5, 18-73; Ti)

342-G. (German.) Force and Deformation Characteristics in Chipless Shaping of Uranium. I. L. Perlin, I. D. Nikitin, V. A. Fedorcenko, A. D. Nikulin and N. G. Resetnikov. Kernenergie, v. 3, Dec. 1960, p. 1217-1224.

Investigation of force and deformation characteristics in rolling, pressing, drawing and forging of uranium sheet, tube, rods and shapes. Measurement of deformability as influenced by temperature (400-1000° C.) and of pressing force as influenced by reduction and temperature (250-800° C.) (G-general, Q23q; U)

343-G. Magnetic Forming. D. H. Birdsall, F. C. Ford, R. E. Riley and H. P. Furth. American Machinist/Metalworking Manufacturing, v. 105, Mar. 20, 1961, p. 117-121.

Principles and applications of magnetic forming, a new development in high-energy metalworking. Hard bronzes, stainless steel, Cu and Al flat parts and tubes are shaped by a magnetic hammer using unidirectional or oscillating magnetic field pulse of 560,000 psi. 16 ref. (G-general; ST, Cu, Al)

344-G. Ultrasonics Ups Grinding Efficiency. James Peacock. American Machinist/Metalworking Manufacturing, v. 105, Mar. 20, 1961, p. 124-125.

Application of a toolhead attachment to the grinding wheel adding ultrasonic vibrations to the surface grinding of brass, 304 stainless steel, Al and Mg. Reduction of wheel wear, prevention of loading and improvement of metal surface finish is attributed to the addition of the vibrations. (G18k, 1-74; SS, Al, Mg, Cu-n)

345-G. Flame Cutting for the Small Shop. Clement F. Brown. American Machinist/Metalworking Manufacturing, v. 105, Mar. 20, 1961, p. 128-130.

Flame-cutting of heavy and irregular shaped mild steel bar stock using O_2 and acetylene gases, using general purpose equipment such as hand cutting torches, portable line-cutting machines, cam-guided shape-cutting machines and beam-type machines. (G22g; CN, 4-55, 4-57)

346-G. Licking EDM Electrode Distortion. Dean T. Wall and Daniel Strack. American Machinist/Metalworking Manufacturing, v. 105, Mar. 20, 1961, p. 142-144.

Prevention of electrode distortion during electrical-discharge machining of narrow, deep slots in a neutron chopper rotor having center and intermediate cores of natural U and a K-Monel outer ring. A suction pump draws coolant past the brass (65% Cu, 35% Zn) electrode during the machining and flushes away gas and heated metal particle. (G24a, 1-52; U, Ni-b)

347-G. Capacitor Discharge Forms Metals. Roy J. Bruun. Electronics, Jan. 20, 1961, p. 30.

Shock wave created by under water discharge of capacitor used for explosive shaping of hard-to-work metals, such as Ti. Development of super conductive bearings, motors and switches for use in the electrospark process. (G24a; Ti)

348-G. Formation of Continuous Chips in Metal Cutting. W. B. Rice. Engineering Journal, v. 44, Feb. 1961, p. 41-45.

Orthogonal cutting of 26ST Al workpiece is investigated utilizing high-speed photography. Mechanisms of ribbon-like and segmented continuous chip formation. Explanation of chip curling and of cratering wear of cutting tool. 6 ref. (G17; Al-b)

349-G. (Japanese.) Machining Performance of Ceramic Tools. Pt. 6. Effects of Tool-Tip Chamfering on Ultra High-Speed Cutting of Steel and Cast Iron. Kunio Yamada, Noboru Nakayama, Hiroshi Kajihara, Seisuke Sakai and Hisao Mii. Government Industrial Research Institute, Nagoya, Reports, v. 10, Feb. 1961, p. 63-75.

Tool wear and cratering and surface roughness, deformation and burring of specimens as a function of tool geometry and cutting speed. Data are given for cutting resistance of surfaces to various degrees of chamfering for various cutting depths. 5 ref. (G17, T6n; ST, CI, NM-a34, 17-57)

350-G. High Energy Forming to Gain Popularity. Steel, v. 148, Apr. 3, 1961, p. 82-85.

Survey of high-speed forming methods including explosive forming, forming with expanding gases, sheet drawing with liquid nitrogen, pneumatic-mechanical extrusion and forging, electrospark forming and bulging and magnetic forming. Application to Ti and Ti alloys; alloy, stainless, austenitic and Mo steels, Al alloys, Haynes alloy 25, Zr, W, Cb alloy and a diffusion of UO_2 in Ni. Effect of forming rate on green strength and green density of compacted powder metals. (G-general, H14; NM-k34)

351-G. Stretch Press Ages Sheet, Probe Tells How Much. Steel, v. 148, Apr. 3, 1961, p. 88.

Use of an eddy current probe during stretch aging of 17-7 PH stainless steel to determine elongation and ultimate tensile strength. Mechanical properties are read directly from the eddy current meter during the process, eliminating a majority of tensile tests. (G9, Q-general, S13h; SS-e)

352-G. Copper--Some of Its Uses. Engineer and Foundryman, v. 26, Dec. 1960, p. 26-28.

Survey of forming and bending techniques and soldering and brazing fabrication of Cu, brass and gunmetal. Applications in compression fittings, valves, sockets and pipe. (G-general, G6, K8, T26; Cu-b, 17-57)

353-G. Free-Machining Sulphur Copper. Production, v. 47, Apr. 1961, p. 64-65.

Application and machinability ratings are given with data for composition, tensile and yield strength, elongation, Rockwell hardness "B" and thermal and electrical conductivity of sulphur, Te and leaded Cu. (G17k, A-general, P-general, Q-general; Cu-b, S, Te, Pb, 17-57)

354-G. Versatile Tooling in Manufacturing Industrial Air Moving Equipment. Production, v. 47, Apr. 1961, p. 72-75.

Fabrication of variable pitch propeller and fan blades from Al sand castings by cutting, drilling, forming and welding methods. Magnaflux testing of the casting for production flaws. (G-general, W13e; Al-b, 5-60)

355-G. "Impossible" Stampings--Thousands Per Hour. Vearl A. Williams. Production, v. 47, Apr. 1961, p. 76-79.

Intricate parts composed of Cu and Ni-Ag alloy are stamped, formed and bent in one operation by a slide-type

machine incorporating multiple tooling. (G3; Cu-b)

356-G. Machining Honeycomb Faster. Production, v. 47, Apr. 1961, p. 82.

Large diameter carbide ring cutters using K92 Kennametal as abrasive are used to machine 17-7 and 15-7 stainless steel foils welded into honeycomb structures. After machining, the panels are brazed between thin sheet metal facings to form heat resistant panels for airplanes and missiles. (G17, K8, T24a; SS, 7-59, 17-57)

357-G. Chipless Machining. Charles H. Wick. Machine and Tool Blue Book, v. 56, Apr. 1961, p. 128-130.

Cold forming of parts with intricate shapes from hot rolled steel bar stock, subsequent machining being greatly reduced or not required. Improvement in tensile, yield and shear strength, fatigue resistance and hardness is attributed to the process. (G-general, 1-67; ST)

358-G. Explosive Metalworking. Metal Industry, v. 98, Feb. 24, 1961, p. 149-150.

Explosive hardening, welding, forging and forming of metals, using stand-off or contact charges, with the pressure from deflagrating and detonating explosives being used to distort the metal into the desired shape. Application of the methods to production of rocket nozzles, fuel tanks, railway tanker heads and other products from powder metals and alloys of Ti, Co, Cu, Mg, Al and Fe. (G-general, K-general, N7e; NM-k34, 17-57)

359-G. Application of Shear Spinning to the Fabrication of Solid-Propellant Rocket Cases. Lewis E. Zwissler. Paper from "High-Strength Steels for the Missile Industry". American Society for Metals, Novelty, Ohio, 1961, p. 201-231.

Manufacturing experience in shear-spinning large-diameter thin cylindrical shells and semi-elliptical head domes. Fabrication of a large-diameter chamber, manufactured of AMS 6434 alloy, for operation at stress levels of 210,000 psi. minimum yield strength. (G13, T2p; ST)

360-G. Large Solid-Propellant Rocket Case Fabrication by Deep Drawing. W. J. Ruprecht. Paper from "High-Strength Steels for the Missile Industry". American Society for Metals, Novelty, Ohio, 1961, p. 232-253.

Physical phenomena involved in forming metals by press drawing. Operations in forming large, solid-propellant rocket motor case halves by deep drawing. (G4b, T2p)

361-G. Tool Materials for the Cold Extrusion Process. A. W. F. Comley. Sheet Metal Industries, v. 38, Mar. 1961, p. 190-207.

Selection of toolsteels suitable for use as punches and dies for cold extrusion of steel. Review of heat treatment methods and defects and their prevention. Comparison with tungsten carbide tools. (G5; TS, 17-57)

362-G. Tape-Control Supercedes Chemical Milling. Metalworking Production, v. 105, Mar. 15, 1961, p. 72.

Sheet Mg skins for the engine struts of a missile are machined in a waffle pattern by a tape-controlled skin miller. (G17b, 1-52, T24a; Mg)

363-G. Techniques of Ultrasonic Machining. Aaron L. Roses. Tool and Manufacturing Engineer, v. 46, Apr. 1961, p. 71-75.

Review of development, operation, principles and applications of ultrasonic machining. Data are presented for abrasive grain size, cutting rates and factors affecting tool design and material selection for machining ultrahard metals, ceramics and intermetallic compounds. 5 ref. (G24c, 10-54; SGB-q)

364-G. Stressing for Reliability--Coining Increases Component Life. Austin Phillips. Tool and Manufacturing Engineer, v. 46, Apr. 1961, p. 87-88.

A coining technique for reducing metal fatigue in aircraft and missile components by setting up internal stress conditions and forming a groove of compressive stress adjacent to areas of tension. (G3n, G25, T24a)

365-G. Selecting Machinable Metals to Extend Tool Life. William Pentland. Tool and Manufacturing Engineer, v. 46, Apr. 1961, p. 89-90.

Analysis on cutting forces, power, tool life, temperature, surface finish

and mechanics and geometry of chip formation as factors affecting machinability of ferrous and nonferrous metals. Machinability ratings are given for different materials and data given for hardness factors affecting ferrous metals. (G17k)

366-G. New Tension-Controlled Blank Holder Combines Stretch and Draw Forming. Western Machinery and Steel World, v. 52, Mar. 1961, p. 45.

Sheets of Al, stainless steel, Ti and Rene 41 are stretch-formed by hydraulic cylinders in conventional press. Prestretching the sheet makes it conform accurately to the die surface. (G9; Al, Co-b, SS, Ti)

367-G. (Spanish.) Modern Techniques of Metal Forming Without Machining. F. Hrazdil. Ingenieria Industria, v. 27, Oct. 1960, p. 140-143, 145, 154.

Techniques for cold extrusion of steel, rolling of low-carbon steel screws and thin-walled tubes and punching of thin steel and nonferrous metal plates. (G5, F26s, F22k; ST, EG-a38)

368-G. (Spanish.) Die Stamping by Explosives. Ingenieria Industria, v. 27, Oct. 1960, p. 193-194.

Underwater explosive forming of Ni alloys, stainless steel and Ti to produce aircraft components. (G3, NM-k34; Ni-b, SS, Ti)

369-G. Explosive Forming. R. Gorcey, J. Glyman and E. Green. Machine Design, v. 33, Apr. 13, 1961, p. 188, 190.

Design considerations for high energy fabrication of hard-to-form materials and shapes. Application of explosive forming to 2024 and 6061 Al alloys, AZ31B Mg alloy, 4130 and 4340 steels; Vascojet 1000; 17-4PH, 17-7PH, 15-7MO, AM355 and 20CB stainless; Rene 41, Hastalloy X, Inconel X, HS21 Co alloy, 6Al-4V and B120VCA Ti alloys; Mo alloys and Teflon and Kel-Fusing plastic using deflagration or detonating explosives. (G17k; SGA-h, EG-a39, EG-d37, NM-d, NM-k38, ST, Ni-b, Ti-b, Mo-b, Co-b, Al-b, Mg-b)

370-G. Cold Heading. Automatic Machining, v. 22, Apr. 1961, p. 59-62.

Production of nuts, bolts and screws from wire using a cold heading machine with carbide or high-speed steel tooling. Shoulder length tolerances are held to ±0.005 in. and the tolerance of the shaft concentricity to the headed section is 0.0015 in. (G10, T7f; 4-61)

371-G. A Review of Bending Methods for Stainless Steel Tubing. C. T. Olofson. Defense Metals Information Center, Battelle Memorial Institute, DMIC Report 150, Mar. 2, 1961, 55 p. (Available as PB 151109 from U. S. Office of Technical Services, Washington 25, D. C.)

Ram, roll, press, compression and draw bending of 321 and 347 stainless steel tubing using bending, wiper, pressure and clamp dies and special mandrels. Physical properties of tubing. Minimum bending radii. (G6; SS, 4-60)

372-G. Contour Machining Beryllium. American Machinist/Metalworking Manufacturing, v. 105, Jan. 9, 1961, p. 69-70.

Turning, boring and gun drilling operations in solid Be billets for making throat nozzles for a Mach 10 wind tunnel with high surface finishes and 0.0002 in. tolerances. (G17; Be)

373-G. Screw Machine Work on Aluminum. Pt. 5. M. Bryan Baker. American Machinist/Metalworking Manufacturing, v. 105, Jan. 9, 1961, p. 91-93.

Various types of trouble encountered in cutting-off, tapping and threading operations on Al alloys in various wrought conditions are given in chart form, with possible causes and corrections. (G17a; Al-b)

374-G. Set-Up for Fine Boring Compressor Casings. Machinery (London), v. 98, Mar. 22, 1961, p. 654-656.

A double ended fine boring machine fitted with a special indexing and work holding fixture is used for rough and finish boring and front and back chamfering on holes in cast iron compressor casings. (G17d, 1-52, W13f; CI, 17-57)

375-G. Turning Operations on Titanium Billets. Machinery (London), v. 98, Mar. 22, 1961, p. 663-665.

A battery of seven 32 in. lathes is used to turn rough commercially pure Ti and Ti alloy billets to size. Recommended angles and nose radii for carbide, cast nonferrous alloy and high-speed steel tools for turning the billets. (G17a; Ti-b)

376-G. Cold Heading Stainless Steels and High Temperature Alloys. S. E. Tyson and J. W. Keegan. Machinery (London), v. 98, Mar. 22, 1961, p. 666-674.

Representative cold heading stainless steels and heat resisting alloys normally employed for the production of fasteners are reviewed in terms of chemical composition, mechanical properties and heading qualities. Survey of wire production and cold and warm heading operations. (G10, Q-general, T7f; SS, SGA-h, 17-57)

377-G. (German.) Testing Cuttability of Sheets With a Radioactive Tool. R. Neider. Kerntechnik, v. 3, Jan. 1961, p. 15-19.

Gamma-radiation measurements are used to assess cuttability of transformer and dynamo sheet cut with a radioactive tool. (G17k, 1-59; SGA-n)

378-G. Introduction to Chemical Milling. Materials in Design Engineering, v. 53, Apr. 1961, p. 128-132.

Recommendations for solution agitation, template size, thickness tolerances and surface areas to use in chemical milling. Methods of increasing uniformity of metal removal. (G24b)

379-G. Ultrasonics for Metal Cutting. George C. Brown and James N. Behm. Tool and Manufacturing Engineer, v. 46, Mar. 15, 1961, p. 57-60.

Applications of ultrasonic energy to conventional turning, milling and grinding operations. (G17, G18, 1-74)

380-G. Broaching for Maximum Production at Minimum Cost. W. H. Sutton. Tool and Manufacturing Engineer, v. 46, Mar. 15, 1961, p. 61-63.

Slotting of a circular A 5120 cam to tolerances of 0.001 in. on a continuous horizontal machine capable of producing 13,000 pieces per day. (G17d)

381-G. (German.) Grinding and Cleaning of Zinc, Pressure Die Castings and Light Metals. Thomas H. Curti. Metall-Reinigung + Vorbehandlung, v. 10, Feb. 1961, p. 19-20.

Grinding by sharp grinding media (SiC) at high speed with simultaneous cooling to avoid smearing or self-ignition. Cleaning of small castings in drums, using a 20% NaOH and 25% chromic acid containing pickling solution with subsequent rinsing, degreasing and drying. (G18, L12; Zn, 5-61)

382-G. (German.) Explosion Working of Superhard Metals. Metall-Reinigung + Vorbehandlung, v. 10, Feb. 1961, p. 22-23.

High-pressure die working by explosion of TNT (Trinitrotoluol), nitroglycerine, tritonal, zyclonite, dynamite, etc., of complicated parts of high-alloyed Cr and Ni steel, Al, Ti, Zr and their alloys using water for pressure transmission. (G-general, NM-k34; Al, SS, Ti, Zr)

383-G. Developments in the Forming of Aluminum Sheet. G. W. Eldridge. Metallurgia, v. 63, Feb. 1961, p. 71-77.

Progressive methods in forming Al and Al alloys by metal spinning, deep-drawing, pressing, high-energy forming and stretch forming. With heat treatable alloys, successful forming operations are conducted after solution treatment and before final precipitation hardening treatment is applied. 26 ref. (G-general; Al, 4-53)

384-G. Review of Some Unconventional Methods of Machining. Francis W. Boulger. Machinery, v. 67, Apr. 1961, p. 140-146.

Principles of electric discharge machining. Electrolytic grinding, electrolytic machining, chemical milling, ultrasonic machining, electron beam machining and plasma arc cutting. Application of these processes for machining refractory metals. High strength and heat resistant alloys, cemented carbides, ceramics and other materials. (G17, G22, G24)

385-G. Ultrasonics Creates a Major Innovation in Surface Grinding. Harold W. Bredin. Machinery, v. 67, Apr. 1961, p. 150-152.

Ultrasonic vibrations applied to cutting surface of grinding wheel through water base coolant prevent metal part build-up. Ultrasonics reduce wheel wear, need for dressing, frictional force and heat of grinding. (G18, 1-74)

386-G. Work Handling Time Cut by Setting up for Reciprocal Milling. A. A. Heckmann. Machinery, v. 67, Apr. 1961, p. 154-156.

Examples of reciprocal milling setups operating singly or in combination with index or progressive milling setups to machine components. (G17b)

387-G. (French.) Hot Drawing of Wire With Glass Lubrication. Louis Labataille. Revue Technique Luxembourgeoise, v. 52, Oct-Dec. 1960, p. 203-210.

Hot drawing of wire and tubes from billets of steel, ductile iron, refractory and nonferrous alloys. Process of glass lubrication. Properties of the tubes and wire produced. (G4, 1-66, 18-73; Fe, ST, EG-d37, EG-a38)

388-G. Machining Molybdenum. Australasian Manufacturer, v. 45, Mar. 4, 1961, p. 58-64.

Machining sintered and recrystallized Mo, Mo-W alloys and Mo-Ti alloys with high-speed steel and sintered carbide tools. Measurement of effect of cutting speed on tool life and effect of rake angle on tool force. Application of electro-erosion machining, chemical milling, electropolishing and photo etching. (G17, G24; Mo-b, Ti, W, 6-72)

389-G. Electroshaping of Metals. Machinery Lloyd (Overseas Edition), v. 33, Mar. 4, 1961, p. 39-40.

Forming of turbine blades by electroshaping produces a product having no stress problems, greatly reduced distortion allowances, good contour and high precision. (G24d, T7h)

390-G. Electrolytic Machining Speeds Metal Shaping. Chemical Engineering, v. 68, Mar. 20, 1961, p. 90-92.

Electrolytic machining of Nimonic, Udimet 700, Waspalloy and S-816 Co alloy. The rate of metal removal is influenced by the electric current and the flow rate of the electrolyte. Applications. (G24d; Co-b, Ni-b, SGA-h)

391-G. Free Machining Steel. E. Usui and M. C. Shaw. American Society of Mechanical Engineers, Transactions, Paper no. 61-Prod-4, 1961, 10 p.

Effect of tool speed, feed rate, chip tool contact length and chip thickness on shear, stress, cutting force, surface finish and tool life during machining of resulphurized, leaded and nonleaded hot rolled steels. (G17; ST)

392-G. (Czech.) Chip Formation Examined by Motion Pictures Taken During Machining. B. Vlach and J. Kozel. Strojirenstvi, v. 11, Jan. 1961, p. 47-49.

Steel and cast iron are machined at cutting velocity of 25-50 m. per min., cutting depth of 0.35-0.9 mm. and cutting angle of 7-18°. Chip formation is studied by motion pictures taken at a frequency of 2000-4000 exposures per sec. (G17; CI, ST)

393-G. Grinding Experts Challenge Tradition. Steel, v. 148, Apr. 24, 1961, p. 132-134.

Substitution of abrasive grinding for milling operations in heavy metal removal results in higher metal removal rates and lower material, fixture and wheel costs. (G18)

394-G. Tricks of the Trade Pay Off in Machining Stainless. G. J. Stevens. Iron Age, v. 187, Apr. 20, 1961, p. 140-142.

Solutions for problems of chip control, drill design and grinding, web thinning, tearing and burring encountered when machining stainless steel. (G17; SS)

395-G. (Japanese.) Correlation Between the Directionality Detected by Means of the Harbert Pendulum and the Earing in Deep Drawing of Aluminum Sheet. Ikeno Takashi, Zaima Shigeo and Shibata Kizo. Light Metals, v. 11, Jan. 1961, p. 20-23.

Directionality and earing phenomena in cold worked and annealed 25Al specimens as detected by Harbert pendulum testing is compared to data obtained with the Knoop indenter. 3 ref. (G4b, 3-72, 9-71; Al-b)

396-G. Machining 6Al, 4V Titanium. Metal Progress, v. 79, Apr. 1961, p. 96B.

Tool material, tool geometry, feed and cutting speeds for turning, milling, drilling and tapping. (G17; Ti-b, Al, V)

397-G. Trends in Aerospace Manufacturing. W. D. Nelson, J. A. Scott and R. H. Gassner. Metal Progress, v. 79, Apr. 1961, p. 106.

While new forming and shaping methods such as chemical milling, electromachining and grinding, subzero and thermal machining are used primarily in the aerospace field at present, they could spark a revolution in the manufacture of conventional items. Outline of the fabrication problems which remain to be solved in the fabrication of missiles, rockets and aircraft. (G24, G18, L-general, K-general, T24, T2p)

398-G. Single-Pass "J" Grooving in Heavy Plate With an Oxy-Fuel Gas Flame. C. B. Milton. Welding Journal, v. 40, Apr. 1961, p. 331-338.

Equipment, speed, gas flow and nozzle positioning for grooving steel plate. Examples of application. (G22g; ST, 4-53)

399-G. (English.) Critical Conditions of Wrinkling in Deep Drawing of Sheet Metals. Nozomu Kawai. Japan Society of Mechanical Engineers, Bulletin, v. 4, Feb. 1961, p. 169-175.

Clarification of mechanisms for preventing wrinkling in sheet metal after deep drawing. Formulas are developed for the prediction of wrinkling conditions when a blank-holder is not used. 9 ref. (G4b; 4-53)

400-G. (English.) Critical Condition of Wrinkling in Deep Drawing of Sheet Metals. Pt. 2. Nozomu Kawai. Japan Society of Mechanical Engineers, Bulletin, v. 4, Feb. 1961, p. 175-182.

Report on critical conditions of wrinkling in sheet metal after deep drawing where a blank-holder is used. By deducing the specific wave amplitude of wrinkles and including it in the equilibrium equation of moments, a formula predicting critical blank-holding pressure is obtained. 3 ref. (G4b; 4-53)

401-G. (English.) Critical Conditions of Wrinkling in Deep Drawing of Sheet Metals. Pt. 3. Nozomu Kawai. Japan Society of Mechanical Engineers, Bulletin, v. 4, Feb. 1961, p. 182-192.

Verification of a formula for predicting critical blank-holding pressure in the deep drawing of sheet metal to obtain minimal wrinkling. 6 ref. (G4b; 4-53)

402-G. New Coil Processing Lines Customize Sheet. Nat Wood. Western Metalworking, v. 19, Apr. 1961, p. 44-45.

Design and operation of a flying press and slitter line for cutting, slitting, flattening, regaging and edge conditioning of Al, stainless steel and carbon steel coil to form cut-to-size sheet, slit coils and blanks. (G2, 1-52; Al-b, ST, 4-53)

403-G. Behavior of Abrasive Grains in the Grinding Process. Hideo Tsuwa. Osaka University, Technology Reports, v. 10, Oct. 1960, p. 733-743.

Microphotographic examination of cutting edge shape, spacing, breakage and wear of abrasive grains during grinding of toolsteel of Rockwell 62 C. hardness. Relation of grain behavior to chip formation and other phenomena of the grinding process. 11 ref. (G18; TS)

404-G. Multi-Head Flame Cutter Clips Cost. Metalworking Production, v. 105, Mar. 29, 1961, p. 54-55.

Flame cutting of steel plate 1/4 to 5/8 in. thick by a multi-head electronic cutting machine increases output four times. (G22g; ST, 4-53)

405-G. Honing of Heading and Upsetting Dies. Gerhard Haasis. Wire World International, v. 3, Feb. 1961, p. 21-24.

Horizontal honing of carbide and toolsteel dies with electrolytically bonded diamond tools. Considerable increase in die life is attributed to the relatively fine surface finishes achieved. (G19n, T6r; TS, 14-68)

406-G. (French.) Fabrication of Pieces by Extrusion and Drawing. Jan Mailliard. Ingenieurs de l'Automobile, v. 35, Feb. 1961, p. 79-87.

Extrusion characteristics and workability of Pb, Zn, Sn, Cu and Al alloys and steels. Data are given for extrusion and drawing effects on mechanical and surface properties. (G4, G5, 17-52, Q-general; Pb-b, Sn-b, Zn-b, Cu-b, Al-b, ST)

407-G. Drilling and Reaming Beryllium. Metalworking Production, v. 105, Apr. 5, 1961, p. 52-53.

Deep hole and gun drilling of Be using carbide tipped or solid carbide tools to increase tool life and decrease the tendency of Be to seize the tool. (G17e; Be)

408-G. High-Speed Machining of Nonferrous Metals for Low Cost Production. Charles R. Onsrud. Production Equipment, v. 36, Apr. 1961, p. 4-5.

Smaller chips and reduced contact between tool and chip lengthen tool life in high speed machining of Al. (G17; Al)

409-G. You Can Reduce Your Grinding Costs. W. W. Mawry. Grits and Grinds, v. 52, Mar. 1961, p. 3-7.

Surface grinding of gray iron, ductile iron, high-speed steel, Meehanite and

high-carbon steel using Alundum 213 as an abrasive. (G18k; Fe, ST)

410-G. Fresh Approach in Machining Takes Aim on Hard Steels. R. H. Eshelman. Iron Age, v. 187, Apr. 27, 1961, p. 101-108.

Data are given for feed, cutting depth and speed, choice of cutting fluid and choice of cutting tool when machining materials above 300 Brinell hardness. (G17; ST, SGB-q)

411-G. Chemically Milled Structures. George H. Fox, Jr., and Hugh H. Muller. Machine Design, v. 33, Apr. 27, 1961, p. 126-134.

Advantages, limitations and design recommendations for chemical milling of Al, Mg, Fe, Ni and Ti alloys. Effect of chemical milling on the compression, tension and shear properties of these materials. (G24b; Al-b, Fe-b, Mg-b, Ni-b, Ti-b)

412-G. Centerless Grinding of Bolts Including Shoulders. Grinding and Finishing, v. 7, Apr. 1961, p. 30.

Grinding of carbonized 1040-steel engine bolts to required tolerances and finishes using a centerless grinder with a vibratory hopper. (G18h, T7f; ST, 17-57)

413-G. Recommendations and Precautions for Fabrication of 5% Cr Ultra-High-Strength Steel. Pt. 2. J. C. Hamaker, Jr., and W. Scott Lightner. Western Machinery and Steel World, v. 52, Apr. 1961, p. 46-50.

Machining and heat treating of 5 Cr MoV steel. Diffused Ni-Cd plating, silicone-Al painting, hot dip aluminizing, chromizing and nitriding impart corrosion and oxidation resistance. Tests showed excellent room and low temperature fatigue, impact and transverse properties, deep air hardenability, freedom from retained austenite and ability to be baked to 1000° F. Vasco Jet 1000 steel is used as a cutting tool 13 ref. (G17, J-general, Q-general; ST, SGB-a)

414-G. Abrasive Belt Grinding Aids Production of Tensile Specimens. Western Machinery and Steel World, v. 52, Apr. 1961, p. 54-55.

A cam controlled grinding machine produces specimens of any configuration from sheet, plate, extrusion or bar stock containing materials in both annealed and heat treated conditions. Materials include Al, stainless steel, Rene 41, Ti and H-11. Al oxide belts are used for all metals except Ti which requires a silicon carbide belt. (G18; Al, Ni-b, SS, Ti)

415-G. Hogging--a Job Shop Specialty. Gilbert C. Close. Modern Machine Shop, v. 33, May 1961, p. 116-121.

Effect of tool pressure and accuracy and work deflection when hogging Monel, titanium and stainless steel. (G17; Ni-b, SS, Ti)

416-G. High-Speed Machining. Modern Machine Shop, v. 33, May 1961, p. 122-125.

The life of tools used in high-speed machining of Al is affected by the time of contact between the chip and tool and by spraying coolant on the cutting tool. (G17)

417-G. Faster Machining Stainless Developed by Universal-Cyclops. Modern Machine Shop, v. 33, May 1961, p. 140-142.

Data given for composition, machinability, weldability and corrosion resistance of Uniloy 303 MA free machining stainless steel. (G17k, K9s, R-general; SS, SGA-k)

418-G. High Speed Machining Triggers Output of Nonferrous Parts. Iron Age, v. 187, May 4, 1961, p. 94-95.

Data for relationship between chip load and feed speed. Factors which prevent welding of chips to the cutter. Use of coolants. (G17; EG-a38)

419-G. (Dutch.) Chip Formation in Machining. J. J. P. Baart and P. C. Schot. Metaalbewerking, v. 26, Mar. 2, 1961, p. 358-361.

Determination of the direction in which the chip tends to move away from the work in turning operations. Dependence of the direction of chip removal on cutting tool profile, nose radius and cutting depth. 7 ref. (G17a)

420-G. (Rumanian.) Machining Parameters for Commercial Carbon Steels. M. P. Popov, I. Mitrica and E. Deciu. Studii si Cercetari de Mecanica Aplicata, v. 11, May 1960, p. 1-13.

Economical cutting speeds for OL 38, 42, 50, 60 and 70 steels are computed from a constant depending on the material used, the cutting depth, the linear feed and two exponents characterizing the mechanical properties. 6 ref. (G17; CN)

421-G. (Dutch.) Manufacture of Screws, Bolts and Nuts. Pt. 2. J. H. Meulman. Metaalbewerking, v. 26, Feb. 16, 1961, p. 330-333.

Upsetting of steel bolt heads and of flat, round and fillister head screws with thread rolling in a flat-die machine. Production of nuts by cold and hot forging methods. (G10p, G12, F22, T7f; ST, 17-57)

422-G. (Dutch.) Various Kinds of Plastic Deformation. Pt. 1. P. Landberg. Metaalbewerking, v. 26, Feb. 16, 1961, p. 319-330.

Investigation of deformation processes occurring during metalworking with attention to deep drawing. Force-depth diagrams are constructed and analysis is made of elastic and plastic flow mechanisms. (G4b, Q24)

423-G. "Fluid-Form" Interesting Process for Forming Sheet Metal Components. Australasian Manufacturer, v. 45, Feb. 25, 1961, p. 44-48.

Blanks are given an irregular shape through plastic forming in a simple tool with a cavity corresponding to the shape of the finished part and using a flexible punch which also acts as a blankholder. (G-general; 4-53)

424-G. Threading Goes Massive. Rupert LeGrand. American Machinist/Metalworking Manufacturing, v. 105, Apr. 17, 1961, p. 124-125.

Temperature-resistant steel, gear steel, Refractalloy and high-Ni steels can be thread rolled if spindle deflection is controlled. Application to worm threads, studs, long bars with helical splines. (G12; ST)

425-G. Accuracy of Milled Surfaces. Metal Cuttings, v. 9, Apr. 1961, p. 2-10.

Effect of end mill deflection during machining of Rene 41 and H-11 steel is investigated by special instrumentation to measure tool deflection and surface accuracy. (G17; Ni-b, ST)

426-G. (Italian.) Mechanical Working by Spark Erosion. Gianni Zucchetto. Macchine, v. 16, Jan. 1961, p. 17-23.

Principle of spark erosion process by electrical impulse. Application to conductor and semiconductor materials, metals, tempered steel and sintered parts. (G24a)

427-G. (French.) Improvement of Machinability by Treating the Liquid Melt With a Nitrogen Blast. Georges Blanc and Nicolas Volianik. Fonderie, v. 180, Jan. 1961, p. 3-10.

Treatment of melts of varying composition with a nitrogen blast through a graphite nozzle. Comparison of machinability of products from these melts with nontreated ones and those treated with ferrosilicon additions. (G17k, D11h)

428-G. An Experimental Investigation Into the Cold Extrusion of Steel. H. Ll. D. Pugh, M. T. Watkins and J. McKensie. Sheet Metal Industries, v. 38, Apr. 1961, p. 253-283.

Study of the extrusion pressure, the flow of metal during deformation and the mechanical properties of the product resulting from single stroke extrusion of simple axisymmetric rods, tubes and cans. Effect of process factors such as reduction, tool geometry, lubrication, ram speed and of the chemical composition of the steel, slug geometry and slug preparation. 33 ref. (G5, Q-general, 3-68; ST, 4-58)

429-G. Sheet Metal Data Sheet, Manufacture of Tin Boxes. Pt. 4. J. W. Langton. Sheet Metal Industries, v. 38, Apr. 1961, p. 305-306.

Data is compiled for the basic forming and soldering or welding operations in fabricating noncircular sheet steel containers with side seam. (G-general, K-general, W12c; ST, 4-53, 8-62)

430-G. Spark-Erosion Machining. Light Metals, v. 24, Apr. 1961, p. 108-109.

Hard metals, Nimonic alloys and intractable materials such as Stellite, tungsten-carbide and magnet steel are machined by a spark erosion installation consisting of machine, spark generator and dielectric filter. (G24a; Co-b, Ni-b, SGB-q)

431-G. Explosive Forming. Light Metals, v. 24, Apr. 1961, p. 115-116.

Forming of Ti, Mn and Al alloys and complex steels into simple or complex shapes by the instantaneous transmission of water or air by impulse waves generated by detonation of an explosive charge. (G-general, NM-k34; Al-b, Mn-b, ST, Ti-b)

432-G. Cold Extrusion of Ferrous and Nonferrous Materials. R. Tilsley and F. Howard. Production Engineer, v. 40, Mar. 1961, p. 176-196.

Cold extrusion of metal by backward extrusion, forward extrusion or a combination with other pressworking operations. Components produced can be circular or noncircular sections. The ferrous or nonferrous materials are caused to flow axially into a shape and size governed by the tooling. 13 ref. (G5)

433-G. Spline and Thread Rolling. John Arnold. Production Engineer, v. 40, Mar. 1961, p. 207-215.

Roto-Flo process of metal displacement for the mass production of metal parts. Spline and thread rolling are used as finishing operations with no subsequent cutting operations. Process maintains its original accuracy at high production rates because rolling dies are subjected to very little friction wear. (G12)

434-G. The Process of Explosive Forming of Metal. W. S. Hollis. Production Engineer, v. 40, Mar. 1961, p. 216-225.

Sheet specimens of FV 520, N 75 and Ti alloys are explosively formed using H_2O or air as the shock transmitting medium. Explosive forming dies are constructed of shock sustaining materials (Kirksite, Kayemalloy, mild steel and epoxy resin). (G-general, NM-k34; ST, Ti-b)

435-G. The Machining of Steel. F. C. Lea and Eric H. Simons. Edgar Allen News, v. 40, Apr. 1961, p. 80-81.

Design of tools for boring, turning, facing, planing and shaping steel. (G17; ST)

436-G. Fabricating in Titanium? Cut Costs by Sawing Contoured Parts From Slabs. Norman Phillips. Machine and Tool Bluebook, v. 56, May 1961, p. 100-104.

Complicated contoured parts from slabs of Ti are cut by a modified band sawing machine that is equipped with carbide tipped saws, flow coolant and features increased feeding pressure. (G17h; Ti)

437-G. A Review of Advantages of High Speed Machining of Light Metals. Light Metal Age, v. 19, Apr. 1961, p. 9.

Question and answer review covering the meaning of high-speed machining, tool life, chip welding onto the cutter and usage of coolant. (G17)

438-G. Cold Extrusion of Titanium. Light Metal Age, v. 19, Apr. 1961, p. 12.

Hexagonal cups are backward extruded in a single operation from solid round AMS 4902 Ti barstock, then are finish machined and threaded on a screw machine to produce a no. 10 hexagonal nut. Production cost savings on material and labor. (G5; Ti)

439-G. Electromagnetic Metal Forming--High Energy Exerts Shaping Force. A. P. Langlois. Tool and Manufacturing Engineer, v. 46, May 1961, p. 105-108.

Permanent deformations are produced in Al tubing and Cu rod by powerful magnetic flux lines. Electromagnetic metal forming exerts high pressure on conductive metals causing their elastic limits to be exceeded. (G-general; Al, Cu, 4-55, 4-60)

440-G. Stampings for the Space Age... by Explosive Forming. G. C. Throner and I. Lieberman. Tool and Manufacturing Engineer, v. 46, May 1961, p. 123-126.

High-strength steels (Tricent, Vascojet-1000, AMS-6434), Unitemp M-252 alloy, AISI 6434 steel, AISI 4340 steel, 6Al-4V Ti alloy, Mg, Al and Al alloys are explosively formed, forged and trued. Explosive compaction is done on powdered ZrO_2, Ta, W, Mo, tungsten carbide with binder, Ta carbide, Be and other refractory metals. (G-general, NM-k34)

441-G. Milling High-Strength Alloys. Tool and Manufacturing Engineer, v. 46, May 1961, p. 127-128.

Data from the machining of space vehicle components are to develop speed-and-feed charts for face milling, side milling, slotting and end milling. Data

are given for martensitic low-alloy steel, hot work die steel, austenitic stainless steel, martensitic stainless steel, Ni-base and Co-base high-temperature alloys and Ti. (G17b; AY, Co-b, Ni-b, SS, Ti, TS)

442-G. (Japanese.) The Life of Grinding Wheels. Hideichi Makino, Shozo Suzuki and Hosei Noguchi. Journal of Mechanical Laboratory (Japan), v. 15, Jan. 1961, p. 1-9.

Cylindrical grinding tests on S45C carbon steel of Rc. 40 hardness using a WA54 LMV grinding wheel on a universal grinder with emulsion cooling. Effect of machine rigidity on grinding action and subsequent wheel wear. (G18g; CN)

443-G. Tool Life Versus Machine Capacity. A. Incardona and H. H. Poett. Production, v. 47, May 1961, p. 54-55.

Machining of free-cutting steels, carbon steels, alloy steels, stainless steels, cast iron, Al, Mg, Ti alloy, brass, bronze, Monel and Inconel with disposable carbide tools to produce experimental missile parts. Measurements to determine effect of cutting speed, feed rate, depth of cut and lubrication on tool life. (G17, T24e; Al, Cu-b, Mg, Ni-b, ST, Ti-b)

444-G. High Speed Machining. Production, v. 47, May 1961, p. 64.

High-speed machining of Al using boring mill, knee mill, duplex mill and air turbine spindle with carbide tools. Data for effect of cutting speed and feed rate on tool life and chip load. (G17; Al)

445-G. Flame-Straightening Restores Fire Distorted Steel. Welding Engineer, v. 46, May 1961, p. 80, 82.

Structural steel members distorted as much as 3 ft. laterally have been flame straightened in place using an oxy-acetylene heating torch and a hydraulic jack. (G22g; ST, 4-57)

446-G. Improvement of Fatigue Life of Aircraft Components by Coining. A. Phillips. American Society of Mechanical Engineers, Paper no. 61-AV-35, 1961, 5 p.

Improvement of service life in structural aircraft components is achieved by coining a process which produces compressive residual stress adjacent to holes, slots or notched edges in a structural member. (G3n, Q7b, T24)

447-G. Explosive Metal Forming Comes of Age. G. C. Throner. American Society of Mechanical Engineers, Paper no. 61-AV-37, 1961, 7 p.

Discussion of advances in explosive cutting, piercing and swaging processes and high-energy compaction to fabrication of large, solid-fuel rocket engine components. (G-general, NM-k34, T24b)

448-G. (Dutch.) Manufacture of Screws, Bolts and Nuts. J. H. Meulman. Metaalbewerking, v. 26, Feb. 2, 1961, p. 301-303.

Cold upsetting of steel screw and bolt heads. Examination of macrostructure during various stages of deformation. (G10p, M28k, T7f; ST, 17-57)

449-G. Advanced Fabrication Techniques. R. Garcey, J. Glyman and E. Green. American Society of Mechanical Engineers, Paper no. 61-AV-13,1961, 19 p.

Advantages, applications and economics of filament winding, explosive forming and furnace brazing techniques used in fabricating missile components. (G-general, NM-k34, K8j, T24e)

450-G. New Ways of Cutting Metal. David Fishlock. South African Mining and Engineering Journal, v. 72, Mar. 17, 1961, p. 605, 607, 609.

Review of chemical, electrical and explosive methods for cutting and shaping alloys of Fe, Al, Mg, Ti, Cu, Zr and Mo including chemical milling, electromachining, electro-erosion, spark erosion, explosive forming and spark forming. (G-general, G24; Fe-b, Al-b, Mg-b, Ti-b, Cu-b, Zr-b, Mo-b, NM-k34, 17-57)

451-G. Copper-Base Extrusions. Precision Metal Molding, v. 19, May 1961, p. 35-39.

Data given for machinability rating, surface finish, corrosion resistance, thermal and electrical conductivity of Cu-base extrusions. (G17k, P15g, P11h, R-general; Cu, 4-58)

452-G. Machining AM350, Solution Treated and Aged to Bhn 444. Metal Progress, v. 79, May 1961, p. 96B.

Tabulated data on turning, milling, drilling and tapping. (G17; ST)

453-G. Fabrication Studies on Columbium Alloy Sheet. Andrew F. Frabold and Steven Bank. Metal Progress, v. 79, May 1961, p. 103-107.

Preliminary tests indicate that D-31 sheet (10% Mo, 10% Ti) has relatively good formability; its machining characteristics are similar to austenitic stainless steel. The alloy has fair bendability but its weldability leaves much to be desired. The material can be sheared cold; it can be dimpled at 500° F. but not at room temperature. (G-general, G17k, K9s, Q23q; Cb-b, 4-53)

454-G. (German.) Evaluation of Characteristic Data for Crank Presses and Drawing Presses With Over 200 Tons Pressing Power. Wolfgang Sibbe and Max Lang. Fertigungstechnik und Betrieb, v. 11, Feb. 1961, p. 90-95.

Time analysis for various forming operations in pressing steel sheet for auto parts by crank and drawing presses. (G4d, 1-52; ST, 4-53)

455-G. Quiet Revolution in Metalworking. H. Dale Long. Industrial Research, v. 3, Apr-May 1961, p. 59-65.

Machining and forming methods used in fabricating superhard alloys for aircraft and missile components, automotive parts and appliances including hot and cold machining, explosive forming and electrolytic machining methods. Application of numerical control to precision drilling, grinding and boring operations and use of harder and more heat resistant cutting tools at higher speeds. (G-general, G17, G24, T-general, 3-67; SGB-q, NM-k34, 17-57)

456-G. Metalworking. Pt. 1. Machining. OTS Selective Bibliography SB-460, 24 p. (Available from U. S. Office of Technical Services, Washington 25, D. C.) $.10.

Bibliography lists research reports of the Army, Navy, Air Force, Atomic Energy Commission and other government agencies as well as foreign technical literature on unconventional machining methods, shop practices, automation and controls, welding, soldering and brazing. (G17, K-general)

457-G. Chatter Patterns Formed on the Surface of Thin Cylindrical Tubes During Machining. R. N. Arnold. Journal of Mechanical Engineering Science, v. 3, Mar. 1961, p. 7-14.

Effect of self-induced and forced vibrations during machining on recurring surface patterns on specimen steel tubes. Measurement of chatter vibration mode, frequency and amplitude as a function of cutting depth, speed and force, tube geometry, density, Poission's ratio and Young's modulus. (G17; ST, 4-60)

458-G. Chipless Machining. Pt. 1. Clifford P. Farr. Canadian Metalworking, v. 24, May 1961, p. 46-47.

Review of the metallurgical aspects of cold working metals, particularly steel. Analysis of resistance to deformation measured in terms of strength, plasticity, ductility, malleability, elasticity and stress-strain relations. (G-general, Q23q, Q-general, 1-67, 10-54; ST)

459-G. (Translation.) Increasing the Effectiveness of Honing. N. I. Goraetskii. Machines and Tooling, v. 31, Nov. 1960, p. 13-15. (Translated from Stanki i Instrument, Nov. 1960.)

An increase in working area, specific pressures and hardness of honing stones improves the effectiveness of honing gray iron and steel. 5 ref. (G19; CI-n, ST)

460-G. (Translation.) Effect of the Built-Up Edge on a Cutter on the Surface Quality of Aluminum Alloys. V. B. Livshits. Machines and Tooling, v. 31, Nov. 1960, p. 29-31. (Translated from Stanki i Instrument, Nov. 1960.)

Effect of thermal conductivity of Al alloy on the active edge formation on a cutter. 3 ref. (G17; Al-b)

461-G. Cold Forming of Steels. Australasian Manufacturer, v. 46, Apr. 8, 1961, p. 44-46, 48-51.

Forming of steel components in closed dies similar to those used for hot forging. Advantages of hydraulic presses. Production of pellets, billets and preforms. (G-general, 1-67; ST)

462-G. Developments in Metal Spinning. Metal Industry, v. 98, Apr. 28, 1961, p. 335.

Spinning of Al black iron and carbon steel components by an electrohydraulic spinning lathe. (G13; Al, CI-s, CN)

463-G. Typical Machining Operations on Aluminium Cylinder Heads. Machinery (London), v. 98, May 3, 1961, p. 1000-1005.

Machining of gravity die cast Al cylder heads on a line which performs milling, drilling and boring operations. (G17, T21b; Al, 5-61, 17-57)

464-G. Step-by-Step Controls Pay Off in Machining Hi-Temp Alloys. Iron Age, v. 187, May 18, 1961, p. 142-143.

Stainless steel, hot work die steel and heat resistant alloys are machined, milled and tested. Hardness, tolerance, thickness and taper determined. (G17; SS, TS, SGA-h)

465-G. High-Impact Metal Forming, 1957-1960. A. A. Beltran. Lockheed Aircraft Corp. U. S. Office of Technical Services, PB 171379, July 1960, 37 p. $1.

List of references relating to explosive forming, hydrospark forming, electro-discharge machining, impact extruding and the firing of bolts into metals. (G-general)

466-G. HE Spark-Forming Moves Into Production. Metalworking Production, v. 105, May 3, 1961, p. 49-50.

High energy electrospark process is applied to instantaneous formation of Al, stainless and high strength steel, Ti, Cb and Be-Cu missile and automotive parts, using a high voltage, underwater discharge to force the metal into the die. (G24a, T21, T24e; Al, Cu-b, Cb, ST, Ti, 17-57)

467-G. Tap and Deburr in One Operation. Metalworking Production, v. 105, May 3, 1961, p. 65.

Removal of burrs from tapped holes in materials such as Al, cast iron, steel, brass, Cu and plastics, as the tap is withdrawn using attachments to the tap shank, including a chamfering bit, bit body, compression spring and collar. (G17f; Al, CI, ST, Cu-b, NM-d37)

468-G. Maskants for Chemical Milling. Henry M. Deutsch. Materials in Design Engineering, v. 53, May 1961, p. 128-130, 241.

Comparison of elastomeric and plastic maskants as to chemical and heat resistance. Methods of applying maskants. Choice of maskant for Al alloys, ferrous metals, Ti and Mg. (G24b; Al-b, Fe-b, Mg, Ti)

469-G. (German.) Importance of Flow Spinning. Herbert Jacob. Fertigungstechnik und Betrieb, v. 11, Mar. 1961, p. 188-190.

Principles and technological parameters for production of small and medium-size symmetric metal and alloy parts by continuous spinning. Tool design and mode of operation for forming a X 10 CrNiMoTi 18 10 steel. (G13; ST)

470-G. (German.) Deformation in Sheet Working. Pt. 2. G. Oehler. Fertigungstechnik und Betrieb, v. 11, Mar. 1961, p. 190-193.

Methods for evaluating deformation mechanisms by marking sheet surface with reference figures (circles and coordinates). Experimental evaluation of deep drawing force and of favorable blank forms for drawing. (G4b, G25, Q24; 4-53)

471-G. (German.) Sheet Cutting With Zinc Alloy Tools. Fritz Keller. Fertigungstechnik und Betrieb, v. 11, Mar. 1961, p. 197-200.

Use of steel mandrel and cast or rolled Zn alloy cutting plate (3.5-4.5% Al, 2.5-3.75% Cu, 0-1.25% Mg, bal. Zn) in cutting or punching of brass, Al-Cu-Mg alloy and steel sheet. Design, physical and mechanical properties and lifetime of cutting tools. (G2, T6n; Zn-b, 17-57, Al-b, Cu-n, ST, 4-53)

472-G. How to Design Rolled Worms. Metalworking Production, v. 105, Apr. 26, 1961, p. 51-56.

Factors affecting design of roll threaded worms including pressure angle, root and corner crest radii, die edges, blank design, thread blank chamfers and material selection, in particular, EN8, 12 and 362 steels. (G12; ST)

473-G. Small Hole Gun Drilling of Superalloys. D. A. Stewart. Society of Automotive Engineers, Paper no. 340K, 1961, 3 p.

Superalloys U-500, U-700 and DCM are drilled horizontally on a milling machine. Data are given for cutting speed, feed rate and gun geometry. (G17e; SGA-h)

474-G. Shearforming 7075 Aluminum. C. E. Howle and Frank Jacobs. Society of Automotive Engineers, Paper no. 340B, 1961, 5 p.

Mechanical properties of 7075 Al alloy as affected by shearforming. Data are presented to illustrate this effect. Use of equipment. 4 ref. (G11; Al-b)

475-G. Applications of the Plasma Arc in Fabrication. R. L. O'Brien. Society of Automotive Engineers, Paper no. 340H, 1961, 6 p.

Use of plasma arc process in cutting, plating and weld surfacing nonferrous metals, stainless steel, carbon steel and high-strength alloys such as RENE 41 and Hastelloy B. (G22h, L29, K6; CN, SS, SGB-a, EG-a38)

476-G. Distortion and Residual Surface Stress in Grinding and Milling of High Strength Steels. L. J. Nowikowski, John Maranchik, Jr. and Michael Field. Society of Automotive Engineers, Paper no. 340L, 1961, 9 p.

Residual stress and resulting distortion is reduced by controlling the machining and grinding conditions. Data are given for determining the nature and magnitude of stresses which produce distortion. (G17b, G18, 9-74; ST, SGB-a)

477-G. Hot Machining of High Temperature Alloys Can Increase Production. Jens L. Wennberg, Clarence L. Mehl and E. J. Krabacher. Society of Automotive Engineers, Paper no. 340J, 1961, 9 p.

High-strength thermal resistant materials and refractory alloys are heated at the time of machining to obtain maximum tool life. Data show effect of elevated temperature on the workpiece. (G17, 1-66; SGA-h)

478-G. (German.) Production of Small Drawing Parts in Plate-Guided Follow-On Tools. Heinz Kuckenberg. Werkstatt und Betrieb, v. 94, Mar. 1961, p. 159-161.

Design of tools and operational sequences for deep drawing of small parts of Ni, Al-plated soft steel and special deep drawing steel sheet without use of multiple-die presses. (G4, W24n, 1-52; Ni-b, ST, 4-53)

479-G. (Translation.) Effect of Ultrasonic Vibrations in Machining Creep Resistant Alloys. A. A. Voronin and A. I. Markov. Machine and Tooling, v. 31, Nov. 1960, p. 15-18. (Translated from Stanki i Instrument, Nov. 1960.)

Effect of high-frequency vibration on metal chip plastic deformation, tool wear, friction, fatigue, cutting force and surface finish during turning, cutting and grinding of high-speed steels, cemented carbides and Ti alloys. (G17, 1-74; TS-m, Ti-b, 6-69)

480-G. (English.) Buckling Limits of Tool Dimensions in Cupping Operation. Matsuo Miyagawa. Tokyo Metropolitan University, Faculty of Technology, Memoirs, Sept. 1959, 14 p.

Effect of the relation between relative thickness ratio and drawing ratio on the wrinkling limits during cupping of killed steel, 70-30 brass, soft and half hard Al, annealed Cu and soft steel. 23 ref. (G4c; Al, CN, Cu-n)

481-G. Fundamentals of Drawability of Sheet Steel. J. W. Frame, R. L. Whiteley and D. J. Blickwede. Paper from "Porcelain Enamel Institute Forum, Proceedings". v. 22. Porcelain Enamel Institute, Inc., Washington 6, D. C., 1960, p. 18-24.

Discussion of punch stretching and die drawing operations involved in deep drawing of sheet steel. Some measure of the drawability of steel can be determined from its elongation and anisotropy. (G4, 17-52; ST, 4-53)

482-G. Properties and Control of Drawing Compounds for Deep Drawing. A. Fucinari and W. J. Wojtowicz. Paper from "Porcelain Enamel Institute Forum, Proceedings". v. 22. Porcelain Enamel Institute, Inc., Washington 6, D. C., 1960, p. 26-30.

Oil, emulsion or dry film lubrication of cold rolled steel, stainless steel, galvanized Fe, enameling Fe, Al or terne plate before deep drawing. (G4b, 18-73; Al, Fe, SS)

483-G. Hot Ingot Milling Machine. Engineer, v. 21, Apr. 28, 1961, p. 719-720.

Hot milling of steel ingots to remove superficial defects such as cracks, cold laps, inclusions, oxides and other impurities. (G17b, 1-66; ST, 5-59)

484-G. Titanium Formed 98% Faster With Hot Dies. Steel, v. 148, May 22, 1961, p. 121.

Hot die forming of 8% Mn, Ti alloy channel rings. Die used is AISI H-13 hot work toolsteel heat treated to Rockwell C-49. (G-general, 1-66; Ti-b)

485-G. A New Test Method for Determination of Spinnability of Metals. Richard L.

Kegg. Journal of Engineering for Industry (ASME, Transactions), Series B, May 1961, p. 119-124.

Measurement of the effect of tensile area reduction on spinnability and of tensile elongation on maximum spinning strain during the spinning of Al alloys, stainless steels, cast iron, Cu and steels on ellipsoidal mandrels. (G13; Al-b, CI, Cu, ST)

486-G. On the Mechanics of Shear Spinning. Serope Kalpakcioglu. Journal of Engineering for Industry (ASME, Transactions), Series B, May 1961, p. 125-130.

Measurement of stress-strain rate, specific energy, tangential force, hardness distribution and metal flow pattern during the shear spinning of Cu, Al alloys, stainless steel and steel on conical mandrels. (G13; Al-b, Cu, ST)

487-G. Machinability of Nodular Cast Irons. Pt. 1. Tool Forces and Flank Adhesion. I. Ham, K. Hitomi and G. L. Thuering. Journal of Engineering for Industry (ASME, Transactions), Series B, May 1961, p. 142-154.

Testing of three nodular cast iron grades (60, 80 and 100) to determine the cutting and feed forces required to machine the materials and the performance of several grades of carbide and oxide cutting tools and to investigate the flank adhesion phenomenon. (G17k; CI-r)

488-G. Free Machining Steel. Pt. 1. Tool-Life Characteristics of Resulfurized Steel. M. C. Shaw, N. H. Cook and P. A. Smith. Journal of Engineering for Industry (ASME, Transactions), Series B, May 1961, p. 163-174.

Testing five steels with sulphur content of 0.33-0.37% to determine effect of cutting speed, cutting fluid, sulphur content and cold working on tool life and tool wear during machining with carbide tools and high-speed steel tools. (G17; ST, SGA-k)

489-G. Free Machining Steel. Pt. 2. Tool-Life Characteristics of Leaded Steel. M. C. Shaw, P. A. Smith and N. H. Cook. Journal of Engineering for Industry (ASME, Transactions), Series B, May 1961, p. 175-180.

Measurement of high-speed steel tool life with relation to cutting speed, feed, cutting fluid and cold working during the machining of hot rolled, leaded and non-leaded steels. (G17; ST)

490-G. Free Machining Steel. Pt. 3. Cutting Forces; Surface Finish and Chip Formation. M. C. Shaw, E. Usui and P. A. Smith. Journal of Engineering for Industry (ASME, Transactions), Series B, May 1961, p. 181-193.

Testing of low-carbon steels, leaded steels and resulphurized steels during machining with high-speed steel tools to determine effect of lubrication with MnS, water, air, Pb, graphite, Al_2O_3, molybdenum disulphide and mineral oil on friction force and to determine effect of cutting speed and cutting feed on cutting force, surface temperature and chip temperature. (G17; ST)

491-G. An Experimental Investigation of the Electrolytic Grinding Process. Reno R. Cole. Journal of Engineering for Industry (ASME, Transactions), Series B, May 1961, p. 194-201.

Measurement of effect of electrolyte flow, electrolyte concentration, grinding pressure and current density on metal removal rate during the grinding of hot rolled carbon steel with a phosphor bronze diamond wheel using a water solution of potassium nitrate for an electrolyte. Calculation of Faraday current efficiency. (G18, G24d; CN)

492-G. Explosives in Metal Working. R. E. Leyman. Australian Machinery and Production Engineering, v. 14, Mar. 1961, p. 21-23.

Advantages and disadvantages of explosive forming for sheet steel and Al. Shock hardening of metals. (G-general, NM-k34; Al, ST, 4-53)

493-G. Tube Grinding and Finishing Operations. John E. Hyler. Australian Machinery and Production Engineering, v. 14, Mar. 1961, p. 28-29.

Description of an internal tube grinding and polishing machine and an abrasive-belt centerless grinder for external operations. (G18, L-general, 1-52; 4-60)

494-G. "Chipless" Tapping: The Cold Forming of Internal Threads. Andrew E. Rylander. Western Machinery and Steel World, v. 52, May 1961, p. 46-47.

Review of process for cold forming internal threads on drill tools by metal displacement. Tabular data on tap drill size selection. (G-general, 1-67, W25p)

495-G. Machining Stainless Steel: Tricks of the Trade for Single and Multiple-Spindle Automatics. Western Machinery and Steel World, v. 52, May 1961, p. 64-65.

Drilling, tapping and grinding procedures for the efficient production machining of stainless steel with single and multiple-spindle automatics. (G17, G18, 1-53; SS)

496-G. Electro-Chemical Machining of Refractory Alloys. W. B. Stephenson, Jr. Modern Machine Shop, v. 34, June 1961, p. 102-109.

Rapid rate of stock removal is achieved in electrochemical machining of blade and bucket airfoils composed of M-252 superalloy. Successful machining is dependent on accurate temperature control of solution. (G24d, T24; SGA-h)

497-G. Machining Missile Parts to Tolerances of 25 Millionths. Gilbert C. Close. Modern Machine Shop, v. 34, June 1961, p. 118-122.

Al and Mg components are machined to close tolerances in controlled air atmosphere of a specially designed cleanroom. (G17, T24e; Al, Mg, 17-57)

498-G. Drilling Close Tolerance High Finish Holes. C. B. Weidner. Modern Machine Shop, v. 34, June 1961, p. 136-139.

Technique for drilling Al tube sheet assemblies to intricate specifications and high-quality finishes while preserving tool life. (G17e; Al, 4-53, 4-60)

499-G. How Shot Peening Improves Solid Shafts. Power Drive Engineering, v. 3, Apr-May 1961, p. 16.

Combination of shot peening and heat treating improves torsional rigidity and fatigue life of solid steel shafts used as automobile rear axles and motor shafts. Comparison with hollow shafts. (G23n, T21c; ST)

500-G. Evaluation of Numerically Controlled Machining of Forging Dies. A. H. Swift. Wyman-Gordon Co. U. S. Office of Technical Services, PB 171378, Sept. 1960, 71 p. $2.

Superior finish, consistent repeatability and greater accuracy are displayed by numerically controlled machining of forging dies, as contrasted to conventional machining methods. (G17, W24n, 18-74)

501-G. Explosive Forming. James P. Orr. SAE (Society of Automotive Engineers) Journal, v. 69, June 1961, p. 57-59.

High-temperature explosive forming of Mo, Ti and other refractory metal at 1200° F. using concrete, kirksite or ductile iron dies. (G-general; EG-d37, Mo, Ti, NM-k34, 17-57)

502-G. Natural Gas Hot Knife Precision Cuts Steel. Arthur Q. Smith. Industrial Gas, v. 39, May 1961, p. 3-4.

Natural gas torch cuts through over 2 ft. of steel. Material is preheated to its kindling temperature and then rapidly oxidized by means of an oxygen stream issuing from the torch. (G22g, 1-52; ST)

503-G. Precision Profile Grinding of Split Die Blocks. Oscar Loeffler. American Machinist/Metalworking Manufacturing, v. 105, May 15, 1961, p. 134-136.

Photographic reduction technique applied in profile grinding of split die blocks, lathe and screw-machine tools using a modified Deckel FP 1 universal punch-milling machine with a combination of optical system (microscope, camera) and pantograph. (G17b, G18m, T6n)

504-G. How Energy-Rate Replaces Force in Exotic Processes. William M. Stocker, Jr. American Machinist/Metalworking Manufacturing, v. 105, May 15, 1961, p. 139-140.

Review of the principles involved in traditional metalworking processes which depend upon mechanical energy or force and the new high-energy-rate processes which depend upon the rate of energy release. These new high-energy-rate processes improve metalworking and manufacturing capabilities by using electrical techniques and magnetic forces. (G-general, 10-54; NM-k34, 17-57)

505-G. The "Secret" of Volkswagen. Anderson Ashburn. American Machinist/Metalworking Manufacturing, v. 105, May 15, 1961, p. 141-145.

Rapid production of Volkswagen automobiles accomplished by a new manufacturing operation which includes circular production lines, highly-automated press lines with integrated welding

stations, transfer lines to machine Mg crankcases and a foundry for shell molding of cylinders and die casting Mg, Al and Zn. (G-general, E-general, K-general, T24, 18-67; Al-b, Mg-b, Zn-b, 17-57)

506-G. Four-Slide Forming--Picked for High Speed, Low Cost. John J. Pascale. Metalworking, v. 17, May 1961, p. 71-73.

Al clad steel strip electron-tube plates are produced by a four-slide forming machine that embosses, outlines, forms and stitches in one operation. (G-general, G3p, 1-52, T1j; ST, Al, 4-53, 17-57)

507-G. Cold-Forming the Stainless Steels. W. L. Keene. Metalworking, v. 17, May 1961, p. 74-77.

Selection of methods and equipment for fabrication of the 200, 300 and 400 series stainless steels. Consideration of drop hammer, bulge, stretch and "Guerin" or trapped rubber forming processes. (G-general, 1-67, W24; SS)

508-G. Metalforming Using Explosive Charges. G. G. M. Carr-Harris. Technical Information, National Research Council, Ottawa, Canada, TIS Report no. 74, Mar. 1961, 11 p.

Review of the literature covering explosive forming principles, methods, materials and applications. A selected bibliography includes cupping, forging, shearing, stamping, press forming, welding and hardening of Mn alloy steel, stainless steel, Al, Ti and superalloys with references to powder metal compacting. (G-general, 10-54, 11-65; ST, Al, Ti, SGA-h, NM-k34, 17-57)

509-G. Corrugating Machine for Super Alloys. Sheet Metal Industries, v. 38, May 1961, p. 334, 348.

Corrugation of heat and thermal stress resistant Ni and Co base alloys for aircraft applications using a combined clamp and vacuum chuck to hold the flat sheet material against the die located between closing tables. (G11, 1-52, T24; SGA-h, Ni, Co, 17-57)

510-G. Cold Extrusion of Small Symmetrical and Asymmetrical Components. O. May. Sheet Metal Industries, v. 38, May 1961, p. 335-340, 348.

Cold extrusion of steel and Al alloy sheets using a slow flow press having a ram speed that is much slower than that of the equivalent eccentric press. The accuracy and precision of the extrusions are determined as functions of flow phenomena such as flow resistance, cross-sectional area of flow, flow speed and speed of deformation. (G5, 1-52; Al-b, ST, 4-53)

511-G. Anisotropy as an Asset for Good Drawability. R. L. Whiteley, D. E. Wise and D. J. Blickwede. Sheet Metal Industries, v. 38, May 1961, p. 349-353, 358.

Correlation between the drawing capacity and plastic anisotropy of killed steel, rimmed steel, 430 and 301 stainless steel, 2S and 52S Al alloys, Cu, 35/65 brass and mild steel as determined by measuring the strain ratio. (G4, 3-68, 3-72, 17-52; ST, Al-b, Cu-b)

512-G. Fabricating Stainless-Steel Bellows. Sheet Metal Industries, v. 38, May 1961, p. 354-355.

Production of bellows from stainless steel or Monel metal sheet by cutting, rolling, seam welding with an argon arc welding machine, polishing and grinding with heat treatment before and after forming for retention of ductility. The finished product is hydraulically inspected. (G-general, J1a, K3p; SS-e, Ni-b, 4-53)

513-G. Splines Hobbed on Six Spindle Automatic. Steel, v. 148, May 29, 1961, p. 73.

Secondary spline hobbing operation for wringer rolls is incorporated into the primary setup on a multiple spindle automatic bar machine by means of a special attachment. Total machining time is cut from 73 sec. to 27.9 sec. (G17b, 1-52)

514-G. Tooling Up a Stainless Balloon. H. M. Edwards and W. P. McGregor. Metalworking Production, v. 105, May 17, 1961, p. 75-77.

Fabrication of fuel tanks of 10 ft. diameter from stainless steel with a skin thickness up to 0.04 in. for use at high internal pressure in the Atlas missile. Tooling operations involve trimming of external and internal skin assemblies, rolling, butt welding, spot welding, roll-spot welding and external

bracketry welding. (G-general, K-general, T24e; SS, 17-57)

515-G. Flute Milling by Tracer Control. Metalworking Production, v. 105, May 17, 1961, p. 78-79.

A hydraulic copying device, located on the Wyssbrod "V" flute miller in place of the usual change wheels, is used for cutting spiral flutes of high-speed steel. The device provides for milling flutes on taper or other form tools and all settings for helix angles are obtained by adjusting the movable milling head. (G17b, T7n, 1-52; TS-m)

516-G. Grinding Wheels in the Foundry Industry. S. M. Gray. British Foundryman, v. 54, May 1961, p. 239-243.

Reinforced resinoid grinding wheels are used to grind malleable iron castings before or after foundry annealing and to remove remnants of risers from castings. Control and arrangement of abrasive grits, binder and pores or air spaces regulate the grinding action of the tool. (G18, W25c, 17-57; CI-s)

517-G. Understanding the Four-Slide Process. C. J. Labonack. Machine and Tool Blue Book, v. 56, June 1961, p. 102-111.

Review of forming operations on a four-slide machine involving separate tool blocks for each bend or form needed. Survey of tooling equipment for piercing, blanking, coining, flattening and similar operations on flat stock. Application to production of small parts from 1010 steel. (G1, 1-52; ST, 4-53)

518-G. What's So Different About High Speed Machining? Machine and Tool Blue Book, v. 56, June 1961, p. 112-115.

Evaluation of high-speed machining in terms of improvement of finish and increased production rates on ferrous and nonferrous metals. Effect of rate of metal removal, heat generation and other cutting variables in tool life. (G17, 3-67)

519-G. Ultrasonic Machining. L. C. Miller. Machine and Tool Blue Book, v. 56, June 1961, p. 117-119.

Ultrasonic machining used for cutting extremely hard and difficult materials such as sapphire, quartz, glass, tungsten carbide, Ge, Si and ferrite. Discussion of principles and technology of the process. (G24c)

520-G. Laminated Plastics Cut Short-Run Die Costs. Robert F. Gieger. Machine and Tool Blue Book, v. 56, June 1961, p. 120-122.

Laminated plastic dies are used for high-pressure rubber pad forming of intricate Al parts for aircraft with good preservation of the high-mill finish on the workpiece. (G14a, T24a, W24n; Al, NM-d, 17-57)

521-G. New Finishing Technique Improves an Established Tool's Performance. Colin Sharp. Machine and Tool Blue Book, v. 56, June 1961, p. 123-125.

Steel metal slitting saws are cold finished by a grinding process, Superfinishing, which results in smooth, hard surfaces with increased stability. (G18, T6n; ST, 17-57)

522-G. This Tooling Permits Deep Box Forming on a Press Brake. Morton J. Schultz. Machine and Tool Blue Book, v. 56, June 1961, p. 146-147.

Al and steel sheet is formed into deep boxes on a press brake using an adapter which accepts standard "V" dies and punches, eliminating the need for special tools and setups. (G4d; Al, ST, 4-53)

523-G. Chipless Machining--Pneumatic-Mechanical Process. Charles H. Wick. Machine and Tool Blue Book, v. 56, June 1961, p. 149-151.

Carbon, alloy and stainless steels, Al alloys, Cu, Ti and refractory metals are formed by a high-velocity process using compressed nitrogen at 2000 psi. pressure in Dynapak machines. Smooth surface finishes and improved microstructure result from grain refinement and uniform dispersal of carbides in the workpiece. (G-general, 1-70; ST, Al-b, Cu, Ti, EG-d37)

524-G. Free-Machining Aluminium. Pt. 21. Aluminium in Practice. Aluminium Courier, no. 53, Mar. 1961, p. 21-22.

Al-5.5% Cu alloy containing small amounts of Pb and Bi produces small chips rather than swarf when machined and, therefore, can be machined at high speeds. Owing to the high thermal conductivity of the alloy, heat is rapidly carried away from the tool edge, thus decreasing tool wear. (G17; Al-b, Cu)

525-G. High-Speed Machining of Non-ferrous Metal Parts. Machinery, v. 67, May 1961, p. 167-168.

Design data for machining with cutter speeds of 5000-10,000 surface ft. per min. with attention to variation of chip load with speed rate, use of coolants and influence of high speeds on tool life and on heat production. (G17, 3-67; EG-a38)

526-G. The Fluid-Form Process. Hugo Moller. Production Engineer, v. 40, May 1961, p. 325-335.

Forming of irregular shapes from sheets of low-carbon steel, 18-8 stainless steel, Nimonic or Al with fluid-form process using metal or plastic dies and a hydraulic press to eliminate springback. (G-general, 1-70; Al, CN, Ni-b, SS)

527-G. Cutting Honeycomb With Quenched Arc. Australasian Manufacturer, v. 46, Apr. 15, 1961, p. 37-38, 42.

Cutting of honeycomb composed of stainless steel, Ti, Al and Zr at rates up to 200 sq. in. per min. with quenched arc band saw machines using hydraulic operated feed tables. (G22h; Al, SS, Ti, Zr)

528-G. Titanium Usage Increases B & P Experienced in Forming and Assembly. Magnesium Products, May 1961, p. 4-8.

Formation of components for missiles and rockets, cryogenic pressure vessels and storage tanks for cryogenic fuels by hot deep drawing and hot forming 6% Al 4% V Ti alloy, 7% Al 4% Mo Ti alloy, 5% Al 2.5% Sn Ti alloy, 13% V 11% Cr 3% Al Ti alloy and A-110 AT Ti alloys. (G4b, G-general, 1-66, T24e, T26; Ti-b)

529-G. Surface Grinder Replaces Shaper. William W. Wilson. Grinding and Finishing, v. 7, May 1961, p. 47.

Grip block teeth for tensile testing machines are surface ground using a wide vitrified Al_2O_3 wheel. Oxidation, warpage and tooth breakage are eliminated. (G18k)

530-G. Loading Buildup--Stopped. Grinding and Finishing, v. 7, May 1961, p. 52-53.

Design of a new ultrasonic attachment which reduces loading build-up during surface grinding. Results include less wheel dressing, extended wheel life, increased finish and greater productivity. (G18k, 1-74)

531-G. Some Aspects of Marine Engine Building Practice. A. W. Astrop. Machinery (London), v. 98, May 17, 1961, p. 1127-1132.

Facing, shaving, hobbing, boring, milling and grinding operations performed on cast iron and forged steel in the production of gears, blocks, bearings and rods for diesel engines. (G-general, W11j; CI, ST, 17-57)

532-G. Flame Cutting as a Production Tool. Australian Machinery and Production Engineering, v. 14, Apr. 1961, p. 21-23, 25, 27, 29.

Oxy-acetylene flame is used to cut steel plates, structural sections and heavy forgings. Fabrication of metals with oxy-acetylene using hand-cutting blowpipes and flame profiling machines. High-quality cuts are made with great accuracy and speed. (G22g; ST, 4-51, 4-53, 4-57)

533-G. Machining the Astro-Metal--Pure Beryllium. Laurence W. Collins, Jr. Machinery, v. 67, June 1961, p. 93-97.

Machining techniques for Be, taking into account the need for salvaging chips and preventing oxidation. Mechanical properties of Be. Physical properties as compared with those of other common structural metals. (G17; Be)

534-G. Different-Sized Parts Lapped in Multiple Quantities. Harry C. Gunetti. Machinery, v. 67, June 1961, p. 113-117.

Finishing of Nitralloy, carbon steel, tungsten carbide, stainless steel and Stellite components within tolerances of 0.000005 in. in flatness using a semi-automatic lapping machine. (G19p; CN, Co-b, SS, 14-68)

535-G. Double-Disc Grinding Proves Boon to Instrument Making. Machinery, v. 67, June 1961, p. 138-139.

Gear-box housings for missile computers are face-ground from Al plates on a horizontal-spindle disc grinder. (G18, T24e; Al, 4-53)

536-G. (Dutch.) Cold Forming. J. L. Remmerswaal. Metaalbewerking, v. 26, Mar. 16, 1961, p. 370-372.

Effect of shape and design of iron and steel castings on the force needed in embossing with attention to dimensional precision as a function of thickness. Consideration of rolling as a finishing operation on castings. (G-general, 1-67; Fe-b, 5)

537-G. Grind Away Cutting Costs. Leo P. Tarasov and Richard H. Merritt. American Machinist/Metalworking Manufacturing, v. 105, May 29, 1961, p. 58-59.

Abrasive machining removes up to 1/4 in. of metal with a grinder, reduces setting-up and machining time and costs. Comparative analysis of machining costs for a gray iron motor base and a face plate machined by a cutting tool and an abrasive wheel. (G18, G17, 1-52; CI-n)

538-G. Giant Saw Cuts Giant Scrap. Irving Epstein. American Machinist/Metalworking Manufacturing, v. 105, May 29, 1961, p. 70-71.

Manganese bronze ship propellers weighing 14-30 ton. are cut into scrap by a 15 ft. high bandsaw constructed of standard structural members and set in a concrete pit 3 ft. deep within 1 ft. of railroad tracks. Work is mounted on a wheeled carriage running on the tracks. (G17h, 1-52, T22h; Cu-s, Mn, 17-57)

539-G. Machined and Finished Die-Castings. Metal Industry, v. 98, May 19, 1961, p. 391-393.

Description of machining and finishing operations for die castings of Zn and Al alloys. Drilling, broaching, polishing, plating, assembling and painting techniques. (G17, L17, L26n; Al-b, Zn-b, 5-61)

540-G. Off-Beat Fine Boring. Charles L. Whitaker. Metalworking Production, v. 105, May 24, 1961, p. 69, 71, 73.

Unusual application of fine boring machines to machine 370 lb. forged steel connecting rods for large-diameter thin-walled bearings and gun drilling operations. (G17d; ST)

541-G. How Explosives Form Space Age Parts. Steel, v. 148, June 5, 1961, p. 86-88.

Common steels, stainless steels, Ti, Al, Tricent, Vascojet 1000, AMS 6434, Unitemp M-252 and Mg are cut, swaged, flattened, pierced, contoured and clad. Zinc oxide, Ta, W, Mo, tungsten carbide, tantalum carbide and Be powders are compacted. (G-general, NM-k34)

542-G. (Book.) The Machining of Steel. 2nd Edition. F. C. Lea and Eric N. Simons. 1960. 208 p. Odhams Press Ltd., Long Acre, London, England. $5.50.

Turning, planning, shaping, milling, drilling, broaching, reaming, sawing, indexing and electrospark cutting with reference to cutting tools, coolants, speeds and feeds. Special treatment of austenitic manganese steel. (G17; ST)

543-G. Strain Strengthening of Type 304 Stainless Steel. Walter Hammer, Jr., Leonard Stemann and E. E. Weismantel. ASTM Preprint no. 83, 1961, 9 p.

Tensile cold straining procedures produce high-strength austenite bar materials. Compressive yield strength, tensile properties and hardness determined. (G-general, 1-67; SS)

544-G. (Dutch.) High-Velocity Deformation. P. J. M. Boes. Metaalbewerking, v. 26, Nov. 24, 1960, p. 214-216.

Extrusion of stainless and heat resistant steels, Ti and sintered Ni by a device making use of the sudden pressure increase of an enclosed gas. Explosive forming of 2-15.9 mm. thick steel sheet using a device where the explosive wave is produced by an electrical discharge of 40 x 10^{-6} sec. duration. (G-general, NM-k34; SS, SGA-h, Ni, Ti)

545-G. Explosive Metalworking. Charles C. Simons. Light Metal Age, v. 19, Feb. 1961, p. 4-8.

Principles, effect on material properties and applications of explosive forming. Explosive compaction of metal powders, explosive welding, applications of explosive techniques including surface hardening, cutting, forging and punching. (G-general, NM-k34, 17-57)

546-G. Machining by Spark Erosion. Australian Mechanical Engineering, v. 48, Mar. 6, 1961, p. 37-39.

Tough metals, including stellite, tungsten-carbide and magnet steel that are difficult to cut by conventional methods are machined by a closely controlled spark discharge which removes the metal by microexplosive dissolution. Three types of spark erosion machines are

discussed as to design and application. (G24a; Co-b, ST, SGA-n, W, 14-68)

547-G. (English.) A New Method of Hot Deep Drawing of Sheet Metals. Matsuo Miyagawa. Tokyo Metropolitan University, Faculty of Technology (Japan), Memoirs, no. 10, 1960, 10 p.

A high drawing rate during hot deep drawing of 52S, 24S and 3S Al alloys, soft brass and steel is obtained by preheating of the blank flanges and simultaneous cooling of the wall of the drawn cup. 11 ref. (G4b; Al-b, Cu-n, ST, 4-53)

548-G. Residual Stresses in Metal Cutting. L. V. Colwell. Chapter 17 from "Handbook of Mechanical Wear". University of Michigan Press, Ann Arbor, Mich., 1961, p. 403-442.

Influence of temperature, pressure, strain rate, strains, friction and other environmental conditions on metal cutting. Review of information regarding machining and grinding as causes of surface damage. Experimental evidence relating residual stresses to metal cutting processes. Thermal and mechanical mechanisms involved in creating residual stresses. 37 ref. (G17, 2-61, 3-74, 3-68, Q25h)

549-G. Abrasive Machining in the Space Age. B. R. McDonnell, Sr. Grinding and Finishing, v. 7, June 1961, p. 32-35.

Roughing, heat treating and finishing operations involved in abrasive machining of 52100 steel bar stock to produce a hydraulic sleeve and slider unit for a missile control system. (G17, T24e; ST)

550-G. How Grinding Replaced Planing. W. C. Simcox. Griding and Finishing, v. 7, June 1961, p. 43.

Surface grinding of hot rolled carbon steel plates for molds to remove scale and distortion. Improved parallelism and finish and reduced machining time result (G18k; CN, 4-53)

551-G. Cold Extrusions Forge Ahead. Iron Age, v. 187, June 15, 1961, p. 103-105.

Raw steel bars are cold forged into hollow shafts or solid form extrusions with varied heads and shafts. Tooling, degreasing, pickling, phosphating, lubrication and cropping operations. (G5; ST)

552-G. Five Steps to Optimum Machining. Steel, v. 148, June 12. 1961, p. 146.

Recommendations aimed at stepping up the productivity of numerically controlled machine tools. (G17)

553-G. (French.) Ultrasound Machining. Pratique des Industries Mecaniques, v. 47, Mar. 19, 1961, p. 57-62.

Cutting method in which the tool is vibrated at a frequency of 20-25 kcps. in an emulsion containing abrasives such as carbides of B, Si or Al in water. The method is applied to machining ferrites, Ge, graphite, hard metals, brass, 12% Cr-steel and toolsteel. (G24c; ST, Ge, Cu-n, SGB-q)

554-G. The Mecatorn Process of Metal-Spinning. Machinery (London), v. 98, May 31, 1961, p. 1248-1250.

Application of the metal spinning process to the production of a bulkhead penetrant seal ring from an 18 in. diameter blank of Monel. (G13; Ni-b)

555-G. Study of Forces Acting on a Turning Tool. E. Bickel. Microtechnic, v. 15, Apr. 1961, p. 39-43.

Investigation of forces affecting chip formation and wearing phenomena of turning tools including effects of relief face wear. Calculation of relief face force. 7 ref. (G17, Q9, T6n)

556-G. Measurement and Significance of Radial Forces in the Cutting Action of Twist Drills. G. Spur and G. Pahlitzsch. Microtechnic, v. 15, Apr. 1961, p. 47-59.

Cutting force components of torque, drill thrust and radial forces as functional factors in the cutting action of twist drill tools on alloy steels and cast iron. 9 ref. (G17e, T6n, 17-57; AY, CI)

557-G. (German.) Wire Bending. C. Hamann. Draht, v. 12, Apr. 1961, p. 155-160.

Design and operation of wire bending machines for production of single and double bend steel wire in manufacture of wire nets and heavy steel springs. (G6, 1-52; 4-61)

558-G. (French.) Spark-Machined Surfaces. A. T. Kravetz and T. Nicholas. Machine Moderne, v. 55, May 1961, p. 62-64.

Investigation of roughness and microstructure of the surface area of machined parts as influenced by machining energy, frequency of impulses and current density. Examination of spark-machined carbon steel with 0.42-0.49% C, toolsteel with 0.50-0.84% C, 0.15-0.8% Mn, 0.15-0.35% Si and 0-0.8% Cr and gray cast iron with 3.4-3.6% C. (G24a; CN)

559-G. (Book.) Grinding Stresses--Cause, Effect and Control. 1961. 81 p. Grinding Wheel Institute, 2130 Keith Bldg., Cleveland 15, Ohio.

Collection of papers on the effect of grinding parameters on residual stresses induced in steels of varying degrees of hardness. Stress relief by heat treatment and mechanical techniques. Effect of residual stress on fatigue strength. (G18, Q25h; ST)

560-G. Residual Grinding Stresses. M. W. Gormly. Paper from "Grinding Stresses--Cause, Effect and Control". Grinding Wheel Institute, Cleveland 15, 1961, p. 7-21.

Summary of research on grinding stresses as affected by depth of cut, metal hardness, wheel and work speed and wheel grade. Methods of stress relief. Effect of stress on fatigue strength of metals. 30 ref. (G18, Q25h)

561-G. Select Grinding Wheels to Produce Minimum Stresses. J. A. Mueller. Paper from "Grinding Stresses--Cause, Effect and Control". Grinding Wheel Institute, Cleveland 15, 1961, p. 23-26.

Relationships between grinding ratio and wheel grade are used to determine wheel efficiency during grinding of A2746T, 3145 and A4142 steels. (G18; ST)

562-G. Improving Reliability of Ground Parts by Avoiding Residual Stress. James E. Price. Paper from "Grinding Stresses--Cause, Effect and Control". Grinding Wheel Institute, Cleveland 15, 1961, p. 27-30.

Specimens of Mn oil-hardening toolsteel are test ground on a reciprocating table surface grinder to investigate the induced residual stress. Amount and kind of stress is determined by a deflection measurement. (G18k, Q25h; TS, Mn)

563-G. Residual Stresses Produced by Up Grinding and Down Grinding. John A. Mueller. Paper from "Grinding Stresses--Cause, Effect and Control". Grinding Wheel Institute, Cleveland 15, 1961, p. 31-34.

Results of grinding tests run on high-carbon, high-chromium 52100 steel and toolsteel hardened to Rc 62. In one instance work moves in the same direction as the wheel while in the other the wheel moves in the opposite direction to the work. 4 ref. (G18, Q25h; ST)

564-G. Successive Grinding Cuts--Do They Affect Residual Stresses? L. M. Kubsh. Paper from "Grinding Stresses--Cause, Effect and Control". Grinding Wheel Institute, Cleveland 15, 1961, p. 35-39.

Grinding process in relation to residual stresses in hardened ball bearing steel with emphasis on accumulation of stress with successive cuts and feasibility of removing this stress by gradually reducing the unit downfeed until sparkout occurs. (G18, Q25h; TS, SGA-c)

565-G. Effect of Work and Wheel Speeds on Surface Conditions. J. A. Plusch. Paper from "Grinding Stresses--Cause, Effect and Control". Grinding Wheel Institute, Cleveland 15, 1961, p. 41-42.

Surface grinding of annealed toolsteel as affected by work speeds from 10-60 ft. per min. and wheel speeds of 6000-3000 surface ft. per min. (G18k; TS)

566-G. Residual Grinding Stresses Can Be Minimized. M. W. Gormly. Paper from "Grinding Stresses--Cause, Effect and Control". Grinding Wheel Institute, Cleveland 15, 1961, p. 43-46.

Samples of annealed Mn oil-hardening toolsteel and hardened 52100 bearing steel are test ground to determine effects of unit downfeed, metal removal rate and depth of cut on residual grinding stress. (G18, Q25h; TS, Mn)

567-G. Relief of Residual Grinding Stresses. R. O. Lane. Paper from "Grinding Stresses--Cause, Effect and Control". Grinding Wheel Institute, Cleveland 15, 1961, p. 47-51.

Evaluation of abrasive tumbling, low-temperature salt bath annealing, aging, lapping, electrolytic etching and chemical treatments as means for relieving grinding stresses. 4 ref. (G23, J1a, Q25h, G18)

568-G. (German.) Electrolytic Machining of Hard Metals. K. E. Schwartz. Industrie-Anzeiger (Berichtsheft zum 10. Aachener

Werkzeugmaschinen-Kolloquium), no. 80, Oct. 4, 1960, p. 1357-1360.

Review of reaction mechanisms, machinery and technology for electrolytic grinding of hard metals using grinding wheels of gray cast iron, embedded SiC, carborundum or diamond particles and electrolytes of water glass or KNO_3 solution. Comparison of surface quality of conventionally and electrolytically ground hard metals. 9 ref. (G24d; SGB-q)

569-G. (Russian.) Titanium-Alloyed Automatic Steel. A-12. I. M. Pavlov, I. K. Suvorov and Yu. E. Fomenko. Chernaya Metallurgiya, Nov. 1960, p. 61-65.

Alloying of high-sulphur steel with 0.19% Ti to make the steel suitable for machining and rolling and to reduce the scale formation during working. Determination of the resistance to cutting by galvanometry. 6 ref. (G17k, Q23q, 2-60; ST, Ti)

570-G. Cold Impact Alters Grain Flow to Boost Socket Strength. Iron Age, v. 187, June 22, 1961, p. 130-131.

Cold impact extrusion process transforms slugs of medium carbon steel into socket wrenches. Mechanical properties are improved as the grain flow follows the punch contours. The impact action adds strength and toughness to every socket, especially at abrupt changes in cross section. (G5; CN)

571-G. Cold Extrusion of Steel. F. Howard, H. A. J. Dennison and N. Angus. Sheet Metal Industries, v. 38, June 1961, p. 403-425.

Review of cold extrusion of steel including backward and forward deformation. Calculation of load test forces. Heat treatment and lubrication of extruded billets and slugs. Component design and commercial application. 8 ref. (G5; ST)

572-G. Curtiss Wright Deep in Motor Case Technology. John F. Judge. Missiles and Rockets, v. 26, June 26, 1961, p. 24-25.

Fabrication processes for missile motor cases including operations to increase yield strength, ductility and toughness. Research on application of thin film technology in metals to motor cases. (G11, G13, Q-general, T24e; ST, 17-57)

573-G. Rapid Boring of Deep Holes. Ragnar Carlstedt. American Machinist/Metalworking Manufacturing, v. 105, June 12, 1961, p. 109-112.

Machining of 4130, 4340, 316 stainless, Inconel-X, Ti, Hastelloy, A-286 and 300 and 400 stainless steels at feed rates four to ten times faster than conventional gun drilling produces fine surface finishes while eliminating reaming or grinding of holes. Straightness and concentricity are held to close tolerances. (G17d; Ni-b, SS, Ti)

574-G. Turning Malleable Irons. Hans J. Heine. American Machinist/Metalworking Manufacturing, v. 105, June 12, 1961, p. 117-124.

Cutting conditions for turning four grades of malleables: 32510 ferritic, 48004, 60003 and 80002 pearlitic. Cutting speed, feed, depth of cut and tool life for K-6 carbide are determined for each grade of malleable and type of cut. (G17a; CI-s)

575-G. Plasma Arc—New Fabricating Tool. R. L. O'Brien. SAE Journal, v. 69, July 1961, p. 84-85.

Cutting of Al, Mg, Cu, stainless steel, high-strength alloys and carbon steel by a plasma arc, a highly constricted arc formed between a tungsten electrode and the workpiece. Applications in plating and weld surfacing. (G22h; Al, CN, Cu, Mg, SS, SGB-a)

576-G. (Japanese.) Shave-Turning. Pt. 3. Tool Life of High-Speed Steel. Masao Kubota, Minori Kanai and Yuhei Masuyama. Journal of Mechanical Laboratory (Japan), v. 15, Mar. 1961, p. 52-56.

Shave turning SDS7 stainless steel and S45C carbon steel using a high-speed cutting tool. Effect of cutting temperature, abrasiveness and strain hardening on the cutting tool life. (G17a; CN, SS)

577-G. (Japanese.) Shave-Turning. Pt. 2. Surface Roughness by Carbide Tools. Masao Kubota, Minori Kanai and Tamehiro Kotorii. Journal of Mechanical Laboratory (Japan), v. 15, Mar. 1961, p. 48-51.

Edge build-up and surface roughness forms when machining Al, brass and carbon and chromium-molybdenum steels with carbide cutting tools. Optimum cutting speeds for each metal. (G17a; Al, Cu-n, ST)

578-G. Fabrication Techniques for Aerospace Systems. W. H. Grierson. Materials

Engineering Quarterly, v. 1, May 1961, p. 3-14.

Hot, inert atmosphere or vacuum forming, spot welding, continuous seam welding, brazing and diffusion bonding of steel alloys, Mg-Li alloy, Cb, Mo and Ti. Design requirements of strength and tolerance are given to 2000° F. (G-general, 1-73, K-general, Cb, Mg-b, Mo, ST, Ti)

579-G. Rate Setting for Turret Lathe Work. John Wolf. Automatic Machining, v. 22, June 1961, p. 35-44.

Work standards in regard to speed and feed, setup, machine handling and load-unload times and cutting tool cast during machining of bronze, Fe, brass, Al and stainless steel. (G17; Al, Cu-b, Fe, SS)

580-G. In-Cycle Grooving I. D. and O. D. Examples on Multi-Spindle Machines. Automatic Machining, v. 22, June 1961, p. 50-53.

Description of two grooving techniques, one involving the rolling of an oil groove on the contoured outer diameter of 4140 cold finished steel and the other cutting groove on the internal diameter of 1035 steel forging. Both techniques are performed on multiple-spindle machines. (G17; ST)

581-G. Production Tripled--Scrap Reduced on Valve Bodies. Automatic Machining, v. 22, June 1961, p. 56.

Production of Al hydraulic valve bodies for missile applications using single-spindle and turret drilling machines to perform drilling and reaming operations. (G17e; Al)

582-G. 45 Motions: 40 Seconds--On a Bechler Swiss Automatic. Automatic Machining, v. 22, June 1961, p. 57-58.

Bars of leaded bronze are milled and tapped on the same automatic machine to eliminate secondary operations. Product, a valve needle, is practically burr-free. (G17b, G17f; Cu-s)

583-G. Aluminum Alloys for Deep Drawing. C. J. Smith. Metal Industry, v. 98, June 2, 1961, p. 431-435.

Survey of the mechanical properties of Al-Mg, Al-Mn, Al-Mg-Si and Al-Cu-Mg-Si alloys, and their application for pressing and deep drawing by the auto industry. Comparison of tensile strength, proof stress, ductility and bend value of annealed Al and Al alloys. (G4, Q23q, Q-general, 2-60, 2-64: Al-b, Mg, Mn, Si, Cu, 17-52)

584-G. Design and Characteristics of Press Tools. Australian Mechanical Engineering, v. 48, Apr. 5, 1961, p. 44-47.

Blanking, bending and forming, deep drawing and explosive forming operation as influencing choice, design and construction of tools and dies. (G-general, W24n, W25, 17-51)

585-G. How Stelco Uses Cold Heading Process. C. P. Farr. Canadian Metalworking, v. 24, June 1961, p. 30-32.

Cold heading production of small parts by an automatic screw machine. Advantages of cold working and close control of tolerances in terms of greater strength of product, economy of operation and speed of production. (G10, T7, 1-67)

586-G. Machining and Surface Finishing Extrusions. Frank Starzyk. Precision Metal Molding, v. 19, June 1961, p. 47-50.

Review of techniques and equipment used in various machining operations and in buffing, anodizing and painting of extruded Al shapes. (G17, L-general; Al-b, 4-58)

587-G. Cold Forging Blasts Barriers. R. H. Eshelman. Iron Age, v. 187, July 6, 1961, p. 69-71.

Cold extrusion of bearing cups, worm gears and stepped shafts using a press with a five-station transfer die and a built-in feed. (G5, T7)

588-G. Ceramic Bits Mill Hardened Steel. American Machinist/Metalworking Manufacturing, v. 105, June 26, 1961, p. 67-68.

Face milling of 4340 gun steel hardened to 380-400 Brinell using a milling cutter carrying ceramic throwaway inserts and a cutting speed of 375 sfm. A severe negative rake angle of 53° is required to take advantage of the compressive strength of the ceramic tool material. (G17b; ST)

589-G. Springback Is Still With Us. American Machinist/Metalworking Manufacturing, v. 105, June 26, 1961, p. 79.

Review of papers presented at the 1961 meeting of the American Society of Mechanical Engineers. Topics include occurrence of springback and residual

stress during explosive forming, fabrication of refractory metals, explosive forging, press forming of heavy Mg plate and machining of nodular cast iron. (G-general, NM-k34, G4d)

590-G. (German.) Boring, Milling and Welding by Electron Rays. H. Droscha. Technica, v. 10, Apr. 28, 1961, p. 597-599.

Review of reaction mechanism of electron beams with materials. Design of equipment and application in electron beam machining and boring of small boreholes in metals and nonmetallic materials such as glass and in precision welding of metals. (G24, K6)

591-G. Cut Dished Stainless Steel Heads With the Tungsten Arc Process. Welding Design & Fabrication, v. 33, Dec. 1960, p. 40-41.

Operating conditions and setup procedure for cutting curved stainless steel parts. (G22h; SS)

592-G. Aluminum Alloys for Deep Drawing. C. J. Smith. Metal Industry, v. 98, June 9, 1961, p. 451-453.

Control of composition, rolling slab quality, microstructure and the casting operation during the manufacture of Al alloy sheet to obtain improved drawability characteristics. 12 ref. (G4, 17-52; Al-b, 4-53)

593-G. Prestressed Steel Beams Replace Concrete. Welding Design & Fabricating, v. 34, Apr. 1961, p. 48-51.

Application of prestressing principles to a 200 x 30 ft. I-beam bridge. Advantages and tests. (G23q, T26p; ST, 4-57, 17-57)

594-G. Flame Cutting Tracers: Guides to Good Cutting. Welding Design & Fabricating, v. 34, Apr. 1961, p. 52, 54-55.

Survey of flame cutting machines and tracer devices including electric eyes. (G22g, 1-52, 1-59)

595-G. (German.) Methods for Influencing Machinability of Steels. G. Ostermann. Industrie-Anzeiger, no. 80, Oct. 1960, p. 1344-1346.

Review of factors influencing machinability of steels such as carbon steels, 16 MnCr 5 steel and 34 Cr 4 steel including alpha to gamma transition, carbon content, heat treatment, microstructure and hardenability and means of controlling machining tool wear. 6 ref. (G17k; ST)

596-G. Stretch-Draw Press-Forming--A Success With Advanced Materials. Space/Aeronautics, v. 35, June 1961, p. 70-74.

Analysis of radial stretch-forming and stretch-draw press forming of advanced aerospace materials using Rene 41 as an example. Prevention of biaxial tensile stresses and advantages of rubber as a female-die material. Advantages and disadvantages of cold work. (G9, G4d, T24e; Ni-b, 17-57)

597-G. More Production Through Modernization. Modern Machine Shop, v. 34, July 1961, p. 114-116, 118, 120, 122, 124, 126.

Review of machining techniques including boring and honing cast iron cylinder sleeves with dual spindle boring machine, stopping machine automatically when tool becomes dull, brazing stainless steel blades to A-286 alloy hub at 1950° F. to produce missile turbine rotor, boring and counterboring stub axles, facing and tapping Zn die castings and extruding billets of brazing alloy at 1000° F. to produce 1/32 in. brazing wire. (G-general, F24, K8, 1-52, 10-54)

598-G. Gas Powers Metalforming Giant. Iron Age, v. 187, June 29, 1961, p. 74-75.

Type 4130 steel, Cu and Cu compacts, W, Mo, Ti, Cb and Zr are formed into complex shapes by the Dynapak process on a vertical drop-forming machine, using nitrogen at 2000 psi. to fire the piston at 1500 psi. (G-general, 1-52, 3-67, 3-74; ST, Cu, W, Mo, Ti, Cb, Zr)

599-G. (French.) Explosive Forming in the Rocket Engine Industry. L. C. Stuckenbruck and C. H. Martinez. Machine Moderne, v. 55, Apr. 1961, p. 9-13.

Explosive forming of rocket engine components from sheets of Al, Cu, Ni, Ta, Zr, Cb, superalloys, Rene 41, Ti and stainless steel. (G-general, T24e; NM-k34, 17-57, Al, Cu, Ni, Ta, Zr, Cb, Ti, SS, SGA-b)

600-G. Spacer Lapping to Millionths. Gene Gleason and George C. Bowen. Grinding and Finishing, v. 7, July 1961, p. 35.

Precision lapping of Ti and Be for electronic components to thousandths of an inch tolerances. (G19p, T1, 17-55, Ti, Be, 17-57)

601-G. Giant Radar Reflector Die Casting Used in Explosive Forming. Western Metalworking, v. 19, June 1961, p. 33.

Large Al radar reflectors are explosively formed using a 35-ton ductile Fe die casting. Contour and dimensions in the mirror's parabolic shape are maintained to within 0.001 or 0.002 in. tolerances. (G-general, NM-k34, X15q)

602-G. Skin Mill Shaves Costs Over Etching Patterns. Western Metalworking, v. 19, June 1961, p. 40.

Bomarc missile ramjet engine struts made of Mg sheet are carved in a waffle pattern to decrease weight of part without loss of structural strength on an automatic dual cutter skin mill controlled by magnetic tape. (G17, 1-52, T24e; Mg, 4-53, 17-57)

603-G. Aluminum Alloys for Deep Drawing. C. J. Smith. Metal Industry, v. 98, June 23, 1961, p. 499-501.

Occurrence of stretcher strain markings on Al alloy pressings. Methods for controlling this defect including salt bath annealing and grain size and Mg content control. 4 ref. (G4, 2-54, 2-60, 2-64; Al-b, Mg, 17-52)

604-G. The Hot-Machining of Metals. R. C. Brewer. Engineers' Digest, v. 22, June 1961, p. 83-87.

Review of high-temperature machining including effect on tool life and consideration of shear forces, stress and angles. Furnace, flame, electric arc, induction, radio frequency and plasma-arc heating methods. 11 ref. (G17, 1-66)

605-G. Diamond-Coated Bandsaws Cut Carbides. Metalworking Production, v. 105, June 7, 1961, p. 63.

Steel bandsaw blades coated with small natural diamonds are used to make contouring cuts in carbides, glass-reinforced plastics, ceramics, ferrite, cermets, Ge, W and other hard materials. Blade designs include a twist-coated wire, a serrated edge which improves cooling, a spaced edge blade and a continuous edge blade. (G17h, W24m, 17-52; NM-k37, 17-57, SGB-q)

606-G. Magnetic Forming. Metalworking Production, v. 105, June 7, 1961, p. 65-70.

Electromagnetic forming of small metal parts from bronze, steel, Cu, Al and stainless steel using a magnetic hammer. A one megaguss magnetic field is used to obtain a magnetic pressure of 560,000 psi. Parts produced include swaged aircraft parts, swaged tubes, flat pancake coils and expendable coils. (G-general, 1-69; Cu-b, Al, ST)

607-G. Flow Turning on Sub-Contract. K. W. Hards. Metalworking Production, v. 105, June 7, 1961, p. 71-73.

Flow turning is combined with ordinary spinning to produce components with varying wall thickness, using a template controlled through a hydraulic copying system. Cu, Al, mild steel and stainless steel are formed into hollow bodies by the process. (G13, G14; Cu, Al, ST)

608-G. Application of Ultrasonics to Grinding. Engineer, v. 211, June 23, 1961, p. 1050.

Method for surface grinding of hard and soft metals such as stainless and nitriding steel, brass, Al and Mg in which a transducer source of intense ultrasonic vibrations is placed in close proximity to the cutting surface of grinding wheel. Vibrations in the 20,000 c/s range are transmitted by a coolant to the wheel surface where loading and subsequent metal build-up is prevented. (G18, 1-74; ST, Cu-b, Al, Mg)

609-G. It's Precision Forming With a Bonus. Steel Horizons, v. 23, 1961, p. 22-23.

Machining of metal sheets into conical, contoured or cylindrical shapes by combined turning and forming in the Floturning process. Advantages of the process include savings in time and materials in the production of a seamless product with the mechanical properties of conventionally cold rolled steel. (G11; SS)

610-G. Machining High-Nickel Alloys. G. Fitzgerald-Lee. Mechanical World, v. 141, July 1961, p. 232-234.

Parameters for turning, drilling, reaming, planing and grinding of wrought and cast Ni and Ni-Cu alloys

and of high-nickel steel. Specifications for suitable high-speed tool-steel for machining these alloys. (G17; SS, Ni-b, Cu)

611-G. Chipless Machining. Pt. 3. Rolling--The Fastest Way to Cut Threads. C. F. Farr. Canadian Metalworking, v. 24, July 1961, p. 32-34.

Thread rolling of openhearth steels improves tensile and shear strength and fatigue life. Techniques and equipment. Advantages and limitations. (G12, 1-52, Q27a, Q2g, Q7b; ST-e)

612-G. Roll Making Modernised. Engineer, v. 211, June 30, 1961, p. 1086-1087.

Casting, roughing and finishing of steel and Fe in making rolling mill rolls, including parameters for melting, casting, annealing and machining. (G11, G19, 1-52, W23k; CN, CI-q, 17-57)

613-G. Finish Boring of Cast Iron Cylinder Sleeves. Engineer, v. 211, June 30, 1961, p. 1105-1106.

Rough and finish boring and honing of cylinder sleeves. Use of air-actuated collet pots to hold sleeves for finishing with eight-blade precision boring heal. (G17d, G19n, 1-52; CI)

614-G. Ultrasonics Boosts Grinding Efficiency. James Peacock. Metalworking Production, v. 105, June 28, 1961, p. 60.

Grinding of superalloys, brass, Al, stainless steel and Meehanite with coolant being ultrasonically vibrated to eliminate wheel loading. (G18, 1-74; SGA-h, SS, Cu-n, Al)

615-G. (Translation-Brutcher no. 5003.) Structure of the Hardened Layer Produced in Grinding. V. A. Landa. Metallovedenie i Termicheskaya Obrabotka Metallov, Dec. 1959, p. 12-18.

Previously abstracted from original. See item 51-G, 1960. (G18, Q29n; ST)

616-G. Backstand Idlers Enable Planers to Surface Grind. Bruce McDivitt. Australasian Manufacturer, v. 46, June 3, 1961, p. 54.

Grinding of large area cast iron tables and wallboard steel plates by a planer modified by the attachment of a backstand idler and motor driven serrated rubber contact wheel and abrasive belts. (G18k, 1-52; CI, ST)

617-G. Drilling and Reaming Beryllium. Australasian Manufacturer, v. 46, June 3, 1961, p. 60-62.

Techniques for conventional hole drilling, deep-hole drilling and gun drilling. Modification of geometry of solid carbide or carbide tipped tools. (G17e, T6n; Be)

618-G. Explosive Forming Processes. Charles H. Wick. Machine and Tool Bluebook, v. 56, July 1961, p. 121-123.

Description and application of various explosive processes. Advantages and disadvantages. Future trends. (G-general, NM-k34)

619-G. New Electrolytic Machining Process Shapes Parts in Minutes. Products Finishing, v. 25, July 1961, p. 66, 68.

Tough alloys are shaped by removing metal by passing d-c. between workpiece and electrolyte. Process is also used to sink die cavities and to drill round and irregularly shaped holes in alloys that cannot be penetrated by conventional drills. (G24d)

620-G. High Production Electro-Erosion. Metalworking Production, v. 105, June 21, 1961, p. 65-67.

Application to chamfering the ends of hardened steel springs in an automatic sequence, utilizing electromagnets for loading and unloading. Parameters of ending cycle. (G24a; ST)

621-G. (Russian.) Drawing Parts With Double Walls. M. N. Horbunov and Tan Yun-Si. Kuznechno-Shtampovochnoe Proizvodstvo, Jan. 1961, p. 5-8.

Drawing and flanging of Al double-walled pieces by circular dies at room temperature or with local preheating. Determination of critical reduction (deformation) degree as influenced by die shape and blank height. (G4, G6, Q24; Al)

622-G. (Russian.) Lubricant Viscosity and Its Effect on Drawing of Thin Steel Sheets. V. I. Konoplina. Kuznechno Shtampovochnoe Proizvodstvo, Jan. 1961, p. 8-9.

Viscosity and adhesion analyses of lubricants composed of gypsum, water, spindle oil, potassium soap, talcum and

other fillers in various proportions used in stamping of sheet steel cylindrical parts at an automobile works. Determination of lubricating efficiency by applied force necessary for a given deformation. (G3, G4, 18-73; ST, 4-53, NM-h)

623-G. (Russian.) Stamping Duraluminum Pistons. V. H. Makarov. Kuznechno-Shtampovochnoe Proizvodstvo, Jan. 1961, p. 47-48.

Technology for stamping pistons (diameter 120 mm., length 220 mm. and weight 7 kg.) from AK-4 Duraluminum in three continuous operations which enable reduction of the blank weight, eliminate necessity to cut away fins and result in better quality piston walls. (G3, T21b; Al-b)

624-G. Torch Cuts Off "Hot" Plates. J. W. Clark and C. H. Wodke. Iron Age, v. 187, July 13, 1961, p. 90-91.

Cutting of Zircaloy-2 diffuser plates located inside a highly-radioactive core vessel using plasma arc cutting equipment and a remote control manipulator. Process is carried out underwater to prevent damage from arc heat and molten spatter and control the spread of radioactive particles. (G22h, 1-52, 2-67; Zr-b, 4-53)

625-G. Metal-Cutting Analysis. Pt. 1. Re-Evaluation and New Method of Presentation of Theories. S. Kobayashi and E. G. Thomsen. American Society of Mechanical Engineers, Transactions (Journal of Engineering for Industry), Paper no. 61-Prod-1, 1961, 8 p.

The orthogonal metal-cutting process is re-analyzed and several existing theories are discussed. The principal factor for determining the steady-state configuration in metal-cutting is suggested as the condition which links shearing and friction processes to the phenomenon of chip-curl and the size of the area of tool-chip contact. Equilibrium conditions are presented in graphical form with emphasis on the relationship of energy of cutting to the cutting angle. 21 ref. (G17)

626-G. A Graphical Analysis of Regenerative Machine Tool Instability. J. P. Gurney and S. A. Tobias. American Society of Mechanical Engineers, Transactions (Journal of Engineering for Industry), Paper no. 61-Prod-5, 1961, 9 p.

A method for the investigation of regenerative machine tool chatter during cutting, drilling or spot facing based on the harmonic response locus of the machine tool structure which allows the determination of the stable and unstable cutting speed ranges. Effects of chip thickness, variation, penetration rate and mode interaction on the stability and chatter frequency. 8 ref. (G17)

627-G. Machining by Spark Erosion. Indian & Eastern Engineer, v. 103, Apr. 1961, p. 189-192.

Operation and applications of spark erosion machining. Description of spark erosion machines including the Seleromat A, the Seleromat B, the spark discharge generator and the Seleromic. (G24a, 1-52)

628-G. Flank Friction Studies With Carbide Tools Reveal Sublayer Plastic Flow. E. G. Thomsen, A. G. MacDonald and S. Kobayashi. American Society of Mechanical Engineers, Transactions (Journal of Engineering for Industry), Paper no. 61-Prod-3, 1961, 10 p.

Orthogonal cutting tests with artificial flank-wear lands are performed on 1112 steel, 4135 steel, 6061-T6 Al alloy and alpha brass. The condition for sublayer flow is predictable based on the state of plastic deformation and the stress-strain properties, from 100-1650° F. and varying strain rates. 12 ref. (G17, Q24, Q9, 2-61, 3-68; ST, Al-b, Cu-n)

629-G. (German.) Efficiency of Mechanical Stress Removal by Vibrators. H. Reinel. Maschinenbau Technik, v. 10, May 1961, p. 238-242.

Induction of residual stresses into ST 37 strip steel specimens by deposit welding with subsequent alternating bending of specimens at a constant number of revolutions per minute and constant amplitude to remove residual stresses. Measurement of elongation as an indication of residual stresses. 17 ref. (G23; ST, 4-53)

630-G. Pressing Aluminium. J. N. Lengbridge. Metal Industry, v. 99, July 7, 1961, p. 2-5.

Circular, elliptical and rectangular shaped shells are formed by pressing blanks. Evaluation of methods used and the numbers of draws necessary

to obtain a seamless, wrinkle-free shell having the same thickness as the original blank. (To be continued.) (G1; Al)

631-G. Explosive Forming by Electrical Discharge. Metal Industry, v. 99, July 7, 1961, p. 12.

Shaping of difficult metals such as Ti, W and stainless steel under water, using built-up electrical energy of 35,000 v. (G-general, NM-k34; Ti, W, SS)

632-G. Metal-Cutting Analysis. Pt. 2. New Parameters. S. Kobayashi and E. G. Thomsen. American Society of Mechanical Engineers, Transactions (Journal of Engineering for Industry), Paper no. 61-Prod-2, 1961, 9 p.

Orthogonal metal-cutting process is studied on alpha brass, SAE 1112 and 4135 steels, 6061-O, 6061-T6 and 2024-T4 Al alloys. A new angle relationship is developed from energy considerations. Use of effectiveness and machinability factor parameters in evaluating the machining process. 13 ref. (G17; Cu-n, ST, Al-b)

633-G. Planned Retooling Saves Payroll Dollars. Metalworking, v. 17, July 1961, p. 7-9.

Grinding, scaling, riveting and drilling with portable air tools and assembly with impactools in production of steel, stainless steel and Al tanks. (G18, G17e, K13n, 1-52, T26q; ST, SS, Al, 17-57)

634-G. Honing Selected for Ultra-Quality Bores. Metalworking, v. 17, July 1961, p. 15.

Honing 4140 and 4340 steel, 17-7 PH alloy, and Ti bores with aluminium oxide and silicon carbide stones in the production of compressible liquid springs, shock absorbers and actuators. Lapping brings surface finish to 0.5 micro-in. (G19n, G19p; AY, SS, Ti)

635-G. Shear Line Cuts Steel Drum Costs. Metalworking, v. 17, July 1961, p. 47.

Shearing, trimming, rolling, flattening, and squaring hot rolled, cold rolled and mild steel coil on automatic shear line to produce drums with a minimum of scrap loss. (G2, G-general; CN)

636-G. Dies You Can Make on a Bandsaw. Metalworking, v. 17, July 1961, p. 48-49.

Deep drawing and bulge forming stainless steel sheet and tubing with imcompressible polyurethane dies eliminates thinning and scuffing. (G4b, G14, W24n; SS, 4-53, 4-60)

637-G. Copper and Impact Extrusion. Copper, no. 12, Summer 1961, p. 18-21.

Methods of backward and forward extrusion of Cu and Cu alloys. Amount of deformation during extrusion and expected tool life. Slug preparation and lubrication method. (G5; Cu)

638-G. Tape Wound Titanium Scores. Iron Age, v. 188, July 20, 1961, p. 92-93.

Helically-interlocked tape winding is used to form pressure vessels for solid fuel rocket motor cases. The B120BCA Ti alloy tape is wound on a removable mandrel using a winding device which locks each turn with the preceding turn. (G-general, T26q; Ti-b, 4-53, 17-57)

639-G. Torch Burns Up Forming Costs. Iron Age, v. 188, July 20, 1961, p. 97.

A rotary torch cutting machine is used in place of a lathe and boring mill to remove the ends from steel cylinders for steam boiler drums. The unit utilizes divergent high-speed oxygen nozzles with oxy-propane cutting tips. (G22g, T26q; ST, 17-57)

640-G. Suction Pump Beats Electrode Distortion. Dean T. Wall and Daniel Strack. Metalworking Production, v. 105, July 5, 1961, p. 71-73.

Elimination of electrode distortion in electro-erosion machining of tapered slots by use of a suction pump which pulls out the gas and eroded metal particles by drawing the coolant around the electrodes. (G24a, 1-52)

641-G. Soviet Progress in Fluid Extrusion. Metalworking Production, v. 105, July 5, 1961, p. 79-81.

Influence of deformation and die inlet angle on extrusion pressure and effect of the fluid cold extrusion on mechanical properties of the product. Process incorporates fluid generated stress as a means of forcing the metal from the magazine through the opening in the die. (G5)

642-G. Aluminum Alloys for Deep Drawing. C. J. Smith. Metal Industry, v. 98, June 30, 1961, p. 517-519.

Methods of measuring and controlling grain size, earing phenomena, surface finish and gage in deep draw pressing of Al alloys. Effects of alloy composition, annealing and rolling conditions on grain size, earing and hardness. 13 ref. (G4b, M27c, Q29, 2-60, 2-64, 3-68, S14; Al-b, 9-71)

643-G. Drop Tank Production. Welding and Metal Fabrication, v. 29, July 1961, p. 274-282.

Rolling, stretch forming, spinning, drilling, argon arc and spot welding and bolting of mild steel sheet in the production of aircraft fuel-carrying drop tanks. (G-general, F23, K1d, K3n, T26q; CN, 4-53)

644-G. Tips on Machining Titanium. Clarence Mathewson and Frederick A. Janz. American Machinist/Metalworking Manufacturing, v. 105, July 10, 1961, p. 83-84.

Drilling, chamfering and tapping tests on as-rolled and heat treated Ti-6Al-4V alloy. Data on cutting speeds, feed rates, chip packing, drill geometry, chamfering and tapping procedures, chamfer diameters and tap sizes. (G17; Ti-b, Al, V)

645-G. Flat Within Tenths--By Milling. American Machinist/Metalworking Manufacturing, v. 105, July 10, 1961, p. 85.

Adjustable-rail miller for reducing scraping and machining time on Jigmil bedways incorporates an automatic cutter grinder for sharpening inserted-blade carbide cutters. Sequence of operations, milling accuracy and cutting speeds. (G17b, W25r)

646-G. Plastic Coat Shows Up Bearing Cage Stresses. American Machinist/Metalworking Manufacturing, v. 105, July 10, 1961, p. 88.

Photoelastic measurement of bearing cage stresses using a plastic surface coating on the bearing cage to reflect polarized light which is photographed through an analyzer filter. (G25)

647-G. Missile-Fuel Control Begins With Precise Machining. H. W. Bredin. Machinery, v. 67, July 1961, p. 78-85.

Machining with Carboloy inserts, lapping and finishing barstock, forgings and castings of 304 stainless steel, mild steel, brass, Al, U and cast iron to produce missile fuel valves with sealing and seating surfaces finished to 4 micro-in. Mass spectrometric leakage testing. (G17, S11c; SS, CN, Cu-n, Al, U, CI, 4-55, 4-51, 5)

648-G. Metal-Forming With Electromagnetics. Machinery, v. 67, July 1961, p. 86-91.

Swaging, blanking, forming, embossing and drawing stainless steel and Al sheet and tubing with electromagnetic Cu work coils to produce wrinkle-free parts. (G-general, F25, T1g; SS, Al, 4-53, 4-60)

649-G. 5-Axis Tape Control Profiling Under at Douglas. C. O. Herb. Machinery, v. 67, July 1961, p. 108-113.

Use of tape-controlled equipment in profile milling of 7079 Al alloy billets, barstock and forgings to produce aircraft parts with tolerances of 0.005 in. (G17b, 18-74, T24; Al-b, 4-51, 4-52, 4-55)

650-G. Novel Milling Chuck Cuts Cost of the B70. L. W. Collins. Machinery, v. 67, July 1961, p. 114-118.

Brazing and milling 17-4 PH stainless steel honeycomb and extrusions supported in a slip grip fixture which takes the place of the usual milling vise to produce smooth and high-temperature resistant aircraft panels. (G17b, K8, T24a, W25b; SS, 7-59, 4-58, 17-57)

651-G. Some Aspects of Fundamental Research in Metal Cutting and Its Application. A. Allen. Australasian Engineer, May 1961, p. 56-59.

Review of metal cutting studies including tool geometry, mechanics of cutting and economics of cutting. Formulas are given for calculating cutting forces, energy consumption and tool and cutting costs. 4 ref. (G17)

652-G. Machining and Machinability. C. A. Gladman. Australasian Engineer, May 1961, p. 60-65.

Pure and applied machining research and the mechanism of chip formation. Description of a machinability test conducted on a steel

billet. Relationship of tool life and cutting speed for CS114 hot rolled steel. (G17, G17k, A9, 1-54; ST)

653-G. Now--Flame Cutting With N/C. American Machinist/Metalworking Manufacturing, v. 105, July 24, 1961, p. 85.

Completely automatic flame cutting including cutting torch control, flame ignition and gas supply with a punched-tape numerical control system. (G22g, 18-74)

654-G. Shear-Forming Pointed Nose Cones. John B. Siegrist. American Machinist/Metalworking Manufacturing, v. 105, July 24, 1961, p. 90-91.

Production of 6061-C Al alloy closed-end missile nose cones by increasing the contact area between the nose of the mandrel and the inner surface of the blank before shear-forming begins. (G11, T24e; Al-b)

655-G. Faster Precision Hole Boring. Raymond Hoss. American Machinist/Metalworking Manufacturing, v. 105, July 24, 1961, p. 92-94.

Increase of efficiency and accuracy of hole sizes and locations with preset tools and direct dial positioning. Plant layout and sequence of operations. (G17d, 1-52, 18-74)

656-G. Abrasive Belt Grinding Projects Golf Irons. Nat Wood. Western Metalworking, v. 19, July 1961, p. 34-35.

Grinding and polishing operations on milled iron forgings; intermediate and final finish grinds. (G18, T10d; Fe-b, 4-51, 17-57)

657-G. Chipless Machining--High Energy Spark Forming. Charles H. Wick. Machine and Tool Blue Book, v. 56, Aug. 1961, p. 127-129.

Basic principles and applications in beading, bulging, expanding and sizing hollow shapes, punching and piercing and forming cup shapes, channels and panels. Parts up to 10 in. in diameter by 3/32 in. thick have been formed and it is planned to produce missile sections 10 ft. or more in diameter and at least 1 in. thick. (G24a)

658-G. Grinding Wheel Loading Minimized by Ultrasonics. Machine and Tool Blue Book, v. 56, Aug. 1961, p. 116-117.

An attachment mounted on a surface grinder ultrasonically prevents loading build-up on the grinding wheel. A transducer transmits vibrations to the head set close to the wheel's periphery. A liquid coolant passes through the head and sprays onto the wheel, where a force field is set up that prevents loading. (G18, 1-52, 1-74)

659-G. Template Solves Tricky Drilling Job. Welding Design & Fabrication, v. 34, July 1961, p. 58-59.

Use of a 96 in. diameter circular steel template as a guide for vertical positioning of a 14 ft. diameter spherical electronic equipment housing during drilling of large-diameter, close-tolerance holes in the spherical weldment of 1 in. thick H480 armor plate. (G17e, 1-52; 4-53, 7-51)

660-G. Chemical Milling. C. H. Rose. Watervliet Arsenal. U. S. Office of Technical Services, PB 171112, Dec. 1960, 21 p. $.75.

Techniques to apply chemical milling accurately and precisely enough to produce highly complex shapes, nonsymmetrical patterns, intricately stiffened structures and tapered skin. Breakthrough in the field is attributed to new organic coatings and tapes resistant to different types of solution, compounded or modified etching solutions that give uniform etching rates without destroying the physical or chemical properties of a metal and electronic measuring and control equipment. (G24b)

661-G. Cutting Super Alloys. Max J. Kuderko. Cutting Tool Engineering, v. 13, Aug. 1961, p. 8-11.

Performance of abrasion-resistant carbides for cutting abrasive and hard alloys including Tantung "G", Co high-speed steel and Stellite and performance of ceramics on work hardening alloys including Inconel X, Udimet 500 and Hastelloy X. (G17, T6n; SGA-h, TS, Co-b, Ni-b)

662-G. Diamond Wheels for High Vanadium Steels. Pt. 2. Cutting Tool Engineering, v. 13, Aug. 1961, p. 12-14.

Effect of workpiece size and diamond grit size on efficiency in

grinding steels with diamond wheels. (G18, W25c; AY, V)

663-G. Proper Sharpening Means Longer Tool Life. Pt. 4. William H. McNeilly. Cutting Tool Engineering, v. 13, Aug. 1961, p. 15, 18.

Sharpening internal, surface and round broaches to maintain specified design to minimize power usage and enhance tool preformance. (G18, T6n)

664-G. Nonstop Broach Speeds Hinge Production. Steel, v. 149, July 31, 1961, p. 59.

Automatic fixture clamping, broaching, unclamping, unloading and chip disposal in production of door hinges by chain broaching process. (G17d, 18-74)

665-G. (German-French.) Chemical Machining of Aluminum. E. Herrmann. Aluminium Suisse, v. 11, May 1961, p. 91-101.

Parts for machining are degreased and the surface oxide films are removed in an alkaline solution. Portions of the part where no metal is removed are covered with a plastic material in the liquid state. Machining is by immersion in a 10% NaOH solution or in diluted HCl. (G24b; Al)

666-G. Machining Magnesium Race Car Wheels. Ted Halibrand. Modern Machine Shop, v. 34, Aug. 1961, p. 94-95.

Use of a lathe tracing attachment which permits speeds of 625 rpm., feeds of 0.018-0.024 in. and cuts from 1/16-1/8 in. and assures constant speed and feed rate thereby eliminating fire hazards during machining. (G17, 1-52, T21c; Mg)

667-G. The Machining of Steel. Pt. 4. Milling Practice. F. C. Lea. Edgar Allen News, v. 40, July 1961, p. 154-155.

Review of equipment and techniques used in milling of steel. Design and use of negative rake cutters for high speed milling and of cutters for roughing and finishing. Method of "climb milling", a process in which the work is fed in the same direction as the cutter rotation. (G17b, T6n, 17-51; ST)

668-G. Production and Application of Cold-Extruded Components. Australasian Manufacturer, v. 46, July 1, 1961, p. 84-91.

Method of cold extruding components of various sizes and shapes from steel billets. Composition of steels suitable for cold extrusion and preparation of billets for extruding by annealing or coating treatments. Design, composition and mechanical properties of the punch and die. (G5, F21, W24; ST, 4-52)

669-G. Machinability of Nodular Cast Irons. Pt. 2. Effect of Cutting Conditions on Flank Adhesion. K. Hitomi and G. L. Thuering. American Society of Mechanical Engineers (Journal of Engineering for Industry), Transactions, Paper no. 61-SA-7, 1961, 7 p.

The influence of feed rate, rake angle, clearance angle and cutting fluids on flank adhesion in nodular irons of varying hardness is investigated using carbide and oxide tools. (G17k; CI-r)

670-G. Plasma-Torch Cutting. James A. Browning and George A. Klasson. Mechanical Engineering, v. 83, Aug. 1961, p. 43-46.

Procedures and applications of arc-plasma cutting of mild and stainless steel, Al, cast iron, Cu, brass and Ni. Wall and gas-whirl stabilization and transferred-arc techniques are discussed, giving data on cutting speeds, cutting speeds, current and gas flow relationships. 12 ref. (G22h; CN, SS, CI-b, Cu, Ni)

671-G. Explosive Forming Procedure Nears Production Stage at Martin. Missiles and Rockets, v. 9, Aug. 7, 1961, p. 24-25.

Use of explosive forming to reduce welding footage in the manufacture of torus tanks. A 15 x 8 ft. gore section of an elliptical dome explosively formed in 5086 Al alloy. (G-general, T26; Al-b, NM-k34, 17-57)

672-G. (Russian.) Force Determination During Stamping of Hot Rolled Iron. V. G. Alkov and L. D. Sokolov. Izvestiya VUZ--Chernaya Metallurgiya, Dec. 1960, p. 183-185.

Calculation of forces required to stamp hot bloom ingot as influenced by area of impression, metal plasticity and extent and rate of deformation. 4 ref. (G3, 1-54, 3-68; Fe, 4-52)

673-G. Turning Aluminum Alloys. Tool and Manufacturing Engineer, v. 47, Aug. 1961, p. 71-72.

Suggested speeds and feeds for turning wrought and cast Al alloys are given with machinability ratings. (G17; Al-b)

674-G. (German.) Technology of Spark Erosion (Spark Machining) and Its Application. H. J. Schulz. Elektrowarme, v. 19, June 1961, p. 210-216.

Review of reaction mechanism, machinery and technology of spark erosion (machining) in production of complex Cu, brass and steel shapes such as drawing, forging, cutting and pressing dies. (G24a, T6r, 1-52; Cu-b, ST, 17-57)

675-G. (German.) Material Processing by Electron Beams. H. Schluge. Elektrowarme, v. 19, June 1961, p. 217-226.

Reaction mechanism and design and operation of equipment for electron-beam machining including drilling, cutting and milling of profiles in metals and nonmetals and for precision welding of steel and for welding nonferrous metals such as Zircaloy and Cu to steel. (G24, K6, 1-52; ST, Cu, Zr)

676-G. How to Increase Tool Life When Machining Gray Iron. Charles F. Walton. Tooling & Production, v. 27, Aug. 1961, p. 25-28.

Influence of microstructure on tool life; machinability of ferrite, coarse pearlite, fine pearlite and acicular matrix structure; recommended cutting speeds and feeds. (G17, N8, Q9n, 1-52, 3-78; CI-n, 17-57)

677-G. (Book.) Theory of Metal Cutting. P. H. Black. 1961. 204 p. McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York, N. Y. $7.50.

Structure and strength of metals, mechanics of metal cutting, basic principles of friction, lubrication and wear, cutting fluids, cutting tools, wear in metal cutting, tool life, grinding, three-dimensional cutting, unconventional methods of machining and economic considerations. (G17, G18, G22, G24, T6n; NM-h)

678-G. Jig Grinding--Versatility in the Die Shop. Pt. 1. Frederick C. Victory. Grinding and Finishing, v. 7, Aug. 1961, p. 22-25.

Principles and techniques for Jig grinding holes and contours in hardened steels and carbides. (To be continued.) (G18; ST, 14-68, SGB-q)

679-G. Tilt Grinder Head to Finish Taper. Aldo Olivero. Grinding and Finishing, v. 7, Aug. 1961, p. 33.

Production of an SAE 1010 steel automotive "C" washer with an ID of 4 in. and an OD of 5.62 in. and tapered one side from 0.250-0.062 in. using a tilted surface grinder. Wheel specification. (G18k, 1-52, T21c; CN)

680-G. Hot Welded Rail Grinding Takes Out Clickety-Clack. Grinding and Finishing, v. 7, Aug. 1961, p. 34-37.

One-quarter mile rail sections are produced by fusing smaller sections under pressure and welding. Welds are ground at 650° F. to remove sheared upset from sides, top and bottom of the rail. (G18, 2-61, T23q; ST, 7-51)

681-G. How to Design for Explosive Forming. Vernon H. Monteil. Metal Progress, v. 80, Aug. 1961, p. 66-70.

The process is not a cure-all for forming difficulties but is a good supplemental technique that is useful in shaping difficult materials and large parts. (G-general; NM-k34, 17-51)

682-G. Ryan's Experience in Explosive Forming. Floyd A. Cox. Metal Progress, v. 80, Aug. 1961, p. 71-73.

Explosive forming can simplify fabrication of complex shapes and produce close tolerance parts. Some examples of what can be done with the new technique point out its potential to design engineers dealing with tough forming problems. (G-general; NM-k34)

683-G. Steel Parts Formed on High-Energy-Rate Machine. Ralph G. Monsees. Metal Progress, v. 80, Aug. 1961, p. 74-75.

High pressures applied at great speeds permit parts to be extruded or forged in one stroke to close tolerances and smooth surfaces. These characteristics open areas of application of high-energy machines to conventional metals such as resulphurized steels as well as those which are difficult to form. (G-general, F22; ST)

684-G. Explosive Forming With Combustible Gas Mixtures. John Miller and

Philip Kruse. Metal Progress, v. 80 Aug. 1961, p. 76-78.

Working with mixtures of hydrogen, oxygen and an inert gas, Boeing engineers are experimenting with a forming method which possesses the advantages of conventional explosive forming but eliminates some of its limitations. Forming pressures can be controlled more accurately and the combustible gas is, in effect, an ideally shaped charge since it is always in contact with the workpiece. (G-general; NM-k34)

685-G. Machining Udimet 500, Solution Treated and Aged to Bhn. 360. Metal Progress, v. 80, Aug. 1961, p. 96-B.

Tool materials and geometry, cutting fluids, feeds and speeds for turning, milling, drilling and tapping operations. (G17; Co-b)

686-G. Mechanisms of Boundary Lubrication. P. R. Lancaster and G. W. Rowe. American Society of Mechanical Engineers, Paper no. 61-LUBS-5, 1961, 8 p. $1.

Experimental study of lubrication during slow metal-drawing at room temperature under heavy loads using dies of high entry angle to minimize hydrodynamic contributions. Boundary lubrication of Cu, mild steel and stainless steel. 4 ref. (G4, 3-68, 18-73; Cu, CN, SS)

687-G. A Review of Metal Processing Literature--Metal Cutting Analysis. J. S. Campbell, S. Kobayashi, J. M. Galimberti, Robert S. Hahn and E. G. Thomsen. American Society of Mechanical Engineers, Paper no. 61-PROD-12, 1961, p. 1-5.

Mechanics of chip formation, tool wear, friction and workpiece temperature, vibration, nonconventional machining methods, machinability and tool life, tool dynamometers, electro and ultrasonic machining, residual stresses and worn tool forces. 68 ref. (G17, G24, 11-65)

688-G. A Review of Metal-Processing Literature--Metal Cutting Practices. J. R. Roubik, A. L. Pickrell, K. H. Moltrecht, R. L. Vaughan, J. A. Sweeney and E. J. Weller. American Society of Mechanical Engineers, Paper no. 61-PROD-12, 1961, p. 5-7.

Tool-machine control systems, health and safety precautions during machining of Be, nonmachining metal removal processes (chemical milling, ultrasonic machining, etc.) and machining conditions for superalloys, ultrastrength alloys, Zircaloy 2, graphite, Mg, Mo and U. 23 ref. (G17, G24, 11-65, A7; Be, SGA-h, SGB-a, Zr-b, Mg, Mo, U)

689-G. A Review of Metal-Processing Literature--Grinding. E. J. Krabacher, R. S. Hahn and J. L. Wennbert. American Society of Mechanical Engineers, Paper no. 61-PROD-12, 1961, p. 10-12.

Grinding wheel wear, vibrations and chatter, wheel properties and truing, accuracy and control and diamond grinding. 25 ref. (G18, W25c)

690-G. Milling of Reliefs on Extrusion Dies. Machine Production, v. 20, July 1961, p. 72.

Design and operation of a unit which utilizes a standard milling head and a two-dimensional tracer control system which is electromechanically controlled operating from a template and will follow any contour around a 360° path at a constant cutting speed regardless of direction. Geometry of the sensing stylus. (G17b, 1-52, W24n)

691-G. (Book.) Machining Characteristics of High Strength Thermal Resistance Materials. v. 4. AMC Technical Report 60-7-532. May 1960. 180 p. Wright Aeronautical Div., Curtiss-Wright Corp. Wood-Ridge, N. J.

Machining characteristics in turning, milling, drilling, tapping and grinding of various steels, Ni-base and Co-base high temperature alloys and Ti alloys. Relationships between tool life, cutting speed, feed, tool geometry, tool material and cutting fluids. (G17, G18; ST, Ni-b, Co-b, Ti-b, SGA-h, SGB-a)

692-G. Shot-Peening Offers New Life to Critical Metal Parts. H. O. Fuchs. Iron Age, v. 188, Aug. 10, 1961, p. 67-70.

Fatigue strength of steel shaft, springs and gears, Be-Cu springs and Al alloy inducers as affected by shot peening. (G23n, Q7a, T7; ST, Cu-b, Be, Al-b)

693-G. Punched Tape Calls the Signals on Tough Tube-Bending Jobs. Iron Age, v. 188, Aug. 10, 1961, p. 72-73.

Tube bending for aircraft, missile and space vehicle applications using a precision bending machine controlled by punched tape. Bending patterns are easily changed and standard dies may be used. (G6, 1-52, T24; 4-60, 17-57)

694-G. Production Procedures at the Beacon Works of John Thompson Motor Pressings Ltd. Sheet Metal Industries, v. 38, July 1961, p. 482-487, 514.

Manufacture of heavy frames for railway passenger coaches and diesel trucks, mineral-wagon doors and other items for the railway and motor industries. Use of reversible die sets. Hot and cold forming and finishing operations by hot spray and rinsing or by an airless abrasive shot-cleaning plant. (To be continued.) (G-general, L-general, T21, T23; ST)

695-G. Pressure Economy. Melvin D. Verson. Sheet Metal Industries, v. 38, July 1961, p. 493-500, 514.

Presses and their design, lubrication systems and toolsteels used in "impact machining", cold extrusion basically carried to the point of eliminating finish machining, carbon and alloy steels. (G5, 18-73, W24g; CN, AY, TS, 17-57)

696-G. Machinability of OFHC Copper I, II. American Machinist/Metalworking Manufacturing, v. 105, Aug. 1961, p. 93-95.

Parameters for turning, forming, internal work, threading, centerless grinding and silver plating of Amsulf composed of 99.7% oxygen-free high-conductivity Cu and 0.30% sulphur. Production machinability is indicated at from 70-95% that of free-machining brass. (G17k; Cu-b, S)

697-G. Close-Tolerance Flame Cutting. J. C. Worthington and A. L. Cooper. American Machinist/Metalworking Manufacturing, v. 105, Aug. 1961, p. 85-88.

Elimination of machining by holding tolerances to 0 to 1/32 in. with an electronic line-tracing device, a low-pressure, injector-type torch and careful control of variables. Data are given for applications to mild steel shapes. (G22g, 1-52; CN, 4-53, 17-55)

698-G. A Million Severely, Multi-Formed Parts Without Rejects Result From Wire With Consistent Tensile. Wire and Wire Products, v. 36, June 1961, p. 763, 795.

Consistent tensile strength results in closer tolerances, fewer inspection rejects, less breakdown of equipment and improved corrosion resistance in the production of 430 stainless steel wire door hinges for home laundry equipment by four-slide forming, punch press flattening, drilling and tapping and passivating and burnishing. (Q-general, Q27a, T10c; SS, 4-61, 17-57)

699-G. (German.) High Intensity Electron Beams as a Thermic Tool. Heinrich Hora. Chemische Rundschau, v. 14, July 15, 1961, p. 393-394.

Review of electron beam high precision machining (cutting, erosion, milling, drilling) of metals and nonmetals (plastics, glass, quartz) under vacuum (10^{-4} Torr) and butt welding of metals including alloyed steels. Physical backgroung and applications. (G24, K6, 1-52, 1-73, 16-62; AY, NM-d, NM-f)

700-G. Belt Machines Hold Honeycomb Tolerances. Steel, v. 149, July 24, 1961, p. 88-89.

Conveyorized, wide belt grinders with 180G, 320G or 240G aluminum oxide or silicon carbide abrasives are used to finish stainless steel honeycomb panels maintaining tolerances within ±0.001 in. for use in the B-70 superbomber. (G18, T24, W25c; SS, 7-59, 17-55, 17-57)

701-G. Hot Machining. Jens L. Wennberg, C. L. Mehl and E. J. Krabacher. Aircraft Production, v. 23, July 1961, p. 246-252.

Methods of heating and hot machining high-strength heat resistant metals. Results of tests to determine effects of workpiece temperature on life of cutting tool, chip formation and metal removal rate. Prevention of thermal damage to the workpiece as dependent on heating method used. 5 ref. (G17, 1-66; SGA-h, SGB-a)

702-G. Cold-Point Drilling. Aircraft Production, v. 23, July 1961, p. 270-271.

Design and operation of a twist drill which incorporates a cooling system and which is used for cold point drilling of high-tensile materials. Testing of the drill by drilling a variety of materials to determine drilling time including bronze, Fe, stainless steel, Inconel, Monel, Nimonic 90 and other materials. (G17e, 1-67, W25p; Cu-n, Fe, SS, Ni-b)

703-G. How to Hot Hob Beryllium Copper. Islyn Thomas. Plastics Engineering, v. 38, July 1961, p. 101-103, 106, 108, 111, 174.

Techniques and equipment used in the production of molds, jigs and dies from Berylco 275C casting alloy by hot hobbing from 1100-2000° F. Importance of hob design. Melting and pouring, finishing, heat treating and plating operations. Physical properties of the alloy. (G17b, 1-66, 1-52, J-general, L-general, P-general; Cu-b, Be)

704-G. What's Your Abrasive Machining I. Q. ? Leo P. Tarasov and Richard H. Merritt. Grits and Grinds, v. 52, June 1961, p. 3-7, 10.

Results of an investigation into all aspects of heavy stock removal machining of flat work, solid hardened steel bars, stainless steel slab and other metals by abrasive tools. (G18, A9m, W25c; ST)

705-G. Fabricating and Machining Practices for the All Beta Titanium Alloy (Ti-13V-11Cr-3Al). C. T. Olofson and F. W. Boulger. Defense Metals Information Center, Battelle Memorial Institute, DMIC Memo. 121, Aug. 3, 1961, 7 p.

Review of heat treating, descaling, forming, spinning, dimpling, stretch forming, bending and machining operations. Tabulation of machining conditions for drilling, tapping and turning the alloy after solution treating and aging to 45 Rockwell C. Comparative formability of weldable Ti-alloy sheet metals. 10 ref. (G-general, G17, 2-65, Q23q; Ti-b, V, Cr, Al)

706-G. (German.) Investigation of Deep-Drawability of Sheets. Standardized Testing by Engelhardt and Gross Technique. Achim Rickert and Horst Gross. Fertigungstechnik und Betrieb, v. 11, June 1961, p. 384-388.

Equipment, shape of specimens, sampling and testing techniques and evaluation of testing data for the testing of steel, Cu alloy and Al and Al alloy sheets. (G4, 17-52, 1-53; ST, Al-b, Cu-b)

707-G. (Translation-Brutcher no. 5050.) Basic Oxygen (L-D) Steel in Wire Manufacture. W. Fogy and O. Kramer. Berg-und Huttenmannische Monatshefte, v. 105, Nov. 1960, p. 261-268.

Previously abstracted. See item 182-G, 1961. (G4, 17-52, Q-general; ST)

708-G. Modern Equipment, Better Work Flow Gain 20% to 300%. R. R. Moran. Production, v. 48, Aug. 1961, p. 64-69.

Layout and operation of an automotive plant for cold heading and machining operations in the production of steering gear parts, bolts and valve push rods. Techniques and equipment used in wire drawing, cutting, straightening, welding, threading, rolling, notching, cold heading and other processes. (G10, 1-67, G17, F-general, K-general, T21c; ST)

709-G. The Mechanics of Chip-Formation. R. D. Harris, S. N. Agrawal and B. H. Amstead. Machinery (London), v. 99, July 26, 1961, p. 193-198.

Use of a high-speed camera to study mechanics of chip formation, deformation, cracking and strain harding of hot and cold rolled steel, brass and Al. (G17, 1-53; ST, Cu-n, Al)

710-G. Production Advantages of Today's Modern Surface Grinding. John E. Hyler. Production Equipment, v. 37, Aug. 1961, p. 6, 8.

Techniques and equipment for heavy surface grinding of toolsteels, nonferrous metals and ceramics. (G18k, 1-52; TS, EG-a38, 6-70)

711-G. Automatic Grinding Saves Time, Men and Money. John W. Lane. Modern Castings, v. 40, Aug. 1961, p. 40-41.

Grinding of gate and riser ends of malleable iron pipe fittings with an automatic machine having a revolving turntable and a vertical grinding wheel. (G18, 1-52, T6a, W19g; CI)

712-G. Ceramics Do the Job When Used Properly. Benjamin E. Storrs. Tooling & Production, v. 27, July 1961, p. 30-33.

Machining cast iron, steel, Monel and other alloys using ceramic tools. Feed rates and types of cut are limited by the low transfer rupture strength. The heat resistance of the ceramic edge allows high speed machining without dulling the tool. Four case histories of machining utilizing ceramic tools. (G17, T6n; SGA-j, NM-f)

713-G. New Rotary Dresser Saves Grinding Dollars. Tooling & Production, v. 27, July 1961, p. 34.

Production of exhaust valves using a single unit to grind two spaced grooves and a chamfer on the foot. The grinding wheels are dressed in a single plunge by rotary diamond set form dressing wheels. Quality and uniformity of valves produced, diamond dressing tool costs, grinding tool life and labor costs. (G18h, T21b, 1-52)

714-G. Electrolytic Grinding Contributes to Customer Savings. Tooling & Production, v. 27, July 1961, p. 43.

Roughing carbide cutoff and grooving tools by electrolytic grinding with subsequent hand grinding to commercial tolerances. (G18, T6n, 1-52)

715-G. Cavities Cut Electrochemically--On Automatic Transfer Machine. David Fishlock. Metalworking Production, v. 105, July 19, 1961, p. 51-55.

Electrochemical machining of Ge wafers into transistors by cutting aligned cavities on each side of the wafer to leave a 0.0005 in. web between the sides. Electrodeposition of Cd in each cavity. (G24d, L17, T1k, 1-52; Ge, Cd)

716-G. Machining the Jet and Space-Age Metals. Donald A. Reiner. Western Machinery and Steel World, v. 52, Aug. 1961, p. 28-30.

Classification, relative machinability, characteristics and basic reasons for difficulty in machining Fe, Ni and Co-base superalloys, stainless steels and refractory metals. (G17; Fe-b, Ni-b, Co-b, SGA-h, SS, EG-d37)

717-G. Diamond Wheels Cut Tool Grinding Costs. Steel, v. 149, Aug. 14, 1961, p. 134.

Grinding of high vanadium toolsteels to good tolerances using a synthetic diamond wheel. Comparison with aluminum oxide wheels as to wheel wear, speed and workpiece surface finish. (G17, W25c; TS, V, NM-k37)

718-G. Micro-Filing Gives Geometrical Accuracy. Metalworking Production, v. 105, July 26, 1961, p. 49.

Microfiling of hardened steel and other materials used in light engineering for pivots, bolts and shafts using a pivot polishing machine. Process achieves a high degree of geometrical accuracy and a surface finish of 2 microinches or finer. (G17j; ST)

719-G. Flame Cutting for the Small Shop. Clement F. Brown. Metalworking Production, v. 105, July 26, 1961, p. 57-58.

Flame cutting of steel plates with portable, cam-guided shape or beam-type machines. (G22g, 1-52; ST, 4-53)

720-G. Flexible Tooling for Continuous Broaching Makes Short Runs Practical. Laurence W. Collins, Jr. Machinery, v. 67, Aug. 1961, p. 90-94.

Production of blades and vanes for compressor rotors and stators, inlet guides, nozzle diaphragms and jet engine turbine wheels by continuous broaching of Al, 403 stainless steel, A-286 alloy, Ti, Hastelloy and other special metals. This surface machining process produces dovetail profiles on blades using a multiple stage fixture. (G17d, T7h; SS, Al, Ti, SGA-h, 17-57)

721-G. Tiny Precision Bearings Boost Guidance System Reliability. Ralph O. Wirtemburg. Machinery, v. 67, Aug. 1961, p. 111-118.

Production of antifriction ball bearings for aircraft and missiles guidance system by cold heading from

round 440-C stainless steel wire with subsequent centerless finish grinding. (G18h, G10, 1-67, T7d, T24e; SS, 17-57)

722-G. Efficient Form Tool Grinding. Frederick H. Hall. Automatic Machining, v. 22, Aug. 1961, p. 65-66.

Use of single spindle automatic screw machine for flat form grinding of high-speed steel and carbide tools for reduced production costs, operator fatigue and increased finish quality. Survey of related equipment including lenses, mirrors and lighting sources. (G18, T6n; TS-m, 14-68, 17-57)

723-G. Modern Cold Heading. Donald E. Wood and R. G. Friedman. Automatic Machining, v. 22, Aug. 1961, p. 67-70.

Cold heading of ferrous and nonferrous metals as applied to products normally produced on screw machine such as balls for bearing, pens or ball mills. Survey of related equipment including single and two-blow headers. (G10, 1-67)

724-G. Broaching Tackles New Jobs. Iron Age, v. 188, Aug. 24, 1961, p. 51.

Broaching of Zr alloy I beams of over 5 ft. length using a horizontal position machine, hydraulic clamping units and carbide-tipped cutters. Design of a broaching machine which combines internal and surface operations. (G17d; Zr, 4-57)

725-G. Cryogenic Forming: New Process Stretches and Strengthens. Iron Age, v. 188, Aug. 24, 1961, p. 61-63.

Stretch forming of welded stainless steel spheres and cylinders at -320° F. using gaseous nitrogen resulting in improved room temperature strength even in the welded areas. (G9, 1-67; SS, 7-51)

726-G. (Italian.) Some Notes on Screw Thread Rolling. Lelio Orsini. Macchine, v. 16, July, 1961, p. 721-725.

Material selection and machine employment to suit applications. Technological and economic considerations. (G12, 1-52)

727-G. Forming at Austenitizing Temperatures for Distortion Control During Heat Treating. R. B. Cantley. Metals Engineering Quarterly, v. 1, Aug. 1961, p. 3-6.

Thin-gage sheet metal parts of martensitic stainless steels are simultaneously heat treated and formed at austenitic temperatures for distortion control using conventional furnaces, special salt baths and electrical resistance heating apparatus in combination with special and conventional presses. (G-general, J22; SS-c, 4-53)

728-G. Deformation of Metastable Austenite--An Interim Report on a New Process. C. F. Zackay, W. M. Justusson and D. J. Schmatz. Metal Progress, v. 80, Sept. 1961, p. 68-72, 126.

Mechanical properties of alloy steels strengthened by deformation in the metastable austenite "bay" of the T-T-T curve as affected in varying degrees by variations in grain size, tempering temperature, carbon content and other metallurgical factors. Application of the Ausforming process to H11 steel. (G-general, J22, N-general, Q-general, 2-59, 2-60, 3-68; AY)

729-G. Special Tooling, 3D Tracer Ease Contouring. Western Metalworking, v. 19, Aug. 1961, p. 40.

Three dimensional contouring and fabrication of Al, Ti, Mo, H-11 alloys and steel using a profiling unit capable of delivering from 23-1800 rpm. in 4 variables. (G17a, 1-52; Al, Mo, Ti, ST, TS)

730-G. How AC Spark Plug Machines Beryllium. Steel, v. 149, Aug. 28, 1961, p. 70-73.

Review of machining parameters used in turning, boring, threading, milling, grinding and deburring of Be to produce precision gyroscope parts. (G17, 10-54; Be)

731-G. (Russian.) Analysis of Seam Temperature During Hot Stamping. E. A. Sonkin. Kuznechno-Shtampovochnoe Proizvodstwo, Mar. 1961, p. 8-9.

Uniform distribution of metal within the dies as a function of the ratio between thickness and temperature of seam formed during hot die stamping of carbon steel. 4 ref. (G3, 1-66, Q25p; CN)

732-G. Chipless Machining--Electromagnetic Forming. Charles H. Wick. Machine and Tool Blue Book, v. 56, Sept. 1961, p. 139-140.

The design, operation and applications of high-energy rate machine to blank, emboss, draw and form parts from electrically conductive metal and to reduce tubes and swage fittings to tubing. Disadvantages of the process include cost of energy and limitations on size of machinable parts. (G24)

733-G. A Study of the Machinability of Gray Iron. A. De Sy and L. Van Eeghem. Foundry, v. 89, Sept. 1961, p. 78-81.

Measurements of tool life during turning with 18-4-1 high-speed steel cutting tools are used to predict the machinability of gray iron cylinders as a function of composition and mechanical properties. 4 ref. (G17k, Q-general, 2-60; CI-n)

734-G. Cold Upsetting and Cold Extrusion of Components on Transfer Cold Headers. B. Hatebur. Wire Industry, v. 28, Aug. 1961, p. 775, 778-779, 781.

Design and operation of split-die and solid-die double-blow cold headers and of transfer headers for boltblanking. Review of sequence of operations for producing a hexagon boltblank by the double-blow trimming method and by the double extrusion method. (G10, 1-66)

735-G. Photo-Template Profile Grinding. Oscar Loeffler. Metalworking Production, v. 105, Aug. 16, 1961, p. 57-60.

A photographic reduction (1:10) of template is used in conjunction with optical system for grinding setup to provide operator with an image of the contour projected onto the workpiece. Punch milling machine is used to make die block of high-carbon high-chrome steel, Rockwell 62C. (G18, 1-52; SS)

736-G. Electric Machining Builders Sight Market Breakthrough. K. W. Bennett. Iron Age, v. 188, Sept. 7, 1961, p. 72-73.

Production of tungsten rocket nozzles, Be and other metal parts by electrical discharge and electrolytic machining. Advantages and limitations of the processes. Production and consumption statistics. (G24a, G24d, A4p; W, Be)

737-G. (English.) Surface Finish Produced by Ceramic Tools. Keiji Okushima and Yoshiya Fujii. Bulletin of JSME (Japan Society of Mechanical Engineers), v. 4, no. 14, 1961, p. 365-374.

Effect of cutting conditions, tool geometry and flank wear on the roughness of surfaces produced by machining 0.44% carbon steel with ceramic or carbide tools. The two types are compared as they affect the appearance of the surface, the depth of the workhardened layer and the relationship between luster of the surface and the oxide film. 4 ref. (G17, S15b, 1-52; CN)

738-G. (English.) Pressure Lubricated Deep Drawing. Yasuo Kasuga, Norihiko Nozaki and Kazuyoshi Kondo. Bulletin of JSME (Japan Society of Mechanical Engineers), v. 4, no. 14, 1961, p. 394-405.

A method of fluid lubrication for the deep drawing of sheet metals is developed with experimental application to Al. The mechanism of pressure lubrication is investigated to improve drawing ratio. (G4b, 1-53, 3-74, 4-53, 18-73; Al)

739-G. Machining Die Cast Motor Housing for Floor Polishers. Machinery (London), v. 99, Aug. 2, 1961, p. 255-256.

Use of automatic boring machines to eliminate line reaming and improve accuracy and efficiency in roughing and finishing of Zn die castings (SAE Alloy 903, ASTM AG40A). (G17, E24j, 1-52, T10c; Zn, 5-61)

740-G. U.S. Gain Experience in Explosive Forming. James P. Orr. Metalworking Production, v. 105, July 1961, p. 50-53.

Review of tooling developments in the explosive forming process includes a description of concrete, ductile iron and epoxy resin forming dies. An application is given for the fabrication of hemispherical Al missile bulkbeads. Advantages and disadvantages of the process are summarized. (G-general, T24e; NM-k34, Al)

741-G. (German.) Drilling of Deep Bore-Holes by Ultrasonic Techniques. W. W. Metelkin. Maschinenbau, v. 10, June 1961, p. 250-252.

Equipment design and process variables for drilling deep holes in glass and quartz and for cutting quartz, Si, Ge and hard metals by ultrasonic methods using boron carbide as the grinding agent. (G24c; SGB-q, Ge, Si, NM-f)

742-G. Breakthrough in Cutoff. Horace Frommelt. Tooling & Production, v. 27, Sept. 1961, p. 39-41.

Use of a carbide throw-away insert tool for slugging and parting a 1045 steel bar. Economic considerations. (G17, T6n; ST)

743-G. More Production, Closer Tolerancing From a Trunnion Machine. A. J. McLaren. Tooling & Production, v. 27, Sept. 1961, p. 42-44.

Description and operation of a 10 station machine for close tolerance boring and facing of nodular iron and gray iron tractor cylinders. (G17d, 1-52, T21b; CI)

744-G. High Speed Machining Ready for New Horizons. Tooling & Production, v. 27, Sept. 1961, p. 58-60.

Tool life and heat transfer during high speed (5000-10,000 sfpm.) machining of Al barstock and die castings. (G17, P11k; Al, 4-55, 5-61)

745-G. The Use of High Speed Stereophotography in Explosive Metal Forming. Rolland Gallup and John Pearson. U.S. Naval Ordnance Test Station, China Lake, Calif., NAVWEPS Report 7738, July 21, 1961, 16 p.

Method for using medium and high speed stereophotography to obtain quantitative engineering data on the dynamics of explosive forming, specifically the time response of the material and deformation and movement of the metals as a function of time. Explosive free-forming of Al is used for illustrative purposes. 5 ref. (G-general, NM-k34; Al)

746-G. Special Welded Beam Is Lighter, Stronger. Welding Design & Fabrication, v. 34, Aug. 1961, p. 30-31.

Wide flange hot rolled ASTM A-7 steel beams are serrated in a punch press to produce a continuous S-shaped or zigzag cut. The section halves are then manually welded. The resulting beams are 40-45% deeper and thus about 50% stronger than the original beams. Comparison with equivalent long-span joists. (G2j, K-general; ST, 4-57, SGB-s)

747-G. Cutting Your Weld Grinding and Finishing Costs. W. G. Pinkstone. Welding Design & Fabrication, v. 34, Aug. 1961, p. 38-41, 44-48, 50-51.

Selection and identification of weld grinding wheels. Techniques for coated abrasives. (G18k, L10b, W25c; SS, 7-51)

748-G. Aluminum Foil and Plastics Give Improved Satellite Skin. Light Metal Age, v. 19, Aug. 1961, p. 17.

Chemical milling of perforations in an Al foil and plastic laminate to produce light weight, wrinkle resistant skins for balloon-type satellites. (G24b, T24; Al-b, NM-d, 4-56, 7-58, 17-57)

749-G. Building Minuteman's Shell. Ben Brosheer. American Machinist/Metalworking Manufacturing, v. 105, Aug. 21, 1961, p. 95-100.

Rough forging, machining, shear spinning, roll forming, Tig welding, stress relieving and bracket assembly operation parameters for fabrication of a low alloy modification of AISI 4340 steel containing approximately 0.50% Ni, 1.00% Cr and 1.00% Mo into first stage rocket engine cases. (G-general, F22, K1d, J1a, T24e; AY, 17-57)

750-G. Transfer Line for a L-o-n-g Run. Charles Emerson. American Machinist/Metalworking Manufacturing, v. 105, Aug. 21, 1961, p. 114-116.

Automated drilling, grinding and swaging operations on cold rolled Cd and Ni-plated C-1213 steel bar stock for producing agitator shafts for washing machines. (G17, G18, F25, 1-52, 18-74, T10c; ST, 8-62, 17-57)

751-G. How to Bend Tubing. R. M. Spencer. Modern Machine Shop, v. 34, Sept. 1961, p. 130-137.

Draw, compression and press bending of welded steel are described with types of mandrels for various applications. Parameters for calculating bend radii and distance between bends. (G6, 1-52; ST, 4-60, 7-51)

752-G. Cold-Forming Taps. F. T. Thorley and E. K. Chofman. Metalworking, v. 17, Aug. 1961, p. 9-11.

Cold forming taps are used to produce internal thread by actions similar to external thread rolling in stainless steel, sintered iron, precipitation-hardening stainless steels, electrolytic Cu, magnet iron as well as the softer metals. Stronger and smoother threads with longer life are attributed to the process. (G17f, T6r, 17-57; ST, Cu, Fe-b)

753-G. Lapping Makes 'Super-Stampings' Metalworking, v. 17, Aug. 1961, p. 47.

Stampings of cold rolled and 300 series stainless steel are lapped using suspensions of Al_2O_3 to obtain flatness

tolerances within 0.0002 in. and surface finish from 3-5 microin. (G19p; ST, 4-59)

754-G. Roll Forming Selected to Ease Titanium Shaping. Lawrence J. Mattek. Metalworking, v. 17, Aug. 1961, p. 50-51.

Room temperature roll forming of A-110-AT and 4Al-6VTi alloy sheet for shroud support-ring applications in aircraft. Effect of nonuniformity and overgaging on crack formation. Technological parameters of the process are discussed in terms of power requirements and production speed and springback and workability of the material. (G11, 1-67, 9-72, T24; Ti-b, 4-53, 17-57)

755-G. Take Guesswork Out of Forming. Iron Age, v. 188, Sept. 21, 1961, p. 93-95.

Standardized indices and equations give a method for predicting formability of sheet material. Forming processes include brake forming, dimpling, drop hammer beading, rubber press beading, sheet stretch, audroform, joggling, linear stretch, rubber stretch, rubber shrink, roll forming, spinning and deep drawing. (G-general, Q23q)

756-G. New Aluminium Alloy 'Machines Like Butter'. Steel, v. 149, Sept. 18, 1961, p. 110.

Drilling and milling tests on a new alloy with a composition similar to that of 355 and 356. An 8 in. long, 3/8 in. diameter hole can be drilled in the new alloy with a feed rate of 40 ipm. (G17, 2-60; Al-b, 17-52)

757-G. Single Point Thread Cutting Goes Automatic. Tool and Manufacturing Engineer, v. 47, Sept. 1961, p. 105-107.

Automatic thread cutting is essentially a faster version of standard thread cutting as a lathe. Because of the fast automatic cycle minimum time is spent in withdrawing the tool at the end of the cutting pass, returning the lathe carriage to the start of the subsequent cut and setting up each cut to the right depth. (G17f)

758-G. Tracer Permits Change in Gear Production. Steel, v. 149, Sept. 11, 1961, p. 116.

Contour machining of forged steel 120-lb. ring gear blanks using a double, hydraulic tracer attachment on a standard lathe. (G17g, 1-52; ST, 4-51)

759-G. Explosive Forming of Refractory Metals. Harry W. Highriter. Fansteel Metallurgy, Aug. 1961, p. 2-3.

Underwater explosive deformation tests on pure Mo and Cb and Ta alloys. Effect of deformation rate and forming temperature on properties including deformation behavior, weldability, ductility, embrittlement and elongation. Pretreatment processes include annealing, stress relieving and hot forming. (G-general, Q-general, 2-61, 3-67; EG-d37, Cb-b, Ta-b, Mo, NM-k34, 17-57)

760-G. (French.) Thermal Sawing. Mines et Metallurgie, Mar. 1961, p. 157-158.

Sawing of hardened or tempered carbon, chromium, nickel-chromium, manganese, chromium-vanadium and tungsten steels or stainless steels at a velocity of 1000-5000 m. per min. The heat produced by friction causes the material sawed to soften and oxidize thereby increasing the effectiveness of the operation. (G17h, 2-61; ST)

761-G. (Italian.) Cost Problem of Steel Part Components. R. Parigi. Il Nickel, no. 92, June 1961, p. 1-11.

Hardening, tempering, annealing, normalizing, stress relieving and machining of UNi 38NCD4, UNi 40NCD7, UNi 14/19 CN5 and 18 NCD 5 steel. Brinell hardness, tensile strength, elongation, workability and their applicability in mechanical industry. Practical and economical advantages of some carbon and stainless steels. (G-general, Q-general, 17-53, 17-57; CN, SS)

762-G. (Italian.) Manufacturing Stainless Steel Fastenings. Luigi Sarogni. Il Nickel, no. 92, June 1961, p. 14-18.

Cold forming, cutting, threading, pickling and passivation techniques are applied to 302, 303, 304, 305, 309, 310, 316 stainless steels for the fabrication of fastenings. Evaluation of mechanical properties. (G-general, L12g, Q-general, R10c, T7f; SS)

763-G. Electrolytic Grinding Scores Five Ways. David Fishlock. Metalworking Production, v. 105, Aug. 30, 1961, p. 73-76.

Production of carbide-tipped tools using an Agathon 125 SE tool grinder.

Advantages include cost reduction, faster grinding, longer diamond wheel life, thermal cracking elimination and consistent surface finish. (G24)

764-G. Cold Extruding for Faster Production. Clifford P. Farr. Canadian Metalworking, v. 24, Sept. 1961, p. 48-51.

Typical designs and applications for both backward and forward extrusion. Careful die design is necessary to achieve accurate steel parts. (G5; ST, 17-51, 17-57)

765-G. Explosive Metal Forming for Short Runs. Guy G. Goyer. Canadian Metalworking, v. 24, Sept. 1961, p. 58-60.

Review of process advantages and disadvantages. Advantages include lower die cost, fewer forming steps and accuracy. Several metal shapes are amenable only to forming by hydraulic process or explosives. (G-general; NM-k34)

766-G. (Italian.) Climb Milling and Down Milling. Giovanni Maestri. Macchine, v. 16, Aug. 1961, p. 781-785.

Comparison of procedures with regard to surface finish, cutter wear, cutting velocity, cutting angle, time factors and costs. (G17b)

767-G. (Italian.) Screw Taps. Macchine, v. 16, Aug. 1961, p. 801-811.

Application of hand and machine screw taps, for threading pipes and nuts with helical, straight and inclined grooves. Rake angle, cutting velocity and lubricants are tabulated for machining metals, alloys, steels, stainless steels and plastic material. (G17f, 1-52, 17-57)

768-G. Research Sheds New Light on Turning Malleable Irons. Hans J. Heine. Metalworking Production, v. 105, Aug. 23, 1961, p. 45-50.

Recommended feeds and speeds for turning pearlitic and ferritic malleable irons. Comparison of machining characteristics and determination of the best tool geometry and cutting conditions. (G17a, G17k; CI-s)

769-G. Androforming. American Machinist/Metalworking Manufacturing, v. 105, Sept. 4, 1961, p. 100-101.

Stretch forming of mild steel, stainless steel and Al-base alloy into a variety of compound contoured shapes, both concave and convex. The sheet is pulled between a set of dies, the contours of which can be adjusted to provide the desired curvature. Stretched more at the center than at the edges, the metal curls because of the tensile and compressive stresses set up on the surface by the bending. (G9, 1-52, G25; CN, SS, Al-b, 4-53)

770-G. Stretch Forming Below Zero. American Machinist/Metalworking Manufacturing, v. 105, Sept. 4, 1961, p. 103.

Stainless steel pressure vessels are cold worked at cryogenic temperature (-320° F.), restoring the strength of weld metal to that of the parent material by cooling with liquid N_2 in a cylindrical die and stretching with N_2 gas at high pressure. Nominal tensile strength of unstretched vessel is 102,000 psi.; of stretched vessel, 260,000 psi. (G9, 1-67, Q27a, T26q; SS, 7-51, EG-p)

771-G. Cutting ID and OD Threading Time 70%. E. L. Fester. American Machinist/Metalworking Manufacturing, v. 105, Sept. 4, 1961, p. 108.

Heat treated alloy steel shafts, ductile iron rotor shaft assemblies and large pipe flanges are threaded internally and externally by a lathe that, with its attachments, generates 8 tpi. 60° pipe thread in 16 automatic passes. (G17f, 1-52)

772-G. 4 Step to Integrated Production. Production, v. 48, Sept. 1961, p. 68-71.

Automated machining, cleaning and inspection of heavy gray iron castings for tractor rear axle housings on a line incorporating multiple drilling, boxing, reaming and tapping operations. (G17, T3r; Fe, ST, 17-57, 18-74)

773-G. An Electrode 'Sweeps' a Mold Cavity. Steel, v. 149, Sept. 25, 1961, p. 159.

By rotating a contoured blade of graphite through a rough machined cavity, 8 x 30 in., mold halves are machined by electrical discharge within close tolerances. (G24, 1-52)

774-G. Factors Affecting the Choice of Inserted Blade or Throw Away Tip Milling

Cutters. F. Gable. Machinery (London), v. 99, Aug. 23, 1961, p. 421-423.

Influence of chip load per tooth, length of cutting edge, shape of the tip and accuracy of a cutter fitted with a throw-away tip on the selection of mill cutters for roughing and finishing operations. (G17, T6n, 1-52)

775-G. Methods Employed for Machining Beryllium in an American Plant. Machinery (London), v. 99, Aug. 23, 1961, p. 442-443.

A gyro gimbal is trepanned by the electrodischarge process and a large ring is machined by a carbide-tipped trepanning tool on a vertical turret lathe. Effective cutting speeds and feed ranges are given. (G19r, T24e; Be)

776-G. Uses of Ultrasonic Energy. Pt. 4. Genrokuro Nishimura. Machine & Instruments, Aug. 1961, p. 31-33.

Review of the mechanism of ultrasonic machining and of the accuracy and surface finish of the machined part as they are affected by tool composition, frequency of tool use and regrinding and plastic deformation. (G24c)

777-G. Design Tips for Using Dowel Embossings. Federico Strasser. Machine Design, v. 33, Sept. 28, 1961, p. 135-136.

Dowel connections are made in mild steel sheet by embossing, using standard, tapered, oversize and stepped dies. Factors affecting allowable punch penetrations. (G3p, 1-52; CN, 4-53)

778-G. Some Unusual Operations on Parts for Nuclear-Powered Submarines. Machinery (London), v. 99, Sept. 6, 1961, p. 567-571.

Tracer-controlled equipment for the precision machining of Al, Ni, Cu-Ni alloys and other metals used in the fabrication of nuclear submarine components. Operations considered include parts contour planning, groove cutting, threading, honing, drilling and milling. (G-general, T22, 1-52)

779-G. Effect of High Temperature Prestraining on Retained Ductility of Steel. Kazuo Terazawa and Midori Otani. Osaka University, Technology Reports, v. 11, Mar. 1961, p. 99-119.

The influence of prestraining temperature in the range 20-600° C. and the amount of compressive or tensile prestrain on the retained ductility, fracture stress and flow stress curve for a killed mild steel. 17 ref. (Q5m, G23q, 1-66; CN)

780-G. Manual Lathe--With Automatic Control. Automatic Machining, v. 22, Sept. 1961, p. 39-40.

Pure Cu blanks for power tubes are machined by a manual lathe fitted with a lathe actuator and a chute type parts feeder. Production is increased and dimensional accuracy improved. Controlled, rather than hand, feed lengthens tool life. (G17, 1-52, 18-74; Cu)

781-G. Tooling Materials for Cold Headers. W. F. Pravel. Automatic Machining, v. 22, Sept. 1961, p. 55-58.

Tabulation of composition, heat treatment temperatures, Rockwell hardness values and wear resistance data for cold heading die steels, cold heading punch steels, steels for cutoff tools and steels for knockout pins. (G10, 1-67, Q-general, 17-57; ST)

782-G. Stainless Shapes Double Their Strength. Machine Design, v. 33, Sept. 14, 1961, p. 40, 42.

Application of Ardeforming to 301, 302 and 304 stainless steel. Vessels fabricated from Type 301 have been stretched 13% at -320° F. Tensile strength went from 102,000-260,000 psi. and yield strength approached 240,000 psi. (G9, 1-67, Q23b, Q27a, T26q; ST)

783-G. Chemicals Blank Precision Parts. John E. Hendricks. American Machinist/Metalworking Manufacturing, v. 105, Sept. 18, 1961, p. 126-129.

Blanking precision parts by a photomechanical technique which combines photography with chemical etching to produce burr-free parts to close tolerances. A multiple-exposure master negative is prepared, from which the designs of the parts to be blanked are transferred to stainless steel, brass, Cu or Al sheet and foil. (G2h, G24b, 1-52; SS, Cu-b, Al)

784-G. Hand-Held Tool Explosive-Forms Tubing. American Machinist/Metalworking Manufacturing, v. 105, Sept. 18, 1961, p. 129.

A hand-fired explosive expanding tool is used to expand the ends of tubular joints

to eliminate heavy couplings in aircraft fuel and hydraulic systems. The tube ends are then brazed. (G-general, K8, T24; NM-k34, 4-60)

785-G. Conveyorized Grinding Holds Close Honeycomb Tolerances. L. G. Brown. Space/Aeronautics, v. 36, Sept. 1961, p. 81, 83, 85.

Grinding of honeycomb cores and stainless sheet tolerances of ±0.001 in. Batch processing method in conjunction with conveyorized and pinch-roll grinders reduces grinding, handling and finishing operations. (G18, 1-52, 17-55; SS, 7-59)

786-G. Taking Heat Out of Solid Case-Making. John F. Judge. Missiles and Rockets, v. 9, Aug. 28, 1961, p. 32-35.

Application of cryogenic metalworking to solid-rocket motor case fabrication. 301 and 302 steel are used for stretch-forming without size limitation. Parameters are given for design of chamber and of equipment. (G9, 1-52, 1-66, T24e; SS)

787-G. From Art to Science in Grinding. Mauric Gormly, Robert G. Fisher and W. Kent Mathias. Grinding and Finishing, v. 7, Sept. 1961, p. 34-38.

Study of basic theories, wheel composition and machine design to develop closer tolerances. Dynamometer is used to obtain work force measurements on the workpiece. Effects of plastic deformation, friction and high temperature and pressure. (G18, 10-54, 17-55)

788-G. Jig Grinding--Versality in the Die Shop. Pt. 2. Contour Grinding. Frederick C. Victory. Grinding and Finishing, v. 7, Sept. 1961, p. 40-43.

Accurately locating and sizing holes, studs and contours in hardened production parts by horizontal-spindle contour grinding and wheel dressing. Parameters governing contour practices. (G18, 1-52)

789-G. Grinding High Strength Thermal Resistant Materials. Grinding and Finishing, v. 7, Sept. 1961, p. 44-46.

Abrasive machining of stainless steel and of Ni, Fe and Co-base alloys requiring variable spindle speed drive; automatic gaging, sizing, wheel dressing and balancing; increased spindle rigidity and "low stress" grinding. (G-general, 1-52; SGA-h, SGB-a, SS, Ni-b, Fe-b, Co-b)

790-G. (Russian.) Contact Friction Stresses in Pressing of Aluminum and Some of Its Alloys. Yu. P. Hlebov and R. A. Nikolaev. Tsvetnye Metally, Apr. 1961, p. 48-50.

Influence of reduction rate and temperature on resistance force developed during die forming. 6 ref. (G25, G4d, 2-61, 3-67; Al)

791-G. New Shear Line Cuts Sheet Fast, To Close Tolerances. Modern Metals, v. 17, Sept. 1961, p. 66-67.

Shearing Al sheet in a line which includes a hump table for taking up slack and a positive stop measuring system of precise measurement of length. Vibration at the cutting point is controlled to maintain accuracy. (G2, 1-52; Al, 4-53)

792-G. Determination of the Deep-Drawing Capacity of Aluminum and Its Alloys. Robert Chopin. Sheet Metal Industries, v. 38, Sept. 1961, p. 637-643.

Tests are made on several diameters and thicknesses of Al and by graphical analysis of the test results. Influence of metal thickness, die radius, drawing speed, temperature and choice of lubricant on drawing capacity. (G4; Al, 17-52, 17-57)

793-G. Quantitative Assessment of Deep Drawing and Stretch-Forming Qualities. Pt. 1. J. C. Wright. Sheet Metal Industries, v. 38, Sept. 1961, p. 649-658, 674.

Parameters and equipment for tests of general metallurgical quality, non-simulative quantitative tests and cupping tests used to evaluate drawability of sheet materials. 22 ref. (G4, 1-54; 4-53, 17-52)

794-G. Steel-Bonded Carbide Whittles Die Costs. Metalworking Production, v. 105, Sept. 13, 1961, p. 69.

Drawing of austentic stainless steel cups using a die fabricated from toolsteel and titanium carbide. Effect of composition and heat treatment on galling resistance and wear life of the die material. (G4c, Q9, W24n; SS-e, TS, 6-69, 17-57)

795-G. Ten Proven Applications of Modern Surface Grinding. John E. Hyler. Production Equipment, v. 37, Sept. 1961, p. 4, 6, 8.

Operating principles and equipment design are reviewed for level, index and contour grinding. Use of special horizontal and vertical grinders for fabricating steel and ceramics bushings, missile and aircraft nose cones and foundry components. (G18k, T7, T24, 1-52; ST, NM-f, 17-57)

796-G. Blasting Metals Into Shape. Lawrence Lessing. Fortune, v. 64, Sept. 1961, p. 127-131.

Use of controlled underwater explosion to shape metals utilized for rocket and missile components. Equipment, principles, operating stages and future applications including an explosive welding process. (G-general, K-general; NM-k34)

797-G. (French.) Operations in Thick-Sheet Mills. Y. Charet. Revue de Metallurgie, v. 58, June 1961, p. 507-511.

Trimming stage including end and side shearing of as-rolled sheet with technological parameters for uniform quality control. (G2g, 1-52)

798-G. (Russian.) Stamping of Truck Camshaft Journals. I. E. Hutkin. Kuznechno-Shtampovochnoe Proizvodstvo, Apr. 1961, p. 15-18.

Sequence of hot stamping operations includes induction heating of hollow blanks. Various designs are given for dies for economic and accurate stamping of journals. (G3, 1-69, 17-51, T21e)

799-G. (Russian.) Two-Step Cold Upsetting Machine for New Automatic Line. A. N. Hladkikh and N. I. Maslennikov. Kuznechno-Shtampovochnoe Proizvodstvo, Apr. 1961, p. 32-35.

Bolts with hexagonal heads are cold stamped by a machine with conveyor and ejector subassemblies. (G10p, 18-74, T7f)

800-G. (Russian.) Dies for Hole Piercing. A. H. Kokin. Kuznechno-Shtampovochnoe Proizvodstvo, Apr. 1961, p. 43-44.

Highly wear resistant dies are designed for simultaneous piercing of multiple holes in steel disks. Methods of cooling and lubrication. (G2j, W24n, 1-52, 17-51; ST)

801-G. How to Select Free-Machining Steel. T. M. Garvey. Metalworking, v. 17, Oct. 1961, p. 24-27.

Evaluation of machinability of representative free machining steels including B1100, C1100 and C1200 series, leaded and resulphurized, high and low phosphorous carbon steel bars; 4000 series alloy bar steels; 303 austenitic, 430 F ferritic and 416 martensitic stainless; and Fremax plate steels. Relation of S, Pb, P and N additives to machinability and effect on mechanical properties. (G17k, Q-general, 2-60; ST)

802-G. Ultra-Modern Feed Line--Key to Precision Blanking. F. W. Tortolano. Metalworking, v. 17, Oct. 1961, p. 72-73.

Drawing blanks for automobile components are stamped from steel strip at closer tolerances and increased production rates on a blanking press fed by an electrically controlled decoiling and feed line. (G3, T21c, 1-52; ST, 4-53, 17-57)

803-G. IBM Chooses EDM to Cut Today's Tough Metals. Metalworking, v. 17, Oct. 1961, p. 75.

Electrical discharge machining, using porous Cu or brass electrode and a dielectric stream for flusing particles from the spark gap, is applied to cutting case hardened high carbon, high chromium steels, tungsten carbide and 304 and 305 stainless steels. Printing wheels and card punch and powder compacting dies are cut to severe tolerances from materials hardened to 63 Rockwell C hardness. (G24a, T6r; SGB-q, ST, 6-69)

804-G. Cold, Silent "Explosion" Shapes Stainless Steel. Metalworking, v. 17, Oct. 1961, p. 77.

Explosive forming of pressure vessels and cylinders to design configuration from welded preforms using gas pressure at -320° F. by the Ardeforming process. Application to 301, 302 and 304 stainless steels, Ti and Al. The temperature deformation enhancing mechanical properties and eliminating the need for heat treatment. (G-general, 2-63, 3-67, 3-74, T26q; SS, 17-57)

805-G. (Japanese.) Shave-Turning. Pt. 2. Tool Life of Carbide Tools. Masao Kubota, Minori Kanai and Yuhei Masuyama. Journal of Mechanical Laboratory (Japan), v. 15, May 1961, p. 1-5.

Shave turning operations on 0.45% carbon steel and 18-8 stainless steel

are studied to determine performance of single, double and universal carbide tools and optimum rate of feed. (G17a; CN, SS)

806-G. (Japanese.) Shave-Turning. Pt. 5. Cutting Temperature. Masao Kubota, Minori Kanai, Masuo Kakishima and Hideyo Ito. Journal of Mechanical Laboratory (Japan), v. 15, May 1961, p. 6-11.

Chip-tool thermocouple measurement during shave-turning of 18-8 stainless steel with high-speed steel tools indicates that temperature is a function of angle of inclination, depth of cut, rate of feed and cutting speed. (G17)

807-G. Automation Speeds Repair Work. Iron Age, v. 188, Oct. 5, 1961, p. 79.

Use of automatic turret lathes to produce replacement parts for earth-moving equipment from cast iron, cast steel, malleable iron and steel forgings. Feeds and speeds for materials are included in each work order for single-spindle checking machines. (G17, T4a, 18-72, 18-74; CI, ST, 4-51, 5)

808-G. Oscillating Stone Shapes Parts. Iron Age, v. 188, Oct. 5, 1961, p. 80-81.

Finishing to close tolerances by rotating small metal parts beneath an oscillating microstoning machine which corrects out-of-round conditions left by centerless grinding. A cycling principle achieves metal removal and final polishing. (G18h, G19n, 1-52, 1-63)

809-G. Factors Affecting the Drawability of Sheet Steel. R. L. Whiteley. Paper from "Regional Technical Meetings, 1960". American Iron and Steel Institute, New York 17, 1961, p. 11-27.

Principles of the deep drawing process as affected by depth of draw, character of the drawing operation and drawability of the sheet material. Effect of the material's ductility and anisotropy on drawability. 12 ref. (G4b, Q23, 3-72, 17-52; ST, 4-53)

810-G. (English.) The Behavior of Ceramic Tools in Turning Operations. G. Pahlitzsch and G. Kamiske. Werkstatt und Betrieb, v. 94, July 1961, p. 161-165.

Turning of 16 MnCr 5, unalloyed and free-cutting steels as it affects wear qualities of oxide ceramic tools with special reference to such operational parameters as cutting angle and frequency. (G17a, T6n, 1-52; ST)

811-G. (English.) Investigations of the Force and Physical Work Required for Punching Holes Into Thick Sheet Metals. Werner Eickhoff. Werkstatt und Betrieb, v. 94, July 1961, p. 171-179.

Determination of forces encountered by hole punching as a function of material strength, metal thickness, cutting clearance, punch diameter, impact speed and return forces. Testing conducted on St. 37, CK35 and CK45 steel sheet. 32 ref. (G2j, 1-53; ST, 4-53)

812-G. Air-Device Makes Four Bends in Resistor Leads at Once. Morton J. Schultz. Assembly & Fastener Engineering, v. 9, Oct. 1961, p. 36.

Fast and accurate bending of resistor leads using an air-powered device, adjustable to height and width specifications, which is usable with many sizes of resistors. A cam, adjustable to various wire thickness, guards against flattening of resistor leads at the time of compression. (G6, T1p, 1-52)

813-G. (Dutch.) Correct Choice of Electrode Materials for Spark Machining. H. J. Hovinga. Metaalbewerking, v. 26, Dec. 8, 1960, p. 231-235.

Machining of Cu, Al, ferrous materials, Ni, brass and Zn with electrodes of the same materials to find the most advantageous pairings (work metal/electrode metal) providing the least electrode wear and optimum electrical parameters. (G24a, T1f; Cu-b, Al, Fe-b, Zn, Ni, 17-52, 17-57)

814-G. Metallurgical Aspects of the Cold Extrusion of Steel. R. E. Okell. Metal Treatment and Drop Forging, v. 28, Aug. 1961, p. 309-316.

Plastic properties and deformation resistance required for extrusion of steel are considered for annealed billets. Behavior of steel during extrusion is related to reduction, tensile strength and Izod values. Effects of extrusion on carburizing, welding, cracking and surface rippling. (G5, Q23q, Q-general, 2-64; ST, 17-52)

815-G. (German.) Deep-Drawing of Rectangular Pieces. W. Dutschke. Werkstattstechnik, v. 51, Apr. 1961, p. 167-173.

Investigation of force, drawing ratio and model relations in the deep drawing of sheet steel specimens of various dimensions at varying drawing speeds. (G4b, G25; ST, 4-53)

816-G. The Fabrication of Stainless Steel. Pt. 1. J. B. Burk. Atlas Steel News, v. 15, Aug. 1961, p. 7-8.

Ferritic, martensitic and austenitic steels are compared on the basis of mechanical properties, corrosion resistance and machinability. (G17k, Q-general, R-general; SS)

817-G. "Buttercut" Tag Tied on Tellurium Grade Steel. Steel, v. 149, Oct. 9, 1961, p. 120.

Machining tests on a modified leaded grade steel with Te additions at speeds 3 1/2 times the normal rate and feed rate increased to 0.0035 in. per revolution indicate good machinability. (G17k, 17-52; ST, Te)

818-G. Steel Rule Dies Pare Costs on Short Stamping Runs. Steel, v. 149, Oct. 9, 1961, p. 132.

Steel rule material is cut, beveled at joints and contoured by hand-operated machine to design blanking and piercing dies which are virtually free from burrs. (G-general, W24n; ST)

819-G. Explosive Forming Scores at General Dynamics. Steel, v. 149, Oct. 9, 1961, p. 145.

Production of intricate parts for missile and space vehicles by explosive forming technique which accommodates parts up to 8 ft. in diameter and 6 ft. in length. (G-general, T24e; NM-k34)

820-G. Propeller Profiling Under Electronic Control. Metalworking Production, v. 105, Sept. 20, 1961, p. 67-69.

Shaping helicoidal pressure surfaces and copy-milling suction surface of propeller blades by tip to root or circumferential methods under automatic control. (G17, 1-52, 18-74, T24a)

821-G. Tips on Machining Titanium. Clarence Mathewson and Frederick A. Janz. Metalworking Production, v. 105, Sept. 20, 1961, p. 70-71.

Results of test drilling of as-rolled Ti alloy containing 6% Al and 4% V, following heat treatment at 1550° F. for 30 min. and hardening to Rockwell C 34. General machining techniques, drill geometry, chamfering and tapping. (G17, 1-53; Ti-b, Al, V, 4-53)

822-G. (German.) Experiences in Processing of Stainless Sheets of Austenitic Steels. E. Fr. Scheven. Werkstattstechnik, v. 51, Feb. 1961, p. 75-79.

Production of household goods from austenitic stainless 18-8 CrNi and CrMnNi steel by drawing and pressing with rubber mandrels, followed by free annealing and annealing to remove strain hardening and magnetic behavior. (G1, J1, J23, T10; SS-e)

823-G. (German.) Tool Design for Processing of Stainless Sheets of Ferritic Steels. H. Kiethe. Werkstattstechnik, v. 51, Feb. 1961, p. 79-82.

Cutting, punching, bending and folding operations on X 10 Cr 13, X 7 CrAl 13, X 8 Cr 17, X 8 CrTi 17, X 8 CrCb 17 and X 8 CrMoTi 17 steel sheet. (G6, G17, 1-52, 17-51; SS, 4-53)

824-G. Fundamentals of Drawability of Sheet Steel for Porcelain Enameling. J. W. Frame, R. L. Whiteley and D. J. Blickwede. Metal Products Manufacturing, v. 18, Oct. 1961, p. 65, 67, 69.

Operations by which flat sheet steel or coil is formed into useful shape prior to enameling include adjusting blank size, holding down pressures, use of lubrication and other techniques to make deep draws. (G4, 1-52, 17-52; ST, 4-53)

825-G. Chip Deformation and Surface Finish in Turning. M. Ehrenreich and Shimon Ilani. Microtecnic, v. 15, Aug. 1961, p. 129-132.

Investigation of chip deformation in turning 1045 SAE alloy with a round-nose cutting tool; comparison of the chip sections obtained with the theoretically expected forms. Effect of the feed/nose-radius ratio on surface finish of the workpiece. 5 ref. (G17, 1-52; ST)

826-G. The Effects of Vibrations on the Cutting of Metals. R. Weill. Microtecnic, v. 15, Aug. 1961, p. 133-139.

Measurement of wear in high-speed steel tools during the cutting of steel

samples. Effects on tool wear of vibrations and variations in cutting force. (G17, Q9p, 1-53; TS-m)

827-G. Economics of the Cutting-Off of Metals. J. L. Remmerswaal and M. J. C. Matthusen. Microtecnic, v. 15, Aug. 1961, p. 140-150.

Cutting of bar stock of stainless steel, toolsteel, carbon steel, cast iron, brass, bronze, Cu and Al and Mg alloys. Cutting-off processes considered include hack, band, circular and friction sawing and abrasive cutting with both automatic and nonautomatic machines. 4 ref. (G17h, 17-53, 18-74; SS, TS, CN, CI, Cu-b, Al-b, Mg-b, 4-55)

828-G. Automatic Profiling of Tube Ends. Engineer, v. 211, Apr. 7, 1961, p. 556-557.

Operating principles and equipment design for a flame-cutting machine which automatically profiles branch tube ends using center line and main structure angle information provided on drawings. Design considerations are given to simple and multiple profiling of tube ends for tubular structures and pipe systems. (G22g, 1-52; 4-60)

829-G. (Dutch.) Drill Points Applicable in the Drilling of Cast Iron. J. N. Klaver and J. G. Wessels. Metaalbwerking, v. 26, Jan. 19, 1961, p. 292-294.

Effect of the drill point profile on drilling speed and the tool life measured as a function of the number of holes and the total depth drilled in cast iron of approx. 200 Brinell hardness. Torsional momentum measured in drilling as a function of the point angle and the applied pressure. (G17e; CI)

830-G. Some Aspects of Explosive Forming. J. L. Remmerswaal and P. J. M. Boes. Microtechnic, v. 15, July 1961, p. 104-109.

Review of the methods of explosive forming according to the source of power. Report of experiments on the relationship between the minimum charge required for forming and plate thickness. Formulas are given for calculating the pressure, impulse and the energy density for these experiments. (G-general, 1-52, 1-53; NM-k34)

831-G. Hard Metals Form Soft Ones. Steel Horizons, v. 23, Fourth quarter 1961, p. 12-13.

Machining and tempering of high-alloy toolsteel to make dies for pressure die casting of various metals including Zn, Al, Mn and brass. (G-general, J-general, E13, 1-52; TS, Al, Cu-n, Mn, Zn)

832-G. (German.) Material Processing by Electron Beams of High Intensity. W. Scheffels. Draht, v. 12, Aug. 1961, p. 352-356.

Precision welding, drilling, cutting and milling of metals such as alloy steel including X 12 CrNi 18 8 steel, Zr, Ti, Al, Cu, W, Mo, Pt, Ge, Ta, Si, Cu-Ag, W-Fe and Cu-Al alloys; and nonmetals such as graphite, diamond, Al_2O_3, ceramics, glass and quartz by high-intensity electron beams. Review of reaction mechanisms; and design and application of equipment. (G24, K6, 1-52)

833-G. (Russian.) Intensification of the Drawing-Out Process of Austenitic Stainless Steels. V. P. Martynov. Kuznechno-Shtampovochnoe Proizvodstvo, May 1961, p. 11-12.

Increasing maximum coefficient for drawing out of steel (from 2.3-5.2) by selection of the correct temperature. 6 ref. (G4, 1-57, 2-61; SS-e)

834-G. Broaching on Dial-Type Machine Cuts Hole Finishing Costs. Metalworking Production, v. 105, Sept. 6, 1961, p. 77-78.

Strip broaching is applied in place of reaming in the processing of connecting rod gudgeon pin holes. Equipment and procedure designed to raise quality while lowering production costs and tool maintenance. (G17d, 1-52)

835-G. Duplex Grinders Have Flexibility Too. Metalworking Production, v. 105, Sept. 6, 1961, p. 79-80.

Increased flexibility in surface grinding achieved, giving cheaper tooling for a wider range of components. Automatic loading and work sizing equipment and processes. (G18k, 1-52)

836-G. One Tape Machine Replaces Five. Metalworking Production, v. 105, Sept. 6, 1961, p. 87-88.

Machining of Al sand castings and stainless steel, using a multiway tape-controlled machine (MT3-Burkhardt &

Weber) that functions as a vertical miller, six-spindle drill, turret lathe, borer and tapper. Operational examples cite cutting time factors. (G17, 1-52; SS, Al, 5-60)

837-G. Machining the Jet and Space-Age Metals. Donald A. Reiner and James M. Galimberti. Western Machinery and Steel World, v. 52, Sept. 1961, p. 74-77.

Machining variables including lead and rake angles, cutting fluid, honing, carbide grade, cut depth and feed and speed affecting machining of Fe, Ni and Co-base superalloys. Suggestions for achieving improved machining include tool care and workpiece handling recommendations. (G17, 1-52; Fe, Ni-b, Co-b, SGA-h)

838-G. Tape-Controlled Jig Boring of Fire-Control Computer Parts. Western Machinery and Steel World, v. 52, Sept. 1961, p. 82.

Tape-controlled jig borer utilized in the fabrication of bearing plates for naval fire-control computers. Numerical control (Fosmatic System) provides table and saddle locations, speed and feed rates and spindle depth and cycle control. (G17d, Ti, 1-52, 18-74)

839-G. Stub Broaching Cuts Shouldered Helical Gear. Metalworking Production, v. 105, Sept. 27, 1961, p. 68-69.

Cutting an internal helical gear for an automatic transmission unit from high-speed steel by broaches mounted on an indexing table controlled through microswitches. (G17d, 1-52; TS-m)

840-G. Tape Quarters Condenser Plate Drilling Time. Metalworking Production, v. 105, Sept. 27, 1961, p. 70-71.

Drilling, tapping and counter-boring 12,000 1 in. diameter holes in brass or steel condenser plates for nuclear power station equipment. Operations and capacity of bridge-type drilling machine. (G17, 1-52; ST, Cu-n)

841-G. Tungsten Arc Cuts Stainless 97% Faster. Welding Design & Fabrication, v. 34, Oct. 1961, p. 65.

Contoured holes in 8-in. stainless steel pipe are cut with standard tungsten arc equipment using a 35% H-65% Ar mixture for shielding. High amperages and voltages are used to speed the cutting with the high content boosting the temperature above 3000° F. A high flow rate for the protective gas cover is used to remove slag and metal from the cut. (G22h, 1-52, 3-67; SS, 4-60)

842-G. Austenitic Stainless Steel Tubing for Bourdon Elements. E. S. Hughes. Instrument Practice, v. 15, Sept. 1961, p. 1119-1123.

Fabrication of corrosion resistant Bourdon tubing by cold drawing hollows of austenitic stainless steel containing C, Mn, Si, S, P, Cr, Ni and Mo. Mechanical properties of the tubing including yield strength, as affected by wall thickness, and workhardening capacity. (G4, 1-67, Q-general, X12; SS-e, 4-60, 17-57)

843-G. (German.) Machining Tests on Drawn and Drawn and Normalized Rods of Openhearth Steel With Varying Carbon and Lead Content. Alexander Schepers and Ernst von Blumenstein. Stahl und Eisen, v. 81, Aug. 31, 1961, p. 1180-1182.

Machining of rod specimens of cold drawn normalized and as-drawn openhearth steel, containing 0.1-0.5% C, 0.15-0.35% Si, 0.45-0.75% Mn, 0.015-0.045% P, 0.015-0.035% S and 0.16-0.22% Pb at varying cutting rates. Machinability as influenced by composition and normalizing. (G17k, 2-60, 2-64; ST, 4-55)

844-G. (German.) Stresses and Forces in Deep Drawing Without Blank Holder Using Conical Rings. Galal S. A. Shawki. Zeitschrift fur Metallkunde, v. 52, Aug. 1961, p. 532-537.

Stress analysis and computation of maximum drawing force as influenced by friction and strain hardening of drawn metal. Comparison of results obtained from deep drawing of St.VIII c steel, Al 99.5 and Ms 63 brass sheets with theoretically derived data. (G4b, G25, Q-general, 3-66; ST, Al, Cu-n)

845-G. The Fabrication of Stainless Steel. Atlas Steel News, v. 15, Sept. 1961, p. 7-8.

Survey of turning speed and feed requirements and tool geometry for machining 300-400 series stainless steels. (G17, 1-52; SS)

846-G. Technological Explosion in Forming. C. L. Kobrin. Iron Age, v. 188, Oct. 12, 1961, p. 153-160.

A brief review of forming techniques, equipment and applications. The use of explosive, hydroelectric, magnetic, gas, contour and radial draw forming, cold and hot extrusion, shear spinning, electroforming, plasma-jet spraying, rolling under an atmosphere, ardeforming and ausforming in the production of aircraft, missile and other components from high strength and refractory metals. (G-general, T24, 1-52, 10-54)

847-G. Abrasives Slash Cutting Costs. Iron Age, v. 188, Oct. 12, 1961, p. 165-167.

The use of an abrasive wheel cutter in heavy-metal removal and machining operations as well as grinding and finishing. The design, wear rate and production rate of the cutter. (G17, 1-52)

848-G. Numerical-Control Costs Tumble. Iron Age, v. 188, Oct. 19, 1961, p. 138-139.

Drilling with a mass produced, automatic single-spindle machine eliminates positioning errors and the need for jigs. Design and speed of the machine are discussed in several applications. (G17e, 1-52)

849-G. Vibrations Shape Soviet Tools. Iron Age, v. 188, Oct. 19, 1961, p. 145.

Ultrasonic vibrations are used during grinding of carbon steel, toolsteel, carbide or Ti alloy cutters to improve crystal structure of the tool and thus increase tool life. Effects on residual stresses and surface smoothness. (G24c, Q25h, S15; CN, TS, Ti-b, 6-69)

850-G. Tool Making by Spark Erosion. P. J. C. Gough. International Plastics Engineering, v. 1, Sept. 1961, p. 399-403.

Production of forging dies, die casting dies, plastic molds and glass molds in toolsteel and Nimonic. (G24a, W19n, W22a, 1-52, 17-57)

851-G. Forming and Piercing on a Press Brake. J. A. Waller. Machinery Lloyd (Overseas Edition), v. 33, Sept. 30, 1961, p. 47-49.

Notching, slitting, punching and bending operations carried out on sheet steel 0.036 in. thick by tools of special design to reduce chance of distortion and cracking during heat treatment. (G1, G2, 1-52, 17-51; ST, 4-53)

852-G. (French.) Explosive Deformation. G. Greiner. Mines et Metallurgie, no. 3554, Sept. 1961, p. 483-485.

Metallurgical applications of explosives include the workhardening of Hadfield steel, causing lattice microdeformations without significant macrodeformation; the pressing of powder, applying a sudden pressure of 150 kilobars to produce a compact with high density and tensile strength; and the forming of sheet metal. (G-general, H14, Q23a, 1-52; ST, 4-53, 6-71, NM-k34)

853-G. (German.) Cutting by Electron Beams. W. Opitz and K. H. Steigerwald. Schweissen und Schneiden, v. 13, Sept. 1961, p. 432-436.

Development of a new electron beam cutting technique which combines electron deep welding and the pulse technique used in electron milling. Design and operation of electron beam cutting machine. Examples for electron beam cutting of sinter metal, "Widia", X 8 CrCb 17 and 18-8 CrNi steel, carbon steel, Ms 58 brass and hardened free-cutting steel. (G24; ST, Cu-n)

854-G. Tolerances in the Prefabrication of Ships. Carl-Erik Fredriksson. Engineer, v. 212, Sept. 29, 1961, p. 538-540.

Machining, welding and other prefabrication procedures performed on steel angle bars, flat irons and plate work are considered in terms of tolerances, shrinkage effect and assembly faults. (G17, K-general, T22g, 1-52, 17-55; ST)

855-G. (English.) Ultrasonic Electro-Spark Machining. Pt. 1. Genrokuro Nishimura. Machine & Instruments, Sept. 1961, p. 34-35.

Method for creating spark and mechanism for feeding the electrode. An R-C circuit produces spark in water, the electrode being fed manually. (G24, G14b)

856-G. Computer Puts Production Runs Into Orderly Machining Plan. Iron Age, v. 188, Oct. 26, 1961, p. 83-85.

Increased production of rollers machined from Krupp steel, a high Ni alloy, through use of saddle-type turret

lathe with special attachments and 2AB automatics. Scheduling techniques are computer-based. (G17, 1-52, 18-54; SS, Ni)

857-G. How Non-Chemical Explosions Shape Hard-To-Form Metals. Iron Age, v. 188, Oct. 26, 1961, p. 88-89.

Electro-hydraulic operating principles and procedures for capacitor-discharge plant equipment used to form, weld, bond and pierce ceramics and metals including Al, Ti, Be, Co and stainless steel. (G14b; SS, Al, Be, Co, Ti)

858-G. Solid Propellant Cases Produced by Ardeform Process. Modern Machine Shop, v. 34, Oct. 1961, p. 124-127.

Cold working of preform in cryogenic stretch-forming process improves strength and ductility of austenitic stainless steels. (G9, 1-67, Q23, T24e; SS-e)

859-G. Machining Small Gears to Precision Tolerances. Winifred M. Berg. Modern Machine Shop, v. 34, Oct. 1961, p. 134-141.

Technique and equipment enabling quality control of spur gears in mass production operation. Blanks of 303 stainless steel or 24ST aluminum are cut, drilled and finished in a series of carefully controlled operations. Al gears are anodized before hobbing. (G17, L19, 1-52; SS, Al)

860-G. (German.) The Electron Beam as a New Tool. W. Opitz. Werkstattstechnik, v. 51, Sept. 1961, p. 448-454.

Welding, milling, cutting and machining of nonmetals including synthetic rubies, Si and quartz and of metals including alloy steel, Cb, Mo, W and Ta. (G24, K6, 1-52; NM-e, ST, Cb, Mo, Ta, W)

861-G. "In Place" Roll Grinding. Ralph H. Bohlin. Grits and Grinds, v. 52, Aug. 1961, p. 10-11.

Redressing calender and other types of rolls made of cast iron and steel by a process carried out in the mill, using a portable roll grinder. Practical advantages and economic considerations. (G18k, W23k, 1-52, 18-71; ST, CI)

862-G. Elevator Plungers Machined by Centerless Belt Grinding. Carlton C. Porter. Grits and Grinds, v. 52, Aug. 1961, p. 12-13.

Descaled mild steel pipe up to 16 in. in diameter and 56 ft. in length is ground to specified roundness limits and finished with coated abrasive belts. (G18h, W25c, 1-52; CN, 4-60)

863-G. Grinding the Largest Cast Steel Rolls Ever Produced. E. T. Larson. Grits and Grinds, v. 52, Aug. 1961, p. 3-7.

Grinding rolls with diameters up to 72 in. using a roll grinder with a grinding wheel made of A301-HB12 Alundum, which offers good accuracy regardless of roll size. (G18, 1-52, 17-57; ST, 5)

864-G. (Japanese.) Study on Machinability of Free Machining Steels. Government Mechanical Laboratory (Japan), Report no. 43, 1961, 126 p.

Effect of Pb and S additives and use of carbon tetrachloride as a cutting fluid on tool friction, chip formation, cutting force, surface finish, temperature and tool life. (G17k, 2-60, 2-66; ST, SGA-k)

865-G. (English.) Machinability Study of Ceramic Tools. Pt. 7. Roughness of Machined Surface. Noboru Nakayama, Kunio Yamada, Hiroshi Kajihara, Seisuke Sakai and Hisao Mii. Government Industrial Institute Research (Nagoya), Report, v. 10, Aug. 1961, p. 457-466.

Effects of cutting speed, tool wear and chamfering of cutting edge on surface roughness of carbon steel (0.44%) machined by standard throw-away type ceramic tools. 5 ref. (G17k, 1-52; CN)

866-G. (English.) Chemical Machining. Pt. 9. Machining of Iron and Steel. Chemical Resistant Coating Film and Surface Treatment. Toshikazu Sato, Kazuo Kodaira and Hirosuke Yamazaki. Government Industrial Research Institute (Nagoya), Report, v. 10, Sept. 1961, p. 523-536.

Uniform etching at the interface between a carbon steel plate and a chemically resistant polymer coating film achieved by use of HNO_3. 10 ref. (G24b, 1-53, 17-57; CN)

867-G. How to Make a Larger Ultrasonic Grinding Tool. G. E. Wright. Ceramic Industry, v. 77, Oct. 1961, p. 75-76, 89.

Technological parameters for tooling developed to machine a pattern over an area of glass or ceramic larger than the recommended maximum. (G24c, 1-53)

868-G. Critical Threads Cut by EDM. Machine and Tool Blue Book, v. 56, Nov. 1961, p. 122-124.

Tapping and threading of 52-100 steel ball bearing races and a 17-4 PH stainless steel cylinder by electric discharge machining, utilizing hollow brass electrodes. (G17f, G24a, 1-52; Cu-n, SS, ST, 17-57)

869-G. Tungsten Can Be Machined! W. E. Montgomery. Machine and Tool Blue Book, v. 56, Nov. 1961, p. 137-139.

Study of tool geometry in cutting, boring, chamfering, turning, facing, drilling and grinding of sintered and hot pressed tungsten. Determination of speed, feed, depth of cut for roughing, semifinishing and finishing operations. (G17; W, 6-72)

870-G. A PE Special Report on Theoretical Formability. W. W. Wood, R. E. Goforth and R. A. Ford. Product Engineering, v. 32, Oct. 16, 1961, p. 71-83.

Design charts are used to predict sheet metal forming failures by splitting or buckling. Forming methods include brake forming, deep drawing and spinning, dimpling, rubber stretch and shrink flanges, joggling, linear stretch heel-in, sheet stretch and beading rubber press. Sheet materials include Al, Ti, Mg, Be, V, Cb, Mo, W and Ni alloys and superalloys. 7 ref. (G-general, G25, 17-52; Al, Be, Cb, Mg, Mo, Ni-b, Ti, V, W)

871-G. New Ways to Form Metals. R. J. Ward, Jr. Product Engineering, v. 32, Oct. 16, 1961, p. 106-107.

Electric discharge, magnetomotive and chemical explosive techniques are discussed with examples of industrial and aerospace applications including the fabrication of bulkheads larger than 200 in. in diameter. (G-general, G24, 10-54; NM-k34)

872-G. Automatic Tube Profiling. Welding and Metal Fabrication, v. 29, Oct. 1961, p. 403-405.

The design, accuracy, setting procedure and operation of an automatic oxygen-cutting machine for producing a profile on steel tubes and pipes required to fit on or saddle other tubes as in structural, chemical and petroleum applications. Use of the profiling machine eliminates many conventional steps in preparation. (G22, T26, T28, 1-52, 17-57; ST, 4-60)

873-G. Giant Band Saw Slices Die Blocks With Ease. Western Metalworking, v. 19, Oct. 1961, p. 29-30.

Forged steel billets and die blocks are cut at a rate of 2.4 sq. in. per min. by an automatic horizontal band saw incorporating two 4-in. band wheels and an oil coolant stream directed through the cut. (G17h, 1-52; ST, 4-51)

874-G. New Twist for Lathe--It Wraps Rocket Chambers. Western Metalworking, v. 19, Oct. 1961, p. 30.

Fabrication of high strength, lightweight, cylindrical chambers for rocket engines and pressure vessels by bonding helically wrapped, thin metal strips to a light weight metal shell. (G-general, T24f, 1-52)

875-G. Solid-Fuel Cases Tapped Hard for Polaris Rocket Engine. Laurence W. Collins, Jr. Machinery, v. 68, Sept. 1961, p. 87-92.

Drilling and tapping blind holes in closure flange of rocket case made of 300 M alloy steel heat treated and tempered to C 54-56 Rockwell hardness. (G17e, G17f, T24e; AY, 17-57, SGB-q)

876-G. Which Tools for Turning--Brazed, On-End, or Throw-Away? G. A. Manchester. Machinery, v. 68, Sept. 1961, p. 98-105.

Analysis of various interrelated factors influencing the selection of tools for turning under a wide range of conditions. Consideration of metal removal rate, downtime, grinding time, tool life, scrap loss, tool geometry, available equipment, part design, required finish, materials to be machined and other factors in terms of productivity and costs. (G17a, T6n; 7-52, 7-59, 17-57)

877-G. Reactor-Case Opener Doubles as Welder. P. L. Marjon. Machinery, v. 68, Sept. 1961, p. 106-110.

Special seal weld cutter for milling the welds on Type 304 stainless steel sealing rings of nuclear reactor pressure vessel. Device also serves as guide for welder during closure. (G17b, T26q, 1-52; SS, 7-51, 17-57)

878-G. Automated Tube Former Improves Washing Machine Production. Edward Damschroder. Machinery, v. 68, Sept. 1961, p. 111-113.

Automatic tube forming machine fabricates cold rolled steel tubes into support posts for washing machine baskets. (G-general, 1-52, T10c; ST, 4-60, 17-57)

879-G. Largest Vertical Dynapak Now in Pilot Phase. Machinery, v. 68, Sept. 1961, p. 133.

Pneumatically operated Dynapak unit is capable of forming a variety of metals and alloys with ram velocities as high as 2000 in. per sec. (G-general, 1-52, 1-71)

880-G. Machine Replaced--Production Increased 100%. Earl Paul. Machinery, v. 68, Sept. 1961, p. 138.

Tube end finishing machine chamfers Al tubing ranging from 3/8-1 in. OD. (G17; Al-b, 4-60)

881-G. Explosive Forming. Metal Treatment and Drop Forging, v. 28, Oct. 1961, p. 401-402.

Summary of process development and review of technological parameters and material deformation characteristics for shaping of complex metal parts and difficult-to-form metals by high energy rate processes. Comparison of a process depending on a combustible gas mixture to forming by detonation of high explosives, the former being more controllable while still producing high forming rates. (G-general; NM-k34)

882-G. Rational Removal of Chips. A. Fackelmeyer. Demag News, no. 160, 1961, p. 27-31.

Design and operating principles of a reciprocating barbed rod conveyor belt including a rod which pushes metal chips along the inside of the conveyor trough. (G17, W12r, 1-52)

883-G. Super-Lathe for Roll Turning. J. Binns. Iron and Steel Engineer, v. 38, Oct. 1961, p. 117-124.

Parameters of design to achieve structural rigidity in order to utilize full horsepower regardless of roll material or type of cutter and development of cutting theory to aid in the selection of ceramic cutters and the evaluation of machinability. (G17, 10-51, 17-51)

884-G. Single Point Threading With Carbide Tooling. Automatic Machinery, v. 22, Oct. 1961, p. 61-62.

Thread cutting with a semi-automatic threading machine incorporating a precision ground hardened Pb screw, a constantly-engaged bronze nut, an auxiliary hydraulic slide and carbide tips. Operating principles and equipment design for producing precise and varied threads. (G17f, W25, 1-52)

885-G. Wire for Cold Heading. S. E. Tyson and J. W. Keegan. Automatic Machining, v. 22, Oct. 1961, p. 71-74.

Stainless steel and heat resistant alloy wires are annealed, coated with a Cu plate and sized in a draw die prior to cold upset heading. Corrosion resistance and workhardening capacity are considered as they affect heading applications. Determination of wire diameter upset, head diameter and heading severity ratios. (G10p, 1-52, 1-67, Q23a, R-general; SS, SGA-h)

886-G. Milling 321 Stainless. A. Incardona and H. H. Poett. Cutting Tool Engineering, v. 13, Nov. 1961, p. 14-15.

Use of a milling cutter with indexable carbide inserts to cut 321 stainless steel billets at a metal removal rate of 24.2 cu. in. per min. Cutter is tested to determine tool life and metal removal rate and feed, cut depth, spindle and cutting speed increases. (G17b, T6n, 17-52; SS, 4-52)

887-G. Machining Complex Stainless Steel Sections. Machinery (London), v. 99, Oct. 18, 1961, p. 912-914.

Milling of airframe components from extrusions of simpler forms. Strength to weight ratio and dimensional accuracy. (G17b, T24a; SS, 4-58, 17-57)

888-G. Temperature Control in Titanium Processing. P. C. Barr. Metal Progress, v. 80, Nov. 1961, p. 71-74.

For processing, Ti should be heated only to the lowest possible forming temperature. Though protective atmospheres are not needed, room air should be kept from inside the furnace as much as possible. (G-general, J-general, 1-52, 2-61; Ti-b)

889-G. Metal Forming With Flexible Tools. Ir. H Hermans and F. H. R. F. Vermeulen. Metalworking Production, v. 105, Oct. 11, 1961, p 69-72.

A number of flexible tooling methods in which rubber or a liquid, or a combination of both, are used to apply the necessary pressure control for deep forming of conical, parabolic or similar shapes. Methods include forming with a free rubber pad, hydroforming and the waterbag process. (G14a)

890-G. (Book and Commentary.) Light Gage Cold-Formed Steel Design Manual. 3rd Edition. 1961. 175 p. American Iron and Steel Institute, 150 East 42nd St., New York 17, N.Y. $1.

Specifications for the design of light gage cold formed steel structurals from A245 and A303 carbon steel, A374 cold rolled steel and A375 hot rolled steel and A446-60T galvanized steel sheet. Information is given for determining the safe load capacities and deflections of sections made of any combination of sheet or strip steel. (G-general, 1-67, 11-62; ST, 4-53, 4-57)

891-G. Ceramic Tips Mill Hardened Steel. Metalworking Production, v. 105, Oct. 4, 1961, p. 54-55.

Milling of steel, hardened to 380-400 Brinell, using a vertical mill equipped with ceramic cutting tips. Comparison of milling efficiency and cost and surface finish for ceramic and carbide tips. (G17b, T6r; ST, NM-f40, 6-69, 7-59, 17-57)

892-G. Broaching Supercedes Reaming. J. M. Sharman. Metalworking Production, v. 105, Oct. 4, 1961, p. 56.

Broaching of Al aircraft parts using portable equipment, incorporating a broaching gun-ram, actuated by air pressure. (G17d, T24a; Al, 17-57)

893-G. Directionality in Sheet and Strip. T. Ll. Richards. Sheet Metal Industries, v. 38, Oct. 1961, p. 715-722.

Discussion of the causes of directionality in metals and its effects on elastic properties. Methods of either eliminating directionality or using it to improve the drawing quality of strip. 10 ref. (G4, 3-72; 4-53, 17-52)

894-G. The Selection and Forming of High-Strength Materials in Aircraft. Sheet Metal Industries, v. 38, Oct. 1961, p. 723-730.

Consideration of manufacturing problems and material characteristics in the design of aircraft, expecially as regards the use of Ti alloys. Topics include structural efficiency, dead weight, bend radius, fatigue, creep and weldability and elongation, springback and buckling during forming. 9 ref. (G-general, Q-general, T24a; Ti-b, SGB-a, 17-57)

895-G. Quantitative Assessment of Deep-Drawing and Stretch-Forming Qualities. Pt. 2. J. C. Wright. Sheet Metal Industries, v. 38, Oct. 1961, p. 731-741.

Review of methods and equipment for Swift and Erichsen cup-drawing, hole-expanding cup, conical cup forming, wedge drawing, bend and lubricant testing and measurement of strains imposed during forming. 18 ref. (G4, G9, 1-54, 17-52)

896-G. (German.) Flame Cutting Technology and Economics. H. G. Kunz. Technische Mitteilungen, v. 54, Aug. 1961, p. 294-298.

Manual and mechanical flame cutting of steel using oxygen of 99.3-99.7%. Review of reaction mechanisms, design of burners and automatic cutting machines, mode of operation and economics. (G22g, 10-54; ST)

897-G. (German.) Inert-Gas Shielded Arc Cutting. F. Walter. Technische Mitteilungen, v. 54, Aug. 1961, p. 298-305.

Mechanism and technology of manual and mechanical inert-gas shielded electric cutting of Al, Cu and austenitic steels. Survey of economics and fields of application. 10 ref. (G22h, 1-54; Al, Cu, SS-e)

898-G. Grinding Fluids. Pt. 1. What They Are. L. P. Tarasov. Tool and Manufacturing Engineer, v. 46, June 1961, p. 67-73.

Reduction of attritious wear, grain fracture and bond fracture of grinding wheel and removal of heat from grinding

wheel and from the work by using grinding oils, water base fluids or gases as lubricants or coolants. Basis for classification of grinding fluids is determined by function and type. (G18; NM-h, 17-57)

899-G. Grinding Fluids. Pt. 2. How They Affect Grinding Action. L. P. Tarasov. Tool and Manufacturing Engineer, v. 47, July 1961, p. 60-67.

Nature of work material as a factor in the selection of water-base or oil fluids for grinding. Quantitative data presented for steels, high-temperature alloys and Ti alloys. 7 ref. (G18, W25c; NM-h, 17-57)

900-G. Grinding Fluids. Pt. 3. Their Selection and Use. L. P. Tarasov. Tool and Manufacturing Engineer, v. 47, Aug. 1961, p. 57-63.

Factors affecting suitability of oils and water-base fluids for grinding operations. Consideration of stability, influence on wheel condition, ability to settle chips, corrosion prevention, residues left on equipment, affect on the operator. Review of flooding-mist and through-the-wheel methods of applying the fluid. 9 ref. (G18, ST, Ti-b, SGA-h, NM-h, 17-57)

SECTION H

POWDER METALLURGY

1-H. Isostatic Pressing Gains Favor. W. Derrick Johnston. Ceramic Age, v. 76, Nov. 1960, p. 14-18.

Hydrostatic compacting and forming of metals, clay, ceramics, plastics and carbides by an isostatic press. The material to be compacted is placed in a rubber die which is then sealed in a pressurized vessel and subjected to pressure through a water or petroleum-based fluid. (H14, 1-52)

2-H. Powdered Metal Products. Walter A. Olep. Wisconsin Engineer, v. 65, Oct. 1960, p. 14-15, 38, 42.

Production of Cu, Fe and Sn powders by atomization, reduction and electrolytic process. Particle size and distribution, density and purity of the powders. Pressing, sintering and finishing of powder metal parts. (H-general; Cu, Fe, Sn)

3-H. Nickel Strip Rolled From Powder. Steel, v. 147, Nov. 28, 1960, p. 84.

Production of high purity Ni strip by direct rolling of powder without intermediate rolling, annealing and pickling. (H14j; Ni, 4-53)

4-H. Metals Reinforced With Fibers. D. L. McDanels, R. W. Jech and J. W. Weeton. Metal Progress, v. 78, Dec. 1960, p. 118-121.

Experiments with composites made up of tungsten wires in a Cu matrix indicate that their strengths are directly proportional to the volume percentages and tensile strengths of the tungsten wires. If whiskers are used instead of wires, composites with tensile strengths of over 1,000,000 psi. may some day be available. (H17; Cu, W, 14-61)

5-H. Sintered Stainless Steel Powders. Pt. 1. R. L. Sands and J. F. Watkinson. Precision Metal Molding, v. 18, Dec. 1960, p. 41-42.

Sintering and compacting behavior of 304 L, 316 L, 347 L and 410 L stainless steel powder pressed at 30-50 tons per sq. in. and sintered at 2100° F. in dissociated ammonia. Effect of composition on particle size distribution, sintered and green density and mechanical strength. (H11, H14, H15, 2-60; SS)

6-H. The Vacuum Sintering of Tungsten Ingots. J. W. Pugh and L. H. Amra. Electrochemical Society, Journal, v. 107, Dec. 1960, p. 990-993.

Rate of densification at various temperatures, microstructure, hardness, fabricability and purity of tungsten ingots vacuum sintered at 1800-3100° C. for 0.25-8 hr. 4 ref. (H15, 1-73, H11k, 2-61, M27, Q29n; W)

7-H. (Japanese.) Elongated Single Domain Iron-Cobalt Magnet and Its Magnetic Properties. Toranosuke Kawaguchi, Mitsuru Nagakura, Tetsuro Yamaguchi, Isao Tanabe and Yoshinori Hosono. Japan Institute of Metals, Journal, v. 29, Sept. 1960, p. 585-588.

Electron micrography and magnetic measurement of powder specimen after heat treatment at 175-250° C. for 10-60 min. Effect of heat treatment, composition, oxidation and isotropic pressing on coercive force, remanence and demagnetization curve and average diameter and dimensional ratio of particles. 9 ref. (H11p 2-60, 2-64; Fe-b, Co-b, SGA-n)

8-H. (Rumanian.) Determining Degree of Sintering by Resistivity Measurements. Georgeta Dan, Aurelia Protopopescu and Olga Ivanciu. Studii si Cercetari de Metalurgie, v. 5, Mar. 1960, p. 343-364.

Electrolytic Fe with a particle size of 0.063 mm. and electrolytic Cu of 0.063-0.09 mm. are pressed under a force of 0.5-8 tons per sq. cm. and sintered at 100-1200° C. in a hydrogen atmosphere. Measurement of electrical resistivity, density and hardness. 11 ref. (H15, H14, P15g, P10a, Q29n; Cu-a, Fe-a)

9-H. Slip Casting: A Good Way to Shape Difficult Materials. L. M. Schifferli. Materials in Design Engineering, v. 51, Dec. 1960, p. 108-109.

Design considerations for engineering metals, refractory metals, refractory metal compounds, mixtures and nonmetallics. Thin-wall closed-end tubes or complex shapes having re-entry angles, now beyond the capabilities of even the most advanced powder metallurgy methods, are particularly suitable for slip casting. (H14)

10-H. (Russian.) Pressing and Rolling Titanium Powder Tubes. B. A. Borok, V. K. Havrilova, H. M. Karpman, E. A. Trifonov and E. B. Zadov. Tsvetnye Metally, Sept. 1960, p. 66-68.

Hydraulic pressing at 850-1060° C. and cold rolling of powdered Ti billets. Specification of dies and lubricants for prevention of adhesion during pressing. Optimal reduction degree for elimination of edge cracking. (H14, F26; Ti)

11-H. (Japanese.) Hot Pressing of TiC-Co Cermets. Masataka Sugiyama and Hisashi Suzuki. Japan Institute of Metals, Journal, v. 24, Oct. 1960, p. 618-622.

Mechanical properties, density and microstructure of powder compacts containing 20-60% Co, hot pressed at 1550-1750° C. and at pressures of 20-140 kg. per cm. sq. for 2-15 min. Investigation of relationship of hot pressing conditions to cermet's properties and applicability of sintering method. 4 ref. (H14h, M27, P10a, Q-general; Ti, 14-68, Co, 6-70)

12-H. (Japanese.) Hot Pressing of TiC Base Cermets. Masataka Suziyama and Hisashi Suzuki. Japan Institute of Metals, Journal, v. 24, Oct. 1960, p. 622-625.

Mechanical properties, density and microstructure of powder compacts containing 20-40% metal binders such as Ni, Nimonic 90, X-40 alloy, Fe and Ni-Cr-Mo alloy and 18-8 stainless steel. Specimens are hot pressed at 1550-1750° C. at pressures of 20-140 kg. per cm. sq. for 2-15 min. Effect of binder oxidation, carbon transfer from the graphite die used in pressing and other process variables on properties. 9 ref. (H14h, M27, P10a, Q-general; Ti, 14-68, Fe, Ni-b, SS, 6-70)

13-H. (German.) Gear Wheels of Sintered Materials. H. Endter. VDI Berichte, no. 46, 1960, p. 69-75.

Pressing by hydraulic and mechanical presses at 6-8 tons per cm^2 and sintering at 800-1300° C. of Fe, steel, brass and bronze gear wheels. Post-treatments such as machining, hardening, corrosion protection by oil soaking and surface oxidation by 350-550° C. water vapor treatment. Mechanical properties. (H14h, H15, T7a; Cu-b, Fe, ST, 17-57)

14-H. Purification Reactions of Tantalum During Vacuum Sintering. W. D. Klopp, D. J. Maykuth, H. R. Ogden and R. I. Jaffee. Metallurgical Society of AIME, Transactions, v. 218, Dec. 1960, p. 971-977.

Investigation of the purification by vacuum sintering of commercial-purity Ta powder at 2600-2860° C., mixtures of Ta oxide and Ta carbide at 1800 and 2200° C. and Ta bars containing 1% additions of O, N and C at 1800-2600° C. Analyses are made of the sintered mixtures to determine the extent of removal of O, N and C at each sintering condition. 11 ref. (H15, 1-73, C-general; Ta, C, O, N, 9-71)

15-H. Zn-ZnO Alloys for Dispersion Hardening. Horace Pops and J. F. Libsch. Metallurgical Society of AIME, Transactions, v. 218, Dec. 1960, p. 1131-1133.

Investigation of powder metallurgy production of Zn alloys with increased strength and high temperature stability by dispersion hardening. Physical and mechanical properties, with attention to deformation and recrystallization behavior, microhardness, macrohardness and fabricability are given as influenced by heat treatment, temperature and microstructure. 3 ref. (H-general, N7a, P-general, Q-general, 2-64; Zn-b)

16-H. Powder Metallurgy. Selective Bibliography 423, U. S. Office of Technical Services, Washington 25, D. C.

Bibliography covering Army, Navy, Air Force and AEC reports and translations on sintering, kinetics of oxidation of metal powders, inspection of sintering compounds, softening temperatures of Fe ores and sinters and effect of partial replacement of coke by gas in sintering machines. (H-general; 11-65)

17-H. A High Temperature Contact Device. Fansteel Metallurgy, Dec. 1960, p. 3.

Vacuum and inert gas sintering of metal bars at 2740° C. using a high temperature contact device to maintain electrical contact at the ends of the compacted bar. Device consists of a machined Mo body to which is riveted a Tantaloy (7.5% Ta, 92.5% W) strip and sliding contact made with a combined Cu strip and H_2O cooled Cu-base plate. (H15, T1; Mo, 17-57)

18-H. Hafnium Carbides. R. Kieffer, F. Benesovsky and K. Messmer. Metal Progress, v. 79, Jan. 1961, p. 196-198. (Digested from Metallwissenschaft und Technik, v. 13, Oct. 1959, p. 919-922.)

Production, solubility for other carbides, sintering and compaction, hardness, bend strength, cutting performance. (H-general, Q-general; Hf, 6-69)

19-H. (Japanese.) Sintering of Cermets of the TiC System. Shinnoku Saito. Ceramic Association of Japan, Journal, v. 68, Nov. 1960, p. 267-273.

Measurement of shrinkage modes and velocities as a function of sintering and heat treatment temperatures in 20% CO-80% TiC cermets. Optical and electron microscopy and rupture tests are used to study properties after flash sintering and cyclic heating at 400-1400° C. 15 ref. (H15, M-general, Q-general, 2-64; Ti, CO, 6-70, 14-68)

20-H. (German.) Properties and Use of S. A. P. Sinter Material. R. Akeret. Technica, v. 9, Nov. 1960, p. 1425-1427.

Production of S. A. P. (sintered Al product) powder by pulverization, or casting and subsequent grinding with stearin addition under oxidizing conditions. Fabrication of semifinished products by cold pressing of powder with sintering at 550-600° C. and extruding. Properties such as electric and thermal conductivity, mechanical properties (including workability) and microstructure. Use of S. A. P. material for piston reinforcement and for supersonic aircraft parts. (H-general, P-general, Q-general; Al-b, 7-62, 17-57)

21-H. (English.) Stress Infiltration of Two Phase Alloys. G. Matsumura. Planseeberichte fur Pulvermetallurgie, v. 8, Dec. 1960, p. 110-118.

Tensile test, X-ray diffraction and microstructure investigation of specimens, consisting of a 1200° C. sintered Fe-Cu (0-8% Cu) skeleton, soaked with Cu or Bi infiltrant, with subsequent freezing. Influence of stress infiltration on tensile strength. (H16e, M-general, Q27, 3-66; Fe-b, Cu, 6-71)

22-H. (English.) Attempt to Produce Synthetic Composite Alloys. D. E. Gucer. Planseeberichte fur Pulvermetallurgie, v. 8, Dec. 1960, p. 119-121.

Application of repeated pressing-sintering cycles to obtain bodies of nonwetting components (mixtures of soft low-melting metals such as Sn, Mg, Zn, Pb, Cd, Bi with 25% WC or TiC). Influence of compacting pressure, sintering temperature and sintering time. (H14, H15; Bi, Cd, Mg, Pb, Sn, Zn, W, Ti, 6-70)

23-H. Extruded Magnesium Pellets. R. S. Busk. Precision Metal Molding, v. 19, Jan. 1961, p. 35-38.

Extrusion of ZK60 pellets involves the atomizing of a stream of liquid alloy into spherical pellets of the desired size and the extrusion of the pellets into the desired shape. Pellets must be spherical to minimize surface area, must contain a minimum of fine dust and must have an average particle size between 100 and 400 microns. 7 ref. (H14k; Mg)

24-H. Sintered Stainless Steel Powders. Pt. 2. R. L. Sands and J. F. Watkinson. Precision Metal Molding, v. 19, Jan. 1961, p. 46-48.

The newer austenitic stainless steel powders such as 304L, 316L, 347L and 410L have adequate green strength and can give approximately 60,000 psi. tensile strength with 5% elongation. (H15; SS)

25-H. (German.) Production and Properties of Atomized 45% Silicon Stabilized Ferro-Silicon. K. Feldmann

and K. Frank. Schweissen und Schneiden, v. 12, Dec. 1960, p. 514-517.

Production of powder for electrode coatings by atomization of liquid electro furnace melted ferrosilicon by air or water vapor and subsequent water quenching. Examination of corrosion resistance by measuring gas formation of powder in water and KOH/NaOH mixtures at 20 and 70° C. Stabilization, grain size and shape, pressing and welding properties. (H10f, H11; Fe-b, Si)

26-H. (Japanese.) Vacuum-Sintering of TiC-Ni Cermets. Masataka Sugiyama and Hisashi Suzuki. Japan Institute of Metals, Journal, v. 24, Nov. 1960, p. 689-692.

Vacuum sintering of TiC-Ni cermets containing 20-65% Ni at 1330-1480° C. for obtaining information on sintering technique for TiC-base cermets. Under fixed conditions of ball-milling, properties such as the transverse rupture strength, Rockwell A hardness, density, microstructure and carbide grain size of the cermets are given as a function of metal binder content, pressing pressure and sintering conditions. 10 ref. (H15, 1-73, Q-general; Ti-b, Ni, 6-70, 14-68)

27-H. (Japanese.) Disintegration of Fe-Al Alloy. Harunobu Sawada, Akira Masuda, Yoriyosu Atobe and Toshimosa Aoki. Japan Institute of Metals, Journal, v. 24, Nov. 1960, p. 732-735.

The phenomenon of disintegration or self-pulverization of 50 Fe-50 Al alloy containing 0-2% carbon in open air and in water at 20-68° C. for various times is studied by microscopy and X-ray diffraction methods. Cracks leading to disintegration are observed to originate at Al_4C_3 grain boundaries with progressive growth and release of stress. In water immersed specimens, methane gas evolution, produced by Al_4C_3 reaction with water, plays a dominant role in the process. 8 ref. (H10; Fe-b, Al)

28-H. Powder Metallurgy. J. S. Jackson. Rugby Engineering Society, Proceedings, v. 50, 1959-1960, p. 16-40.

Review of powder production by mechanical, electrolytic, chemical and atomization methods and of compacting and sintering operations. Applicability for production of hard and refractory metals and semi-metals including W, Ta, Mo, carbides, Si nitrides and cobalt and for production of large numbers of components cheaply to high tolerances and associate reproducibility in the ordinary metals. Data are given for physical and mechanical properties, with T-T-T curves for some materials. (H-general, 10-54; EG-d, W, Ta, Mo, Co, 14-68)

29-H. (Russian.) Effect of Allotropic Transformation on the Sintering of Iron Powder Compacts. A. A. Shmykov and V. S. Saklinskii. Metallovedenie i Obrabotka Metallov, Dec. 1960, p. 26-36.

Selection of optimum sintering variables. Dilatometric study of changes in linear shrinkage and expansion coefficient during sintering within 500-1000° C. Improvements in mechanical properties, porosity and plasticity of sintered parts. (H15, N6p, P10; Fe, 6-72)

30-H. (Russian.) Activated Sintering Process for Iron Powder. P. A. Andrievskii and I. M. Fedorchenko. Metallovedenie i Obrabotka Metallov, Dec. 1960, p. 36-39.

Intensification of sintering process by using dry and moistured hydrogen, H_2 + HCl, Al_2O_3 + NH_4Cl or Al_2O_3 + NH_4F as a sintering medium. Favorable effect of H_2 + HCl on density, magnetic properties and microhardness of sintered parts. 10 ref. (H15, Q-general; Fe, 6-72)

31-H. Powder Metallurgy. Nature, v. 189, Feb. 4, 1961, p. 365-367.

Review of the history and techniques of powder metallurgy including mechanisms of the sintering process and methods of hydrostatics and isostatic pressing, slip casting, hot extrusion, rolling, explosive pressing, blow forging and dispersion hardening. (H-general)

32-H. New Powder Metallurgy Practices. J. Comstock. Australian Machinery and Production Engineering, v. 14, Jan. 1961, p. 28-29.

Slip casting of stainless steel or other corrosion resistant metals and alloys by a process in which metal particles are added to water and held in solution by an alkalied alginate to form slip. Slip is poured into dry porous molds where water is absorbed. Alginate gel holds

particles together in a transient bond. (H14; SS, 6-68)

33-H. (Translation-Brutcher no. 4883.) Hot Pressing of Chromium-Boride Powder and Some of Its As-Sintered Properties. V. S. Neshpor and P. S. Kislyi. Ogneupory, v. 24, May 1959, p. 231-236.

Conditions of sintering of Cr boride powder obtained by reaction of Cr oxide with boron carbide; also of various properties of sintered Cr boride powders and comparison of results with available literature data. (H14h; Cr, B, 14-68)

34-H. Powder Metallurgy Operations at Maytag. Walter Anderson, Wesley Bissett and P. R. Kalischer. Precision Metal Molding, v. 19, Mar. 1961, p. 43-46.

Discussion of mixing, compacting, sintering, sizing and inspection techniques used in manufacture of metal bushings. (H-general, T7d)

35-H. For Stronger, Tougher Metal-Powder Parts. Felix Giordano. Product Engineering, v. 32, Mar. 13, 1961, p. 78-79.

Application of sintered Fe powders with densities over 90% in metal-powder parts. Density, tensile strength, yield strength, elongation, dimensional tolerances and surface finish of carburized, hardened and nonheat-treated high-density parts. (H15, H11k; Fe)

36-H. Fabrication of U_3O_8--Aluminum Dispersion Fuel Elements by Extrusion. R. A. Noland, D. E. Walker and L. C. Hymes. Paper from "Materials in Nuclear Applications". STP no. 276, American Society for Testing Materials, Philadelphia, Pa., 1960, p. 336-344.

Hot coextrusion of Al canned uranium oxide-Al powder mixtures to produce dispersion type fuel elements. Effects of powder preparation, billet can composition, extrusion temperature and uranium oxide content of powder mixture. (H14k, T11g; Al, U)

37-H. (Translation.) Kinetics of the Sintering of Metal Powders. R. S. Mints. Russian Journal of Inorganic Chemistry, v. 5, Apr. 1960, p. 437-444.

Thermal testing of compacted Ni, Cu, Ti and Mo powder specimens during sintering by cyclic or isothermal heating. Design and operation of the vacuum dilatometer used to measure thermal contraction and expansion. Comparison of the specific gravity, hardness and microstructure of specimens processed by each method. 8 ref. (H15; Cu, Ni, Mo, Ti)

38-H. Equipment for Hot Rolling Strip in Vacuum. M. Hill, R. Holman and E. Kulinski. Paper from "Vacuum Technology Transactions". Pergamon Press, New York, 1959, p. 124-128.

Ti powder compacts are heated to 2000° F., rolled at 100 ft. per min. and then cooled while continuously under vacuum. Equipment used consists of entrance and exit chambers, furnace, rolling mill and pumping system. (H14j, 1-66, 1-73, W23; Ti)

39-H. (German.) Sinter Process and Suitable Sinter Materials for High Temperature Technology. Eberhard Meyer-Hartwig. Jahrbuch 1959 der WGL, v. 13, Oct. 1959, p. 390-394.

Sintering by exothermic reaction of hot and cold pressed mixtures of metals (Al powder) and ceramic materials (Al_2O_3, Cr_2O_3, B_2O_3, MgO) without external heating and with and without after pressing to produce cermets or pure ceramics. Reaction mechanisms. Applicability. (H15; Al, NM-f)

40-H. Fuel Elements for German Reactor. M. Becker. Nuclear Power, v. 6, Mar. 1961, p. 81-84.

Solvent extraction, co-reduction and powder metallurgy techniques for producing sinterable UO_2 and natural U. Fabrication methods, including extrusion, cladding and chamber argon-arc welding, for producing fuel elements and tubes from rods and billets. (H-general, F24, K1d, T11; U, 14-68, 17-57)

41-H. Powder Metallurgy. L. Harrison. Engineering Materials and Design Conference, Proceedings, Feb. 1960, p. p. S1-S12.

Application of powder metallurgy techniques in production of structural components, bearings, frictional materials, porous media, hard metals, magnets and special alloys. Design considerations for compacting and sintering techniques and equipment. (H-general)

42-H. Production and Utilization of Cobalt Powders. E. De Bie and P. Doyen. Cobalt, Mar. 1961, p. 22-32.

Review of powder metallurgy production methods; particle size and specific surface area analysis and industrial applications of Co powders. 16 ref. (H-general, H11; Co, 6, 17-57)

43-H. (Japanese.) Vacuum-Sintering of TiC-40Ni-Cr-Co Cermet. Masataka Sugiyama and Hisashi Suzuki. Japan Institute of Metals, Journal, v. 25, Jan. 1961, p. 4-8.

Some room temperature properties such as transverse-rupture strength, hardness, density, Curie temperature and microstructure of a TiC based cermet containing 40% Ni-Cr-Co (3:1:1 ratio) as a function of wet ball milling times to 200 hr., sintering temperature of 1270-1440° C. with times of 1 hr. and with Mo additions of up to 5% as a substitute for Co in the binder. 8 ref. (H-general, Q-general, M-general, 2-60, 2-61; Ti-b, Ni, Cr, Co, 6-70)

44-H. (Ukrainian.) Some Properties of Cu-Ni Sintered Briquets. V. V. Ogorodnikov, I. M. Fedorchenko and O. I. Raichenko. Dopovidi Akademii Nauk Ukrainskoi RSR, Dec. 1960, p. 1603-1606.

Comparative isothermal sintering experiments with pure Cu or Cu-Ni powder mixture or Cu-Ni alloy powders. Data are given for compression strength, porosity, shrinkage, electric conductivity and effect of Cu concentration. 6 ref. (H15, Q-general, P-general; Cu-b, Ni, 6-72)

45-H. Todays Five Trends in Powder Metallurgy. Donald Peckner. Materials in Design Engineering, v. 53, Apr. 1961, p. 111-115.

Survey of developments in production of pre-alloyed powders, coated powders, large parts, composite structures and magnetic alloys. (H-general)

46-H. The Fansteel Method--Tantalum--From the Ore to You. R. G. Christophersen. Corrosionomics, v. 6, Jan. 1961, p. 1-4.

Conversion of tantalite ore to Ta ingots by a method involving crystallization of tantalum raffinate into K_2TaF_7 and electrolysis of K_2TaF_7 to obtain Ta powder. The powder is pressed and sintered in controlled atmosphere furnaces. (H10b, H10c, H-general; Ta)

47-H. Quantum Mechanism of the Formation of Metallic Powders by Electrolysis at High Current Densities. A. Calusaru and I. Atanasiu. Revue Roumaine de Metallurgie, v. 5, Feb. 1960, p. 291-300.

Explanation of the phenomena at limit current. New theory on the mechanism of formation of metal powders and its confirmation by calculations based on the quantic transit scheme of electrons through the potential barrier between the levels in the metal and those in the solution. 5 ref. (H10b)

48-H. (Japanese.) Comparison of the Mechanism of Pore-Formation Between Fe-Cu and Cu-Sn of Sintered Bearing. Terushia Watanable. Government Industrial Research Institute, Nagoya, Reports, v. 10, Mar. 1961, p. 140-151.

Pore formation during sintering of self-lubricating bearings of 86.4% Fe-13.6% Cu and 90% Cu-10% Sn as caused by "Sn-off" or "Cu-off" cavity formation when the alloys are heated above the melting point of the lesser components. The lower melting point materials melt-off into the cavities, formed by expansion of the compact due to alloying of the materials, resulting in increased pore size. 8 ref. (H15, T7d; Fe-b, Cu-b, Sn, 6-71)

49-H. (Japanese.) Study on the ZrO_2-Ni Cermets. Pt. 1. Effects of Additive on Sintering. Shigeharu Naka, Etsuro Kato, Goro Nishiyama and Hideo Matumoto. Government Industrial Research Institute, Nagoya, Reports, v. 10, Mar. 1961, p. 199-205.

Effects of CoO and NiO additions on the oxide-metal wettability, mechanical strength, high temperature stability and sintering properties of ZrO_2-Ni cermets, containing CaO stabilized ZrO_2, sintered at 1450° C. 9 ref. (H15, P-general, Q-general; Ni-b, Zr-b, 6-70)

50-H. (German.) Sinter-Bronze Composite Bearings. J. Kubelik, E. Navara and V. Prochazka. Neue Hutte, v. 6, Feb. 1961, p. 115-118.

Production of specimens of Pb-Cu sinter-bronze (20-50% Pb) bearing alloy by water jet pulverizing of a liquid Pb-Cu alloy and subsequent sintering of powder at low pressure. Mechanical and fatigue testing of specimens with data given for properties as influenced by Pb content of the bronze. (H15, Q-general, 2-60; Cu-b, Pb, 6-72)

51-H. Make Better Use of Powder Metallurgy Parts. Precision Metal Molding, v. 19, Apr. 1961, p. 27-30.

Metal Powder Industries Federation seminar review covering such properties as self-lubrication, corrosion resistance, pressure tightness, density, hardness, tensile strength, ductility, surface finish and close dimensional tolerances. (H-general)

52-H. Composite Powders. Precision Metal Molding, v. 19, Apr. 1961, p. 54-55.

Production of composite powders by a process in which Ni or Co is precipitated by pressurized hydrogen on to the surface of powders of refractory carbides, silicides, nitrides, borides, oxides and metals. (H10c)

53-H. Powdered Metal Bullets. Robert A. Powell. Ordnance, v. 64, May-June 1960, p. 952-953.

Experiments show that the 7.62 mm. NATO ball bullet can be fabricated by powder metallurgy techniques from Fe powder compacts if their density is increased by Cu or Pb-Bi alloy admixtures. (H14, T2j; Fe)

54-H. The Effect of Porosity in Metal Powder Compacts on the Structure of the Sintered Material. Henry H. Hausner. Indian Institute of Metals, Transactions, v. 13, Dec. 1960, p. 351-373.

Relation of powder metal properties, particularly particle size and shape, and compacting and sintering variables to pore volume, number, orientation, gas content and distribution. Investigation of consequent porosity and densification process effects on compact microstructures, in particular, grain growth, grain boundary migration and grain structure. Data are given for structure and properties of Cu, Be, Zr, Mo and stainless steel powder compacts. 11 ref. (H-general, H11, M-general, N-general, 9-68; Cu-b, Be-b, Mo-b, Zr-b, ST)

55-H. Redesigning for Powder Parts. Richard B. Thompson. American Machinist/Metalworking Manufacturing, v. 105, Apr. 17, 1961, p. 113-115.

Pump thrust plates are made from 361 Gramix iron. Powder is compacted under 60,000 psi. pressure, sintered and steam treated. Density, tensile strength, yield and hardness determined. (H14, H15; Fe)

56-H. Spherical Powders of Metals and Alloys Developed by Union Carbide Corporation. Current Engineering Practice, v. 3, Feb. 1961, p. 39.

Report on spherical powders of Cu, Al, Ni, 316 stainless steel, W and Nichrome (particle size 20-150 microns) produced in an inert atmosphere to avoid defects. Applications and physical data are noted. (H-general; Al-b, Cu, Ni-b, SS, W)

57-H. Designing for Powder Metallurgy. T. L. Robinson. Precision Metal Molding, v. 19, May 1961, p. 56-59.

Tensile strength, elongation, compressive strength, Brinell hardness, porosity, specific gravity, density, coefficient of thermal expansion, electrical conductivity and particle hardness given for sprockets formed of sintered 4630A alloy steel or sintered medium Cu-Fe. (H15; AY, Fe-b, Cu)

58-H. (Pamphlet.) Designing for Pressed Brass and Nickel Silver Metal Powder Parts. 1960. 24 p. New Jersey Zinc Co., 160 Front St., New York 38, N. Y.

Advantages and limitations of nonferrous powder metallurgy. Materials, methods, design and cost. Properties and tolerances of powder parts. Applications of powder parts. (H-general; Cu-b)

59-H. Powder Metallurgy--A Survey. I. Jenkins. Metal Industry, v. 98, May 5, 1961, p. 351-354.

Metallographic examination of Cu, Ta, W, Ag, Pb, Be and C particles formed by electrolysis, atomization, thermal dissociation or reduction to determine particle size and distribution, particle shape, density, packing, molding and chemical properties. (H-general; Ag, Be, C, Cu, Pb, Ta, W)

60-H. New Powder-Metallurgy Process Makes Parts in Vacuum. R. H. Eshelman. Iron Age, v. 187, May 25, 1961, p. 101-103.

Production of nuclear reactor parts with high density and low porosity by vacuum pressing powder on sponge of Zr, W, Cb or Mo at high temperatures. Specifications are given for typical parts of Zircaloy-2 alloy. (H14h, 1-73; Cb, Mo, W, Zr)

61-H. Pressing and Sintering of Nickel Brasses. J. Wilcock and R. J. Woolfall. Metallurgia, v. 63, Apr. 1961, p. 167-173.

Optimum processing conditions for nickel brass components involve lithium stearate lubrication and compacting at 30 and 35 tons per sq.in. Torsional properties approaching those of rolled nickel brass strip are found with controlled additions of Fe and phosphorus. (H14, H15, 18-73; Cu-n, Ni)

62-H. (English.) Theory and Application in the History of Powder Metallurgy. W. Leszynski. Planseeberichte fur Pulvermetallurgie, v. 9, Apr. 1961, p. 14-20.

Development of powder metallurgical theory and technology from Pt sintering in the first half of the 19th century to present day production of hard metals from sintered carbides, of structure parts and magnetic materials and of cermets and high-temperature SAP (Al_2O_3-Al combination) material. (H-general)

63-H. (English.) Sintering Behavior of Loose Metal Powders. H. H. Hausner. Planseeberichte fur Pulvermetallurgie, v. 9, Apr. 1961, p. 26-32.

Sintering of spherical and irregular shaped 316 stainless steel powder under hydrogen at 1300° C. to investigate density of sintered mass as influenced by particle size, particle distribution and particle activity. 5 ref. (H15; SS, 6-68)

64-H. (English.) Swelling of an Iron Copper Compact During Sintering. G. Matsumura. Planseeberichte fur Pulvermetallurgie, v. 9, Apr. 1961, p. 33-35.

Twisted Fe wires of 1.2 mm. diameter are mounted in solid Fe-saturated Cu and heated at 1050° C. for up to 200 hr. Observation of Cu diffusion into Fe. Surface cracks caused by swelling of Fe. (H15, P10d, N1; Fe, Cu)

65-H. Explosive Compacting. Digest of "The Compacting of Metal Powders by Explosives". Paper no. 7 Read Before the Powder Metallurgy Joint Group of the British Iron and Steel Institute and the Institute of Metals, Dec. 16, 1960. W. T. Montgomery and H. Thomas. Metal Progress, v. 79, June 1961, p. 178.

Results are given for "W-Ti", Al, Cu and Fe powders. Apparent advantages of the method are for compacting shapes too large for available presses or made from powders requiring inordinately high pressures. (H14, NM-k34; Al, Cu, Fe, Ti)

66-H. Powder Metallurgy in Russia. Metal Industry, v. 98, May 26, 1961, p. 418-419.

Resume of the proceedings of the Fifth All-Union Conference on Powder Metallurgy. Topics include preparation of powder, sintering, compacting, mechanical and physical properties of powder metal parts and applications. (H-general)

67-H. Powder Metals Increase Profits. Design Engineering, v. 7, June 1961, p. 42-44.

Design parameters affecting powder metallurgical processes including size, shape, porosity and machinability of the part. Welding, peening and finishing techniques. (H-general)

68-H. Powder Metallurgy Slashes Cost of Armature. Materials in Design Engineering, v. 53, June 1961, p. 12.

A pressed bronze powder core is placed within a sintered steel outer ring and the two sintered together at 1450-1600° F. to produce an armature having alternating magnetic and nonmagnetic sections. Cost savings of 72% result from the elimination of machining and staking or peening operations. (H14, H15; Cu-s, ST)

69-H. (Russian.) Vibration Compression in Powder Metallurgy. V. I. Likhman, N. S. Gorbunov, I. T. Shatalova and P. A. Rebinder. Doklady Akademii Nauk SSSR, v. 134, May 1960, p. 1150-1152.

Compression of powders containing Ti-C, W-C and Co in a mechanical vibrator for a maximum time of 4-10 sec. with a frequency of 14,000 vibrations per min. increases density and uniformity and prevents cracking. (H14; Co, Ti, W, 14-68)

70-H. (German.) Surface Diffusion in Sintering of Nonpressed Powder. Karl Torkar and Hellfried Neuhold. Zeitschrift fur Metallkunde, v. 52, Apr. 1961, p. 209-215.

Ni-Cu powder mixtures of given particle size and a mixing ratio of Ni:Cu= 1:2 are sintered at varying times under a

hydrogen current from 800-1050° C. Density measurements and magnetic evaluation of the diffusion zones in the sintered bodies. Computation of diffusion factor and activation energy using the Arrhenius equation. (H15, N1; Cu, Ni)

71-H. (German.) Production and Stability of Aluminum Di-Boride. H. J. Becher. Zeitschrift fur Anorganische und Allgemeine Chemie, v. 308, Mar. 1961, p. 13-22.

Production of AlB_2 from Al and B powder by sintering under inert gas and vacuum at 800° C. Investigation of thermal stability by heating to 1450° C. Structure identification of obtained phases by X-ray diffraction. (H-general, M22g, P11; Al-b, B)

72-H. Half a Century of Modern Powder Metallurgy. Paul Schwarzkopf. Paper from "Powder Metallurgy". Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 1-7.

Review of significant historical developments. (H-general, A2)

73-H. Theory of Solid State Sintering. G. C. Kuczynski. Paper from "Powder Metallurgy". Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 11-30.

Limited to simplified models such as spheres to spheres (or wires) to plates. Experiments with such sample yield fairly reliable confirmation of the theory proposed. The first stage of sintering, characterized by formation of a neck between two particles, can be brought about by one or more of the following processes: viscous or plastic flow, evaporation and condensation and volume diffusion or surface diffusion. 17 ref. (H15)

74-H. The Role of Interparticle Contacts in Sintering. R. T. De Hoff, R. A. Rummel, F. N. Rhines and A. H. Long. Paper from "Powder Metallurgy". Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 31-51.

The topological model of the sintering process leads to the conclusion that the rate of densification should be simply related to the genus, which is the difference between the number of interparticle contacts and the number of particles plus one. During first stage sintering it is found by experiment that the number of interparticle contacts may increase. Alteration of the specific genus by changing the number of particles in unit mass of the powder causes the rate of lineal contraction to vary inversely with the particle diameter. (H15)

75-H. Sintering of Wire Compacts. A. L. Pranatis and L. Seigle. Paper from "Powder Metallurgy". Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 53-73.

Influence of the presence of grain boundaries on the rates of sintering of Ni, Cu and Fe wire-wound compacts. In Fe compacts sintered in the alpha range, surface diffusion appears predominant and no grain boundary effect is, therefore, expected or evident. On the other hand, sintering of Cu and Ni compacts at temperatures close to their respective melting points apparently occurs by volume diffusion but with varying grain boundary effects. 16 ref. (H15; Cu, Fe, Ni)

76-H. Sintering in the Presence of a Liquid Phase. F. Eisenkolb. Paper from "Powder Metallurgy". Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 75-95.

Behavior of metallic and nonmetallic additions which melt in the sintering process when mixed with metal powders. Tests on alloyed and unalloyed Fe powders varying in grain sizes and in origin from different production processes. Powders of Cu alloys, sulphides and silicates delivering the required liquid phase at the sintering temperature applied were added to the Fe powders. Effects of these additions and of the sintering conditions on change in dimensions, porosity and mechanical properties. 12 ref. (H15; Cu, Fe)

77-H. On the Sintering of W-Ni-Cu Heavy Metal. Simo Makipirtti. Paper from "Powder Metallurgy". Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 97-111.

Study of the phenomena which occur when a 90W-10(2Ni-Cu) powder mixture is sintered at high temperatures. On the basis of accurate shrinkage observations, it is noted that sintering obeys a new sintering equation which is valid over the entire sintering range for this mixture as well as for the investigated pure and multicomponent system in which the grain size of the powders is small. 16 ref. (H15; W-b, Cu, Ni)

78-H. The Nickel-Activated Sintering of Tungsten. J. H. Brophy, L. A. Shepard and J. Wulff. Paper from "Powder Metallurgy". Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 113-135.

When fine W powders are coated with a uniform Ni layer of the order of atomic thickness, rapid densification occurs during sintering at unusually low temperatures. Theoretical and experimental considerations indicate that Ni-activated sintering of W takes place by the movement of W through or on a thin Ni carrier phase. 29 ref. (H15; W)

79-H. High Density Sintering of Metal Powder Compacts. Michel A. Eudier. Paper from "Powder Metallurgy". Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 137-156.

Review of the different conventional ways of obtaining high density parts, high-temperature sintering, hot pressing, hot forging, rolling extruding and drawing. Other possibilities are discussed, especially the use of ultra-fine powders, special atmospheres on thin films and intermediate liquid phases created by small additions such as phosphorus which can be eliminated afterwards. 11 ref. (H14, H15)

80-H. Kinetics of Hot Pressing. J. D. McClelland. Paper from "Powder Metallurgy". Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 157-171.

Hot pressing of powdered materials can be adequately described using a plastic flow theory proposed by Mackenzie and Shutleworth for sintering. The present derivation assumes that the principal driving force for the closing of pores is the applied hydrostatic pressure instead of the surface tension of the pores. This pressure term, when corrected for the density of the compact, can be substituted for the surface tension term in the original derivation. The resultant equations give the rate of densification of the material in terms of a yield point and viscosity. 9 ref. (H14h)

81-H. The Latest Developments of the S. A. P. Process. E. A. Bloch and H. Hug. Paper from "Powder Metallurgy". Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 371-385.

For the practical manufacturing of S. A. P. semifinished products, a heavy oxide containing Al powder is used; its flakes are cold welded. Each powder particle already shows dispersion hardening. Sintering in the strict sense (i. e., shrinking and consolidation of the compact) does not take place in the case of S. A. P. However, the oxides undergo a transformation from 525-550° C. Electron micrographs of oxide replicas show that the oxide is embedded in the metal ground mass in the form of platelets of 100-500 A thickness. (H14, H15; Al)

82-H. Large Sintered Bodies and Parts. F. Emley. Paper from "Powder Metallurgy". Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 389-401.

Various powder compaction processes are reviewed in regard to largest sizes of parts which are made commercially by each technique. The present status of processes for continuous compaction is presented along with a discussion of potential applications. (H14)

83-H. Hydrostatic Pressing of Powders. Charles E. Van Buren and Harold H. Hirsch. Paper from "Powder Metallurgy". Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 403-441.

Particulate matter can be consolidated into shaped bodies by the application of pressure in a fluid by a flexible, nonporous membrane. Pressure can be applied slowly or rapidly, the charge can be deaired or not, and the powder may be made to load into the flexible membrane densely or loosely. These factors along with the effect of pressure, particle hardness, size distribution and granulations are investigated to establish their effects on the quality of the pressed bodies and subsequent processing. (H14, 1-70)

84-H. A Compaction Technique for Shaped Parts of Metal Powder Compositions. H. W. Highriter, Rinaldo Curcio and Leo Kaempf. Paper from "Powder Metallurgy". Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 443-459.

A method of hydrostatic compacting metal powders in shaped flexible molds has been successfully employed in the production of heavy metal (W-Cu-Ni) parts but

is also applicable to materials which sinter without forming a liquid phase. (H14, 1-70; W-b, Cu, Ni)

85-H. Explosive Forming of Metal and Its Potential Application to Compacting Metal Powders. R. A. Cooley. Paper from "Powder Metallurgy". Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 525-542.

Brief review of the procedures used. Observations made on changes in metals caused by explosive energy with respect to hardness, strength, elongation and springback. (H14, NM-k34)

86-H. Comments on Copper Strip Rolled From Chemically Produced Powders. Dennis K. Pickens. Paper from "Powder Metallurgy". Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 543-552.

Commercial development of continuous rolling of strip from Cu powder. Powder characteristics are reviewed and comparative results of strip made from chemically produced powders as compared with strip from electrolytic powders. (H14; Cu, 6)

87-H. Continuous Hot Compaction of Metal Powders. P. E. Evans. Paper from "Powder Metallurgy". Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 553-562.

Potentialities of hot rolling metal powders with results of experiments with Cu powders. The powder must be kept in motion while being heated. Since the apparatus did not permit rolling temperatures above 300° C., the hot rolled strip requires subsequent sintering. However, strip produced by rolling powder at 300° C. and subsequent sintering is stronger than cold rolled and sintered strip. 11 ref. (H14j, 1-66; Cu, 6)

88-H. Hot Extrusion of Metal Powders. P. Loewenstein, L. R. Aronin and A. L. Geary. Paper from "Powder Metallurgy". Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 563-583.

Hot extrusion is a practical method of consolidating and shaping metal powders into long lengths of various cross sections. It generally yields superior physical properties and is at present used as the production method for a number of Al-base alloys. For other metals, however, hot extrusion is still in the laboratory stage. (H14k, 1-66; Al-b)

89-H. Lubricants for Powder Metallurgy Parts Manufacturing and Their Influence on Properties. Ernst Geijer and Roy S. Jamison. Paper from "Powder Metallurgy". Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 585-610.

Prior to the briquetting of a metal powder part, a lubricant is usually mixed with the metal powder to minimize die wall friction. Analysis of variations obtained in mixed, pressed and sintered properties of a sponge Fe powder with and without graphite addition when mixed with varying amounts of different stearates and other solid lubricants. (H14, 18-73; Fe)

90-H. Shrinkage Compensation by Alloying. H. Silbereisen. Paper from "Powder Metallurgy". Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1061, p. 611-627.

There is an increase of volume if Cu is added to Fe powder. This phenomenon is investigated in a series of experiments. With the correct Cu addition it is possible to compensate the shrinkage so that there will be neither an increase nor a decrease in volume. With this method, the blueprint dimensions may, therefore, be used for die construction. The resulting compact will have, to a large extent, the required final dimensions. (H15, 9-67; Fe-b, Cu, AD-n32)

91-H. Recent Trends in European Metal Powder Parts Manufacture. Sven I. Hulthen. Paper from "Powder Metallurgy". Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 631-643.

Efficient presses as well as continuous and semicontinuous furnaces for temperature up to 2375° F. have facilitated the manufacture of sintered parts with high physical standards. Much work has been devoted to the problem of manufacturing sintered parts with properties equal to those of ordinary forgings. (H-general, H15)

92-H. Titanium and Zirconium Powder Metallurgy. A.D. Schwope. Paper from

"Powder Metallurgy". Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 731-746.

Powder metallurgy techniques for Ti and Zr follow classical methods and appear to be appropriate for production. The metals can be effectively strengthened by dispersions, particles or fibers and can be used as bases for alloy systems. Alloying elements which are alpha stabilizers are particularly useful since they usually have low melting temperatures and hence promote rapid sintering and homogenization. (H-general, N7a; Ti, Zr)

93-H. The Powder Metallurgy of Beryllium. Wallace W. Beaver and Harold F. Larson. Paper from "Powder Metallurgy". Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 747-773.

Practically all processing methods applicable to powder metallurgy are useful in the consolidation of Be powder. Although vacuum hot pressing has many advantages for the production of large and short-run parts and the ability to cycle machine shot scrap directly back through the attritioning process makes it economic, other conventional powder metallurgy methods as well as specialized techniques can be used for making shapes closer to dimensions and to contour. 9 ref. (H-general; Be)

94-H. An Exploratory Investigation of Pre-Alloyed Powders of Aluminum. S. G. Roberts. Paper from "Powder Metallurgy". Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 799-818.

Utilization of alloy powders instead of conventionally cast ingots in the production of wrought Al base alloys. Mechanical and metallurgical characteristics of laboratory scale extrusions made from atomized pre-alloyed powders. Alloys investigated are based on the common Al alloy systems and range in composition from current commercial alloys to highly alloyed materials in which the alloying additions are greatly in excess of the levels feasible with current commercial practices for wrought alloy production. 5 ref. (H14k; Al-b)

95-H. Powder Metallurgy Provides Friction Material Work Horse. Clyde S. Batchelor. Paper from "Powder Metallurgy". Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 825-831.

Increased service requirements and broad new fields of application such as heavy duty truck brakes and aircraft brakes demand new physical shapes and advanced thinking. Fe-graphite combinations, cermetallics and certain austenitic compounds show considerable promise. Be with its low gravity, high modulus of elasticity, high specific heat and high conductivity has tremendous potential, particularly, for aircraft brakes. (H-general, Q-general, T-general; Be, Fe, SS, 17-57)

96-H. (Book.) Bibliography on Powder Metallurgy in Nuclear Engineering. (1956-1960). Henry H. Hausner and Helen C. Friedemann. 1961. 119 p. Metallwerk Plansee Aktiengesellschaft. Reutte/Tyrol, Austria. $2.

Collection of 643 selected references, most of them annotated. References are taken from reports, magazine and book literature and cover foreign as well as English language sources. (H-general)

97-H. (Pamphlet.) Production of Extrusion Billets of High Temperature Aircraft Alloys by Powder Metallurgy. M. W. Toaz, G. F. Davies and R. D. Johnson. AMC Aeronautical Systems Center, AMC TR-60-7-764, Manufacturing and Materials Technology Division, Wright-Patterson Air Force Base, Ohio, Dec. 1960, 111 p.

Out of several high-temperature superalloys for high performance aerospace vehicles, Rene 41 and PH-157 are best adapted for extrusion from powder metal billets by hydrostatic compaction. Density and mechanical properties of the powder metal extrusions are within 5% of those of wrought metal at room temperature. (H14k; Ni-b, SS)

98-H. Fiber-Metal Seals Allow High Temperature-Pressure Operation. Lars G. Soderholm. Design News, v. 16, June 19, 1961, p. 90-91.

Fabrication of high-temperature, high-pressure static seals using sintered and brazed skeletons of Mo and stainless steel fibers impregnated with melted In and Ag by compression under vacuum and in an argon atmosphere. Data are given for compression and recovery measurements, thermal cycling and

hydraulic leak tests at various temperatures to 1000° F. and pressure to 5000 psi. at varying impulse cycles. (H15, H17; Mo, SS, In, Ag)

99-H. Designing for Powder Metallurgy. T. L. Robinson. Precision Metal Molding, v. 19, June 1961, p. 24-26.

Design parameters for the composition, applications, corrosion resistance, accuracy, self-damping qualities, mechanical properties and tooth form of powder metal gears produced from Cu, nickel silver, brass, Fe and various steels. (H-general, T7a, 17-51; AY, Cu-b, CN, SS, 17-57)

100-H. Brass Gears and Cams Win 1961 Prize. Precision Metal Molding, v. 19, June 1961, p. 42-43.

Design considerations for dimensions, tolerances and mechanical properties of a fire alarm gear and cam assembly produced by powder metallurgy. (H-general, T7a, 17-51; Cu-n, 17-57)

101-H. How Design Affects Quality of Powdered Metal Parts. Iron Age, v. 187, July 6, 1961, p. 76-78.

Methods of designing powder metal parts so that no machining is required, sharp corners and thin walls are avoided and density is uniform. Parts should be shaped so that dies and punches can be strong. (H-general, 17-51)

102-H. Hot Pressing of Lead Spheres. F. E. Westermann and R. G. Carlson. Metallurgical Society of AIME, Transactions, v. 221, June 1961, p. 649-650.

Spherical antimonial Pb (47% Sb) alloy shot is pressed from 300-400° F. and 400-1500 lb. compressive load with dilatometric readings during compacting to test a rate equation for densification. Photo-macrographic examination is made of the compacted specimen. 4 ref. (H14h, H11k, M23b, 2-61, 3-74; Pb-b, Sb)

103-H. Powder Metallurgy. I. Jenkins. Metal Industry, v. 98, May 12, 1961, p. 375-377, 380.

Review of powder metallurgy processes with emphasis on pressing and sintering. Application in the area of high density components, magnetic processes, ferrous and nonferrous alloys, cemented carbides and porous and high-temperature materials. Future trends and research suggestions. (H-general)

104-H. Preparation of Tantalum and Niobium Metal Powders. Toyoji Ishiyama and Tadashi Kuroda. Electrochemical Society of Japan, Journal (Overseas Edition), v. 28, July-Aug. 1960, p. E143-E145.

Purity yield and yield efficiency data for the preparation of Ta and Cb metal powders by the Zeppelin and Kroll processes and the hydrogen-reduction process. Chlorination process flowsheet. (H10; Ta, Cb)

105-H. (French.) Stainless Steel Powder. Peintures, Pigments, Vernis, v. 37, Apr. 1961, 3 p.

Composition analyses and corrosion test on stainless steel powder containing a maximum of 0.12% C, 17-19% Cr, 0-2.5% Mo, 0-1.2% Cb, 0.8-3% Si and a maximum of 1% Mn. Description of their production from a melt by atomizing and simultaneous water quenching. 6 ref. (H10f, J26, R11; SS, C, Cr, Mo, Cb, Si, Mn, 6)

106-H. Powder Metallurgy. Machine Production, v. 20, June 1961, p. 17-19, 23.

Parameters are given for the molding, sintering and sizing of metal parts from various materials. Advantages include the use of unusual combinations of metals or of metals with nonmetals, applications to refractory metals and the fabrication of special products. (H-general)

107-H. Metal Powders--Boon for Industry? Erich Tetz. Canadian Metalworking, v. 24, July 1961, p. 21-22.

Advantages of metal powders in industrial applications. Summary of atomizing process which produces metal powder by subjecting molten metal to high pressure air blasting in the downward course of a huge funnel-like apparatus. (H10f; 6, 17-57)

108-H. All Industries Find Powder Uses. Donald Harvey. Canadian Metalworking, v. 24, July 1961, p. 23-24.

Production and use of sponge Fe powders and Fe alloy powders in powder metallurgy, the arc welding electrode industry and in cutting and

scarfing of stainless and alloy steel billets and other shapes. (H-general, W29h, F21e, G17; Fe, 6, 17-57, SS, AY)

109-H. What Is the Powder Metal Process? J. G. Parr. Canadian Metalworking, v. 24, July 1961, p. 25-26.

Review of methods for producing metal powders. Fabrication and interfacial diffusion. (H-general, N1h; 6)

110-H. How to Make Structural Parts From Powdered Metals. H. F. Johnson. Canadian Metalworking, v. 24, July 1961, p. 26-27.

Compressing, sintering and sizing operations to form low, medium and high density structural components. Advantages and limitations of the process. (H-general; ST, Fe, 6-72)

111-H. Redesign for Powder Parts. Richard B. Thompson. Metalworking Production, v. 105, June 28, 1961, p. 61-62.

Compacting and sintering Fe powder at 2000° F. in a controlled atmosphere for the production of pump thrust plates. Parts are self-lubricating, shock and wear resistant and have a dense, fine grained, pearlitic structure with a radial crushing strength of 37,000 psi. and tensile strength of 18,000 psi. (H15, Q-general; Fe, 6-72)

112-H. (Translation-Brutcher no. 4991.) Effect of Copper on Carbon Absorption in the Sintering of Iron-Copper (Powder) Alloys. V. K. Sorokin. Metallovedenie i Termicheskaya Obrabotka Metallov, Oct. 1959, p. 61-62.

Previously abstracted from original. See item 2-H, 1960. (H15, 2-60; Fe-b, Cu)

113-H. Preferred Design in Metal Sinterings. Metalworking Production, v. 105, July 5, 1961, p. 67-70.

Process design considerations including size, radial projections, length to diameter ratio, undercuts, re-entrant grooves and recesses, threads, bevels and tapers, holes in the direction of pressing and at right angles to the direction of pressing, variations in cross section, density, physical properties, tolerances and finishes. (H15, 17-51)

114-H. (Japanese.) The Grain Refining of Magnox by Powder Extrusion. Shigeyasu Koda and Shotaro Morozumi. Light Metals, v. 11, Mar. 1961, p. 125-130.

Comparative study of microstructure and mechanical properties of Magnox alloys (Mg-1% Al-0.015% Be), containing 0-40% Mg-0.6% Zr powder, produced by powder extrusion and of cast billet extrusions, both after annealing from 450-500° C. Data are given for tensile properties and corrosion resistance, recrystallization structures and grain size. 7 ref. (H14k, M27c, N5, Q-general, 2-64; Mg-b)

115-H. (Pamphlet.) Bibliography on Powder Metallurgy in Nuclear Engineering (1956-1960). Henry H. Hausner and Helen C. Friedemann. 1961. 119 p. Metallwerk Plansee Aktiengesellschaft, Reutte/Tyrol, Austria.

Annotated bibliography on research, properties, fabrication, production and application of powder metals with reference to nuclear engineering. Metals covered include Be, U, Zr, B, Al, Th, W, Cd, Si, Rh, Pu, Y, Hf, Ir, Fe, Pd, Pt, Cb, rare earths and their compounds and alloys. Principal processes noted are slip casting, bonding, sintering, isostatic pressing, coating, calcining, rolling, compacting, granulation and machining. 643 ref. (H-general, A-general, 10-54, 11-65)

116-H. Sintering Crystalline Solids. Pt. 1. Intermediate and Final State Diffusion Models. R. L. Coble. Journal of Applied Physics, v. 32, May 1961, p. 787-792.

Photomicrographs of pore and grain boundary structures in sintered powder compacts of Cu, Ag and various oxides for qualitative description of the densification phases. The explicit change in densification rate with discontinuous grain growth is predicted in terms of pore spacing and grain size. 12 ref. (H15, M27, N3, 2-59; Cu, Ag, 14-68, 17-56)

117-H. Blending Metal Powders. John J. Fischer. Precision Metal Molding, v. 19, July 1961. p. 36.

Principles of the process. Advantages of twin shell and double cone type blenders. Causes of segregation and overblending and preventive techniques. Effect of granulating powders before pressing. (H12, W26b)

118-H. Atomizing Shapes Future for Powdered Metals. Iron Age, v. 188, Aug. 10, 1961, p. 79-80.

Development of a process for atomizing pre-alloyed metal into powders having less surface oxide, higher green strength and a more desirable shape for molding into structural parts than products made by mixing primary powders. Application to stainless steel and Vasco 50 (50% Ni-Fe). (H10f, H11n; SS, Fe-b, Ni-b)

119-H. Particle Control Beefs Up Compacts. Arnold R. Poster. Steel, v. 149, Aug. 7, 1961, p. 66-69.

Green strength and density of powder compacts with emphasis on tungsten as affected by particle size and shape. (H11n, P10a; W, 6-71)

120-H. Designing With Powder Metallurgy to Improve Quality and Reduce Costs. Paul J. Failla. American Society of Mechanical Engineers, Paper no. 61-MD-16, 1961, 8 p. $1.

Design considerations in the manufacture of bronze, brass, Fe, Fe alloy and FeC mechanical components and oil-impregnated bearings. Commercial dimensional tolerances for plain cylindrical bearings, flange bearings and thrust washers. Friction of powders on die wall and punches. Mechanical limitations of tooling. (H-general, 17-51, Q9p, T7d; Cu-n, Cu-s, Fe)

121-H. Designing for Powder Metallurgy. T. L. Robinson. Precision Metal Molding, v. 19, Aug. 1961, p. 36-38.

Parameters for the design and application of powdered metal cams. Fabrication of density and yield in compression, data for several Fe, steel, stainless steel and Cu-base powdered metal compacts. (H14, 17-51; Fe, ST, Cu-b, 6-71, 17-57)

122-H. New Press Uses Water Pressure to Shape Powdered Metals. Iron Age, v. 188, Aug. 24, 1961, p. 72-73.

Production of boring bars, steel mill rolls and billets from carbides and powdered metals using a 100,000 ton capacity hydrostatic press actuated by 60 tons of water. (H14k, 1-70)

123-H. Carbon-Oxygen Relationship in Sintered Columbium. E. M. Grala and R. J. Van Thyne. Paper from "Columbium Metallurgy". v. 10. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 139-145.

Little decrease in oxygen content occurs as a result of vacuum sintering Cb compacts at 2000° C. for 1 hr. at pressures below 1 micron. Carbon additions effectively aid in the removal of oxygen as carbon monoxide. The carbon composition of the sintered material is not increased unless the amount added is greater than the stoichiometric content required to form CO. Nitrogen content is unchanged by the 2000° C. treatment similar to low carbon, vacuum-sintered material. (H15, 1-73, N15; Cb)

124-H. Beryllium Processing by Powder Metallurgy. K. G. Wikle and V. C. Potter. Journal of Metals, v. 13, Aug. 1961, p. 537-544.

Description of the vacuum hot pressing process, including operational techniques required for high quality control and other techniques employed in powder processing and fabrication of hot pressed billets. (H-general; Be)

125-H. (Ukranian.) Sintering of Two-Phase Powder Systems. V. V. Skorokhod and I. M. Fedorchenko. Dopovidi Akademii Nauk Ukrainskoi RSR, Apr. 1961, p. 486-489.

Kinetics of the growth of interphase contacts in the powder systems Cu-W, Cu (5%Ni)-W, Cu(5%Ni)-ZrC and Cu-ZrC during sintering. Relationship between the wetting angle and the magnitude of interphase contacts is measured by electroconductivity. A theory of viscosity of block crystals is proposed. 10 ref. (H15, P13h; Cu-b, W, Ni, Zr, 14-68)

126-H. Density-Pressure Relationships in Powder Compaction. R. W. Heckel. Metallurgical Society of AIME, Transactions, v. 221, Aug. 1961, p. 671-675.

The rate of density increase with applied pressure for Fe, Cu, Ni, W and graphite powders is determined to be proportional to the volume fraction of pores for pressures exceeding a lower limit varying from 15,000 to 30,000 psi. depending on the powder. The relationship of the "At-pressure" and the "zero-pressure" powder compact density to the applied pressure is obtained from continuous measurements of punch movement during a single compaction operation.

4 ref. (H14, H11k, 3-74; Fe, Cu, Ni, W, NM-k36)

127-H. Don't Overlook Powdered-Metal Parts. Product Engineering (Design Digest Issue), v. 32, Sept. 4, 1961, p. 65-67.

Advantages and limitations of powder metal parts; basic principles of design with particular reference to Ni, brass and Ag. (H-general; Cu-n, Ag, Ni, 6-72)

128-H. Impregnation--Materials and Techniques. George J. Caudron. Product Engineering (Design Digest Issue), v. 32, Sept. 4, 1961, p. 167-168.

Success of the process depends upon infiltration of the pore and retention of material in the pore by capillary action. Commonly used impregnating materials are sodium silicates mixed with various fillers and polyester resins. The vacuum pressure technique delivers the greatest infiltration. (N16d; NM-d35, 17-57)

129-H. Sintered Insert Shaves Cost of Diecast Engine Flywheel. Henry Lefer. Precision Metal Molding, v. 19, Sept. 1961, p. 79.

Powder alloy used is 90% Fe-10% Cu. It is pressed at about 35-40 tons into a density of 63 gm. per cc., then is sintered in a reducing atmosphere. No sizing or coining is required. (H-general, E13; Fe-b, Cu, 7-59)

130-H. Designing for Powder Metallurgy. T. L. Robinson. Precision Metal Molding, v. 19, Sept. 1961, p. 80-83.

Materials and properties for nondisposable filters. Data on pore size, pressure drop, cleaning, machining and brittleness of filter materials with special reference to sintered bronze. (H-general, 17-51; Cu-s)

131-H. Small Stainless Steel Camera Components Produced by Powder Metallurgy. Machinery (London), v. 99, Aug. 16, 1961, p. 365.

Sintering and coining of stainless steel powders to form complicated shapes within close tolerances having necessary properties of corrosion resistance without further sealing or electroplating. (H15, H16a; SS)

132-H. (German.) Powder Metallurgy, a Complementary Subject to Ceramics. W. Jellinghaus. Berichte der Deutschen Keramischen Gesellschaft e.V., v. 38, June 1961, p. 253-257.

Powder metallurgy and ceramics are compared with reference to production of powders, production of compacts by pressing at room temperature and subsequent sintering at elevated temperatures, mechanism of sintering and surface treatments. 5 ref. (H-general; NM-f)

133-H. (Translation-Brutcher no. 5195.) Investigations Into the Sinterablity of Chromium-Nickel Austenitic Steels. F. Eisenkolb. Monatsberichte der Deutchen Akademie der Wissenschaften zu Berlin, v. 1, no. 7-10, 1959, p. 446-451.

Brief review of available German research data on the behavior in sintering of 0.05-0.20 C, 12-20 Cr, 8-20 Ni, 0.1-2.0 Si, 0-3 Mo steel powders. Ways of overcoming difficulties in sintering caused by slowed-down diffusion owing to presence of alloying elements in solid solution and of chromium oxide films on surface of particles. (H15; SS-e)

134-H. Vibratory Compacting. Metal Industry, v. 99, Sept. 1, 1961, p. 167-168.

Greater densities are obtained in compacting carbide with Ti or Co powder by combining vibration with pressure. (H14g, 1-54, 3-74)

135-H. (Russian.) Obtaining Plastic Tantalum From Electrolytic Powders. V. M. Amosov. Tsvetnye Metally, June 1961, p. 65-72.

Grinding, briquetting and vacuum sintering of high impurity electrolytic tantalum powder. Effect of C-O ratio and of Si on plasticity and porosity of Ta briquettes. 4 ref. (H15, 1-52; Ta, 6-73)

136-H. Hydrostatic Compaction of Consumable Electrode. Leonard S. Dorsett and Thomas M. Krebs. Paper from "Vacuum Metallurgy Conference, Transactions". Interscience Publishers, Inc., New York 1, 1961, p. 3-13.

A high pressure hydrostatic medium is used for compacting a column of fines within a flexible tube inside a pressure vessel. Application to Fe and Ti powder and sponge with subsequent vacuum sintering to produce consumable electrodes for vacuum melting. Effect of compaction on density and dimensional changes and of sintering on meltability of the electrodes. (H14, H15, 1-70, 1-73; Fe, Ti)

137-H. (Ukranian.) Influence of Variable Particle Sizes on Sintering of Two-Phase Powder Mixtures. V. V. Skorokhod and I. M. Fedorchenko. Dopovidi Akademii Nauk Ukrainskoi RSR, June 1961, p. 745-748.

Compressing and sintering of Cu and W powders with correlation of the effect of particle size on the electroconductivity and shrinkage of briquettes. 6 ref. (H15, P15g; Cu, W, 6-73, 9-67)

138-H. (Translation-ConBur.) Specific Surface of Titanium Sponge. L. V. Biryukova, L. L. Neroslavskaya and E. V. Mekhova. Journal of Applied Chemistry of the USSR, v. 33, Dec. 1960, p. 2761-2762.

Specific surface is determined as a function of compaction for sponge prepared by reduction of $TiCl_4$ with Mg and Na, electrolysis of $TiCl_4$ and electrolytic refining of Ti wastes. (H11j, 1-54, 2-60, C-general; Ti)

139-H. Hydrostatic Press. Machine Production, v. 20, Sept. 1961, p. 51.

A press which generates 50,000 psi. is used for compacting powder metals and carbides in rubber molds incased in perforated steel tubes. Application to the production of boring bars, billets, nuclear fuel, elements and consumable electrodes for arc melting. (H14g, 1-52, 17-51)

140-H. (Russian.) Influence of Small Additions of Nickel and Cobalt on Sintering of Iron Powder. R. A. Andrievskyj and I. M. Fedorchenko. Izvestiya Akademii Nauk SSSR--Metallurgiya i Toplivo, Mar. 1961, p. 50-54.

Changes in strength, density, porosity and shrinkage of sintered Fe powder briquets as effected by small additions of Ni and Co powder. 19 ref. (H15, 2-60; Fe, Ni, Co)

141-H. Metal-Bonded Graphite. Engineering Materials and Design, v. 4, Oct. 1961, p. 697-698.

Metal compacts containing Fe, Cu, Ni, W, Ce, Ca, Mg, Ba, Si, Co, Ag and Al are sintered with additions to improve wettability of graphite. Compressive strength is related to porosity and composition and electrical resistivity and wear data are given for anti-friction, electrical and refractory applications in the automotive industry. (H15, P15g, Q9, Q28, T21, 1-52, 3-71; NM-k36, 6-71)

142-H. (German.) Investigation of Concentration Changes in Binary Mixtures Nickel-Iron and Nickel-Copper in Sintering. Fritz Fraunberger and Volker Scheuning. Zeitschrift fur Metallkunde, v. 52, Aug. 1961, p. 547-550.

Sintering of pressed powder specimens of Ni (10-90%) and Fe (10-90%) and Ni and Cu (15% Cu) at temperatures from 500-1300° C. Investigation of concentration changes by inductive measurement of effective resistance influenced by sinter temperature and pressing force. (H15, P15g, 2-60, 2-61, 3-74; Ni, Cu, Fe, 6-71)

143-H. Designing for Powder Metallurgy. T. L. Robinson. Precision Metal Molding, v. 19, Oct. 1961, p. 69-70.

Design of ratchets and pawls to take advantage of wear resistance, hardenability and accuracy. (H-general, T7, 17-51; 6-71)

144-H. The Sintering of Tungsten and Molybdenum. Precision Metal Molding, v. 19, Oct. 1961, p. 88-89.

Effect of moisture content of the hydrogen atmosphere on nucleation and grain growth. (H15q; Mo, W)

145-H. (German.) Sinter Materials of Nickel or Nickel-Aluminide Containing Aluminumoxide. Werner Jellinghaus. Forschungsberichte des Landes Nordrhein-Westfalen, no. 1016, 1961, p. 1-33.

Compacts are produced by pressing of mixtures of Al_2O_3 with Ni, or NiAl alloy (50:50) and vacuum sintering at 1400-1500° C. with and without subsequent oxidation at 900-1100° C. in air. Investigation of deformability and stress-rupture strength and bending strength at elevated temperatures (800-900° C.) (H-general, Q3q, Q5g, Q23q, 1-52, 2-62; Ni, Ni-b, Al)

146-H. Fourth International Plansee Seminar (Held in Tyrol, Austria, on June 20-24, 1961). Werner Leszynsk. Journal of Metals, v. 13, Oct. 1961, p. 746-751.

General subject of "Powder Metallurgy in the Nuclear Age" includes sintering theory, two-component systems, dispersion strengthening, reactor fuel materials, properties of uranium carbides and oxides, uranium nitride, boride and Tn, Pu and Be and surveys of high-melting metals including W,

Ir, Mo, Ta, Cb and Ru and of pre-alloyed powders. (H-general, N7a, T11g, 11-63, 17-57; Be, Cb, Ir, Mo, Ta, Th, Pu, Ru, U, W)

147-H. Pressureless Compacting and Sintering of Metal Powders. H. H. Hausner. Journal of Metals, v. 13, Oct. 1961, p. 752-758.

Comparison with pressure compacting with reference to density, particle deformation and contact, diffusion, lattice defects, stress and other characteristics. Vibratory compacting and slip-casting processes. 11 ref. (H-general, H15, Q24m, 1-52, 10-54)

148-H. An Analysis of Powder Compaction Phenomena. R. W. Heckel. Metallurgical Society of AIME, Transactions, v. 221, Oct. 1961, p. 1001-1008.

The compaction of metal powders is analyzed through density-pressure curves as a three-stage process--die filling, individual particle motion and gross compact deformation. The densification occurring during each of these stages is evaluated quantitatively for specimens of Fe, Ni, Cu, W and 4630 steel. The amount of densification in the first and second stages is primarily a function of particle geometry. The densification taking place in the third stage is dependent mainly upon the material. 18 ref. (H14, H11, 3-73; Fe, Ni, Cu, W, ST)

149-H. Beryllides Boost Temperature Level. John Judge. Missiles and Rockets, v. 9, Nov. 6, 1961, p. 36-37.

Powder metallurgical production of $TaBe_{12}$, Ta_2B_{17}, $CbBe_{12}$, Cb_2Be_{17}, $ZrBe_{13}$ and Zr_2Be_{17} by cold and isostatic pressing, sintering, extrusion, slip casting, diamond grinding and flame spraying. Evaluation of oxidation resistance, specific gravity, modulus of rupture and tensile strength for beryllides used in missile components. (H14, H15, Q27, T24f; Be, Ta, Cb, Zr, 14-68, 17-57)

SECTION J

HEAT TREATMENT

1-J. Temperatures for Rapid Uniaxial Stress Relief of Heat-Resistant Alloys. Howard S. Avery. Welding Journal, v. 39, Nov. 1960, p. 509s-512s.

Hindered contraction testing of alloy steel to determine the temperature necessary to reduce residual stresses below a selected level. Effect of composition on stress in cast heat resistant alloy steel cooled under restraint from 2000° F. 6 ref. (J1a, Q25, 2-60; AY, SGA-h)

2-J. (Japanese.) Die Steel. Akira Takeuchi. Metals, v. 30, Sept. 1, 1960, p. 40-43.

Martempering, sub-zero treatment, surface hardening (atomalloy treatment) and hard Cr plating of die steel to increase hardness and toughness; protection against warping and aging; applications. (J26p, J28, L17, Q29n; TS)

3-J. Surface Treatment Extends Metal Life. B. M. Pearson. Machinery Lloyd (Overseas Edition), v. 32, Oct. 8, 1960, p. 41-43.

Methods for increasing wear resistance of steel and cast iron parts including surface deposition of metal diffusion coatings by oxides and carbides, hardness, induction hardening and nitriding. (J28, J2g, L15, Q9n; CI, ST)

4-J. (French.) Surface Treatment by "Sulphinuzation". R. Desbrandes. Metaux-Corrosion-Industries, v. 35, Oct. 1960, p. 353-378.

Sulphinuzed steels with lower friction resistance and improved abrasion resistance are produced by a cementation process in a molten bath of cyanide, sulphocyanide and alkaline sulphide salts at 550° C., with cooling in still air. (J28, Q9n, Q9p; ST)

5-J. Vacuum Bright Annealing in Elevated Furnaces. Wire Industry, v. 27, Oct. 1960, p. 985-987.

Annealing of wires of all gages and tubes with very narrow inner diameters in elevated annealing furnaces. (J23a, 1-73, W27; 4-60, 4-61)

6-J. Does Silicon Accelerate Decarburization? Peter Payson. Metal Progress, v. 78, Dec. 1960, p. 78-81.

Not in medium-carbon alloy steels, according to the author. Si actually promotes separation of ferrite from austenite on cooling and the excess ferrite at the surface of steels high in Si has been attributed erroneously to decarburization. Elements added for more hardenability (Cr and Mo, for example) will negate this effect. (J4a, J5, 2-60; AY, Si)

7-J. (German.) Heat Treatment and Hardening of Various Types of Cast Iron. Horst Hentze. Industrie-Anzeiger, v. 82, Nov. 15, 1960, p. 1579-1582.

Unalloyed and alloyed Fe, both with laminar graphite and SG cast iron are held at 320-620° C. for 0-15 hr. Residual stress, transformation temperature, growing tendency and dissolved carbon are determined as functions of compositon, heating temperature and time. 7 ref. (J-general, N-general; CI)

8-J. (Russian.) Thermomechanical Magnetic Treatment of Metals and Alloys. M. L. Bernshtein. Metallovedenie i Termicheskaya Obrabotka Metallov, Oct. 1960, p. 31-36.

Combination heat treatment for steels and technically pure Fe to improve tensile properties and plasticity. Method

consists of tensile loading after furnace heating of material with subsequent austenitization at 800-950° C. in a magnetic field, followed by water cooling and tempering. 8 ref. (J22, J29, Q23p, Q27a; ST, Fe-a)

9-J. (Russian.) Conveyor Type Quenching-Tempering Equipment. V. I. Filippov. Metallovedenie i Termicheskaya Obrabotka Metallov, Oct. 1960, p. 46-54.

Quenching and tempering of 1KH18N9T and KH25N20 steels using electric heat treating furnaces with automatic temperature regulation in a conveyorized line. (J26, J29, W27, 1-52; ST)

10-J. (Russian.) Heat Treatment of Forging Dies. I. N. Tavadze and E. K. Kovshikov. Metallovedenie i Termicheskaya Obrabotka Metallov, Oct. 1960, p. 54-57.

Oil quenching of forging die bodies with simultaneous tempering of the shanks to provide maximum hardness. Correlation of heat treatment parameters with grade of steel in the die. (J26, J29, Q29n, W22a; ST)

11-J. (Russian.) Normalizing and Sorbitizing of Rails Along the Whole Length at Dzerzhinsky Iron Works. P. T. Besedin, H. H. Oreshkin, A. A. Sorokin, P. M. Chepelev, A. F. Valilev, A. M. Karpunin and A. D. Kutsenko. Stal', Oct. 1960, p. 946-953.

Heat treatment of rails to increase mechanical properties at low temperatures and after aging. Testing of rails for flaking, plasticity and shock resistance. 5 ref. (J24, N8, Q-general, 2-63, T23q)

12-J. Quench Hardening of Aluminum. Takao Kino. Hiroshima University, Journal of Science, Series A, v. 24, July 1960, p. 85-96.

The increase of yield stress due to the quenching is investigated using Al polycrystalline wire 0.5 mm. in diameter. The main contribution of quenching vacancies to hardening is caused by the internal stress originated by the vacancy clusters dispersed in bulk. 11 ref. (J26; Al)

13-J. Open Coil Processes of Annealing and Gas Alloying. Engineer, v. 210, Oct. 7, 1960, p. 611-612.

Separations between individual wraps of cold rolled Sn or steel coils permit rapid heating and cooling during annealing. Carbon, nitrogen and other alloying elements that can be gasified during annealing are used to change the composition of the coil. (To be continued.) (J23; Sn, ST, 4-53)

14-J. (Ukrainian.) Softening of Steel During Electric Heating. V. N. Gridnev and Yu. Ya. Meshkov. Dopovidi Akademii Nauk Ukraino'koi RSR, Aug. 1960, p. 1081-1084.

Quench-hardened or cold deformed (33-80%) steel samples are exposed to cyclic electric heating in magnetic field at various temperature intervals. Effect on kinetics of internal stresses relaxation, magnetization changes, structure and mechanical properties. 8 ref. (J29, P-general, Q-general; ST)

15-J. (German.) Kinetics of Annealing of Martensite and of Retained Austenite Decomposition Determined by Hardness Measurements and Bend Tests on a 1.1% C Steel. Peter Fischer. Archiv fur das Eisenhuttenwesen, v. 31, Oct. 1960, p. 617-622.

Data for hardness, bending strength and angle and retained austenite content of unalloyed steel samples annealed at 160-400° C. are correlated with annealing time and temperature and activation energies for precipitation from martensite. (J23, N8, Q29, Q5, P13a, 2-61; CN)

16-J. A Basic Guide to Specifying Heat Treatment of Steels. Pt. 1. Heat Treatment Methods. Lester F. Spencer. Machine Design, v. 32, Dec. 8, 1960, p. 160-167.

Normalizing, annealing, quenching and tempering of carbon and alloy steels. Effect of heat treatment on mechanical, electrical and magnetic properties. (J-general, Q-general, P15, P16; AY, CN)

17-J. (Japanese.) Nitriding Treatment of High Speed Steel. Sadao Koshiba, Kazuo Taraka and Akeo Sumi. Japan Institute of Metals, Journal, v. 24, July 1960, p. 429-432.

Hardness distribution and depth of nitrided case, microstructure, toughness and cutting durability of high speed steels nitrided in liquid after heat treatment, at 450-600° C. for 30-60 min. dipping times. (J28k, Q-general; TS-m)

18-J. Induction Heating of Alloy Steel for Rolling. Roy H. Neer. Iron and Steel Engineer, v. 37, Oct. 1960, p. 117-120.

Induction heating of alloy steel billets minimize scale formation and decarburization. Design of the conveyorized system which discharges the billets at the mill. (J2g; AY, 4-52)

19-J. New Salt Bath Furnace at Convair Heat Treats Aluminum Alloy Sheet Parts. Industrial Heating, v. 27, Nov. 1960, p. 2350, 2512.

Heat treatment of Al alloy aircraft parts at 800-1200° F. using a salt bath furnace which holds a 22,000 lb. bath of $NaNO_3$. (J-general, T24, W27m, 1-52; Al-b, 4-53)

20-J. Alumina Lined Hump-Type Atmosphere Furnace Bright Brazes and Heat Treats Stainless Steel. Industrial Heating, v. 27, Nov. 1960, p. 2380, 2382.

Bright annealing, bright brazing and atmosphere quenching of fabricated stainless steel dies using an electric hydrogen-controlled atmosphere furnace. (J23a, J26, K8, W27n; SS)

21-J. Vacuum and Controlled Atmosphere Heat Treatments Specialized at Metallurgical Consultants, Inc. Industrial Heating, v. 27, Nov. 1960, p. 2503-2504, 2506, 2508, 2510, 2512.

Brazing in all atmospheres, bright annealing, nitriding, vacuum outgassing, aging and atmosphere quenching of aircraft, missile, atomic and electronic components. (J-general, 1-73, T1, T24)

22-J. Continuous Annealing Furnace. Iron & Steel, v. 33, Nov. 1960, p. 547.

Steel forgings and stampings are cycle annealed and normalized in a five-zone furnace with conveyorized charging and discharging. (J23, J24, W27, 1-52; ST, 4-51, 4-59)

23-J. (Spanish.) Notes on Nitriding and Data on the Use of Type F-124 Chromium-Molybdenum Alloy as a Nitriding Steel. Pt. 1. Enrique Garcia. Tecnica Metalurgica, v. 16, May-June 1960, p. 111-124.

Effect of nitriding on performance and life of steel automotive and aircraft components, turbine parts and machinery parts in general. Principles and mechanism of nitriding. Influence of composition of steel, structure of core and nitrided case and process variables (time, temperature and degree of dissociation of ammonia) on hardness and depth of nitrided layer. Changes produced by this nitrided layer in mechanical properties of steel. (J28k, 2-60, 2-61, Q-general, T21, T24; ST)

24-J. (Spanish.) Contribution to the Study of Spanish Casehardening Steels and the Direct Measurement of Case Depth. Pt. 1. P. G. Gomez and E. Asensi. Tecnica Metalurgica, v. 16, Jan-Feb. 1960, p. 1-45.

Casehardening and service behavior of aircraft engine components. Cementation process and theories of diffusion. Structures, case depths and hardness of a carbon steel, a Cr-Mo steel, two Cr-Ni steels and a Cr-Ni-Mo steel treated in cyanide bath and with "Caron" mixture, a solid casehardening agent composed of carbon and barium carbonate, at temperatures of 875-925° C. for periods of 1-8 hr. (J28, Q29n, T24b; CN, ST, Cr, Mo, Ni)

25-J. Vacuum Annealing. Mechanical World, v. 140, Nov. 1960, p. 450.

Vacuum annealing of Cu-wire using a bell furnace installation with a movable cylindrical casting and automatically controlled heating elements. (J23, 1-73, W27; Cu, 4-61)

26-J. (Italian.) Heat Treatment of Ductile Light Metals. Pt. 2. E. Hugony. Trattamenti Termici, v. 3, Sept-Oct. 1960, p. 3-12.

Duralumin, Avional and Ergal type alloys are exposed to stabilization annealing or heterogenization heat treatment causing coalescence of the precipitate Al_3Mg_2, subsequent to deformation. Effect of heating and cooling velocities in hardening on mechanical properties and corrosion resistance. (J21, J23, Q-general, 3-67; Al-b, EG-a39)

27-J. (Italian.) Hardening of Stamping Dies. Pt. 3. M. Tosci. Trattamenti Termici, v. 3, Sept-Oct. 1960, p. 15-24.

Die steels containing 0.90% carbon are hardened at 740-900° C. and water quenched with some samples being subsequently tempered for 2 hr. at 180-300° C. Effect of heat treatment temperatures on hardness, elasticity, toughness and microstructure. (J-general, M27, Q-genera; TS)

28-J. (German.) Surface Hardening Plant for Welded Crossing and Wing Rails. Horst Binnewies. Glasers Annalen, v. 84, Sept. 1960, p. 509-512.

Design and mode of operation of hardening plant. Preheating of steel rails in an oil furnace to 600° C., heating to hardening temperature (930° C.) by coal gas and oxygen burners and subsequent shower-quenching to obtain 350-400 Brinell surface hardness. (J-general, 18-67, T23q; ST, 7-51)

29-J. Heat Treating Electrical Steels. John J. Lawless. American Machinist/Metalworking Manufacturing, v. 104, Nov. 14, 1960, p. 128-129.

Heat treatment of high Ni and Si steels and magnetic ingot iron, with emphasis on control of contamination levels and cooling rate. (J-general; CI-a, ST, Ni, Si)

30-J. (Pamphlet.) Cold Rolled Carbon Spring Steel. Steel Products Manual, Nov. 1960, 34 p. American Iron and Steel Institute, 150 E. 42 St. New York 17, New York.

Manufacturing methods and heat treatments in production of cold rolled steel. Specifications for Rockwell hardness, dimensional tolerances, edges and finishes. (J-general, S22; CN, SGA-b)

31-J. (French.) Effect of Oxidation During Heat Treatment on the Machinability of Black Heart Malleable Iron. Journal d'Informations Techniques des Industries de la Fonderie, Oct. 1960, p. 10-11.

Hardness increase in small sections as caused by oxidation and the formation of cementite during malleablizing. (J23b, G17k, R1h; CI-s)

32-J. (German.) Residual Stresses in Iron Castings and Their Elimination by Annealing. Joseph Czikel, Harald Kochling and Joseph Sturm. Freiberger Forschungshefte, B 45, 1960, p. 21-52.

Stress-free annealing of a cast iron lathe frame at 300-450° C. and of plate-shaped iron castings at 450-600° C. Microstructure of stress-relieved castings. (J1a, J23, M27; CI, Fe, 5)

33-J. Heat Treatment of Cast Stainless Steels. Pt. 1. W. P. James. Precision Metal Molding, v. 18, Dec. 1960, p. 36, 38.

Effects of various heat treatments, including annealing, normalizing, hardening and tempering on mechanical and physical properties of investment cast steels with special attention to 410 steel as a representative of the martensitic group. (J-general, P-general, Q-general; SS, 5-62)

34-J. An Improved Die Surface. H. K. Barton, R. Pochard and M. Veilhan. Precision Metal Molding, v. 18, Dec. 1960, p. 31-33.

Application of the Lubri-Case process, a soft nitriding or second tempering carried out in a Cassel type salt bath at about 570° C., for producing dies with a slippery surface which is highly resistant to galling. (J28k, W19n)

35-J. (German.) Experimental Determination of Case Depth in Induction Hardening at a Frequency of 10 Kcs. H. Geissel. Elektro Warme, v. 18, Oct. 1960, p. 309-313.

Computation of power consumption and heating time to evaluate case thickness at given hardening temperature. Induction heating of CK45 steel specimens (20-80 mm. diameter) at 900-920° C. and subsequent shower quenching. Measurement of case depth by macrostructure examination. (J2g, Q29n, 1-54; AY)

36-J. Is Premature Die Failure Necessary. R. F. Spillett. Metalworking, v. 16, Dec. 1960, p. 69-70.

The greater percentage of die failure is caused by faulty heat treatment. Mistakes during austenitizing and quenching involve overheating or underheating, removing from quench too soon, quenching too cold and not tempering immediately, using the wrong quenching medium, non-uniform quenching, or insufficient volume of liquid quenching medium. (J-general; TS)

37-J. (Japanese.) Nitriding of Titanium. Akira Takamura. Japan Institute of Metals, Journal, v. 24, Sept. 1960, p. 565-569.

Kinetic study of the nitriding of Ti in a nitrogen stream at 850-900° C. Diffusion and reaction rates, case depth and hardness distribution as a function of nitrogen solubility and diffusion coefficients, time and temperature. 13 ref. (J28k, N-general, P13b, Q29; Ti)

38-J. Effect of Carbide Stringers on the Distortion of Die Steels During Heat Treatment. K. Sachs. Metal Treatment and Drop Forging, v. 27, Nov. 1960, p. 455-460.

Causes and mechanism of die steel distortion during heat treatment; influence of structure of steel with emphasis on part played by carbide stringers. Effect of temperature, heating rate and alloying additives. (J-general, 2-60, 2-61, 3-71; TS, 9-74)

39-J. Heat Treatment of Steel. Pt. 10. Liquid Heating Baths. E. Gregory and E. N. Simons. Edgar Allen News, v. 39, Nov. 1960, p. 251-252.

Use of liquid heating baths of molten pig Pb contained in cast iron, pressed steel or heat resisting alloy pots with solid or liquid covers to prevent oxidation of the molten Pb. Classification of salt baths and their use in heat treating steel. (J-general; ST)

40-J. Which Heat Treatment for AM350 and AM355? Materials in Design Engineering, v. 51, Dec. 1960, p. 110-112, 145.

These steels are deliverable in six conditions. By choosing the proper combination of treatments a wide range of mechanical properties can be obtained. (J-general; SS)

41-J. (Russian.) Protective Atmosphere for Heat Treatment of Stainless Steels, Heat Resistant Materials and Titanium. A. Ya. Ishchenko and V. I. Kolchinskii. Metallovedenie i Termicheskaya Obrabotka Metallov, Nov. 1960, p. 25-28.

Methods for drying and purifying of Ar and hydrogen. Use of halogenized protective atmosphere in place of vacuum for bright annealing, nitriding and soldering of heat resistant materials. (J-general, K7; SS, SGA-h, Ti)

42-J. (Russian.) Effect of Heat Treatment and Nitriding on the Magnetic Properties of Austenitic Steels. M. M. Belenkova, A. V. Kostenko, M. N. Mikheev, E. E. Stoinskaya, T. M. Pogrebetskaya and A. A. Yurgenson. Metallovedenie i Termicheskaya Obrabotka Metallov, Nov. 1960, p. 16-20.

Samples are heat treated at 1150-1070° C. with subsequent aging at 800° C. and nitriding at 600° C. for 55-75 hr. Structure and magnetic susceptibility and permeability are measured as a function of depth of the nitriding layer. Results of experiments show the possibility of controlling nitriding depth by an electromagnetic method. 5 ref. (J-general, J27d, J28k, P16; SS-e)

43-J. (Russian.) Heat Treatment of Manganese Cast Iron Crankshafts. D. A. Sveshnikov. Metallovedenie i Termicheskaya Obrabotka Metallov, Nov. 1960, p. 28-37.

Hardness, tensile strength, bend strength and elongation of crankshafts having a granular pearlitic structure which is produced by air quenching from 950° C. and tempering at 725° C. for 8 hr. with subsequent air cooling. (J26, J29, Q-general, T21b; CI, Mn)

44-J. (Italian.) Heat Treatment of SG Cast Iron. Fonderia, v. 9, Oct. 1960, p. 454-455.

Gray cast iron with 3.42-3.49% C, 1.87-2.98% Si, 0.32-0.34% Mn, 0.03% P, 0.01% S and 0.75-0.82% Ni, Ni alloyed and Ni-Mo alloyed iron are stress relief annealed at 1000-1250° F., treated for higher ductility at 1650° F., normalized, tempered at 1600-1700° F. and austempered, martempered or surface hardened to improve ductility and hardness. (J-general, Q29n, Q23p; CI, Fe, Mo, Ni)

45-J. How to Cut Tool and Die Costs. Pt. 3. Eliminating Heat-Treat Failure. J. S. Pendleton, Jr. Tool and Manufacturing Engineer, v. 45, Dec. 1960, p. 49-51.

Heat treat failures on steel tools are minimized by well planned fixturing in the furnace, correct atmospheres and controlled annealing and quenching methods. Effect of size change, soft spots, warpage and cracking on tool failure. (J-general, T6; ST)

46-J. The Heat Treatment of Steel. Edwin Gregory. Edgar Allen News, v. 39, Dec. 1960, p. 271-272.

Advantages of medium and high temperature salt baths for hardening of steel using rectification agents or cast iron chips to prevent contamination. Methods of melting and replenishing baths for use at 500-900° C. (J2j; ST)

47-J. Method of Heat Treating Silicon Steel. George W. Wiener. U. S. Patent, no. 2,965,526, Dec. 20, 1960.

Production of oriented Si steel strip to specified thickness and magnetic and electrical properties by annealing material containing small quantities of oxides, sulphides and nitrides at annealing temperatures as high as 1300° C. in a reducing atmosphere and using a high rate of

heating. 5 ref. (J23, F23, 1-67; ST, Si, 4-53)

48-J. (German.) Soft Nitriding and Carbonitriding in Precision Mechanical Engineering. F. W. Eysell. VDI Berichte, no. 46, 1960, p. 57-61.

Soft nitriding in salt bath at 570° C. and carbonitriding in cyanide and cyanate bath of steel and cast iron at 700-730° C. is discussed with reference to: dimensional changes and deformation of parts during carbonitriding; surface roughness and mechanical properties; formation and influence of diffusion in martensite zone and hardness testing. Applications. (J28k; CI, ST)

49-J. (Japanese.) Change of Brightness of Steel Parts During Bright Quenching Related to Deterioration of Quenching Oil by Thermal Decomposition. Masayashi Tagaya, Imao Tamura and Mitsugu Tanaka. Metal Finishing Society of Japan, Journal, v. 11, Nov. 1960, p. 629-632.

Nichrome and steel specimens heated at 900° C. are quenched cyclically in circulating mineral and fatty oils held at constant temperature of 30° C. in a nitrogen atmosphere. Decrease in brightness and increase in thermal polymerization is reported as a function of oil deterioration and specimen reaction with decomposition products as a result of oxidation and thermal decomposition. 4 ref. (J26; ST, Ni-b)

50-J. How to Select Proper Case Depth for Carburized and Hardened Gears. R. Pedersen and S. L. Rice. SAE Journal, v. 68, Nov. 1960, p. 34-38.

Testing of gears composed of 8600 and 8700 steel to determine case thickness and causes of pitting fatigue and case crushing. Subsurface shear strength is calculated for gear teeth and used to determine shear stress/shear strength ratios. (J28, T7a; ST)

51-J. (German.) Bright Annealing in Hood Furnaces Under High Vacuum. E. Schwarz. Draht, v. 11, Nov. 1960, p. 710-713.

Bright annealing of cold worked steel or Cu wire in mobile hood furnaces at temperatures over 350° C. with automatic temperature control. (J23a, 1-73; Cu, ST, 4-61)

52-J. Automatic Hardening and Tempering of Carbine Barrel Forgings. Iron and Steel, v. 33, Dec. 1960, p. 576-577, 581.

Effective dimensions, rating and operating temperatures of furnaces. (J26, J29, W27; 4-51)

53-J. New Process Ups Fatigue Strength of Steel. Western Metalworking, v. 18, Dec. 1960, p. 41-42.

Heat treating process for mild, stainless and alloy steels and cast irons based on immersion in a specially formulated molten salt bath operating at 1050° F. Process develops a tough, ductile, wear resistant surface and increases fatigue strength and resistance to corrosion. (J2j, Q7a, R-general; AY, CN, SS)

54-J. Spray Cooling Inside a Standard Bell Furnace. American Machinist/ Metalworking Manufacturing, v. 104, Dec. 26, 1960, p. 70-71.

Annealing of strip metal in an atmosphere of steam and natural gas using a bell furnace. Water is introduced during the cooling cycle and is turned to steam. Vaporization of the water extracts heat from within the bell and circulation of the resulting water vapor cools the work. Internal spray cooling boosts production by cutting the overall annealing cycle from 22 to 10 hr. (J23, W27; 4-53)

55-J. Reroller Adopts Vacuum Annealing. Machinery, v. 67, Jan. 1961, p. 143.

Production of stainless steel and high Ni strip and electrical resistance wire in a rerolling plant. A vacuum annealing system has been installed to produce purer products. (J23, F23; Ni, SS, 4-53, 4-61)

56-J. (Czech.) Precipitation Hardening of Low Carbon Steel. Mirko Klesnil and Premysl Rys. Hutnicke Listy, v. 15, Nov. 1960, p. 867-876.

A steel containing 0.05% C and 0.0042% N is held at 1000° C. for 1 hr. and cooled in a furnace for 24 hr. to develop a large grain. After heat treatment at 700° C. water quenching, the steel is aged at 23-128° C. and studied by microscopy to determine amount of precipitation. 18 ref. (J27, N7, M21; CN-g)

57-J. (German.) Development and Properties of Direct Case-Hardenable

Steels. Herbert Tauscher and Eberhard Stecher. Neue Hutte, v. 5, Oct. 1960, p. 596-607.

Development of case-hardenable steel by alloying with elements which improve hardenability (Mn, Mo, Cr, Si, Ni, B) and control grain size (Mo, Ti, W, V). Static and dynamic mechanical properties for 20 MoCr5 and K13NiCr14 steel after varying case-hardening operations. (J5, J28, M27c, Q-general; AY)

58-J. Computerized Control of a Continuous Annealing Line. Robert H. Smith. Paper presented at Pittsburgh Regional Technical Meeting, American Iron and Steel Institute, Nov. 16, 1960, 19 p.

Continuous annealing of Sn-plated steel strip in a line in which all process variables of the annealing cycle, including temperature, holding time and resultant metal hardness are controlled by digital computers. (J23, 18-74; ST, 4-53, 8-62, Si)

59-J. Continuous Annealing...Increases Production of Motor Laminations. Irwin Schumaier. Metal Treating, v. 11, Dec-Jan. 1961, p. 7-8, 43.

An automatic conveyorized heat processing machine is used to anneal stator and rotor laminations. (J23, W11q)

60-J. (German.) Investigation of Stress-Free Annealing for Stress Relief of Alloyed and Unalloyed Steels. M. Kroneis. Schweisstechnik, v. 14, Nov. 1960, p. 126-128.

Prestressed springs of alloyed and unalloyed steels are annealed at 300-700° C. and at varying annealing times. Elastic recovery is measured as an indicator of residual stress. (J1a; ST)

61-J. Effect of Carbide Stringers on the Distortion of Die Steels During Heat Treatment. K. Sachs. Metal Treatment and Drop Forging, v. 27, Dec. 1960, p. 487-492.

Causes and mechanism of distortion of die steels during heat treatment; influence of the structure of the steel and the role of carbide stringers. (J-general, N8r; TS, 9-74)

62-J. (German.) Short Time Malleablizing. Horst Kruger. Giesserei-Technik, v. 6, Oct. 1960, p. 312-313, 316.

Duplex melting of malleable iron (2.5% C; 1.4% Si; 0.5% Mn) for auto parts in 750 mm. diameter hot blast cupola and four ton line-frequency induction furnaces. Malleablizing (two-chamber system) by preheating at 350° C., annealing at 950° C. and cooling at a cooling rate. (J23b, E10; CI-s)

63-J. Influence of Alloying Elements on the First Stage of Tempering in High-Carbon Steels. H. W. King and S. G. Glover. Iron and Steel Institute, Journal, v. 196, Nov. 1960, p. 281-288.

Tempering of five 1% carbon steels containing Si, Mn, Ni, Cr, or Mo and 1.14% plain carbon steel at range 23-100° C. is studied by measurements of the change in electrical resistivity. Cr and Mo steels resistance decreases with tempering time at all temperatures. Resistance changes in Si, Ni and plain carbon steels exhibited a positive peak and Mn steel a point of inflection, at temperatures below 80° C. These various forms of resistance changes are associated with alpha-carbide in coherent form. 28 ref. (J29, N8r, P15g; CN-r)

64-J. Open Coil Process of Annealing and Gas Alloying. No. 2. Engineer, v. 210, Nov. 28, 1960, p. 650-651.

Control of the carbon and nitrogen level and the temper of steel through temperature-time and atmosphere regulation in open coil annealing. Gas alloying and decarburizing are applied producing "direct on" enameling steel and "Tu", "T-5" and "T-6" tinplate from one grade of steel. (J23, J2k, J4a; ST-d, Sn, 8-62)

65-J. (Czech.) Heat Treatment of Cast Iron in Gas-Tight Containers. Stanislav Drapal and Josef Rydlo. Slevarenstvi, v. 8, Nov. 1960, p. 379-383.

Black-heart iron of improved mechanical properties is obtained by malleablizing in gas-tight containers. Impact strength is measured as a function of testing temperature from -30 to 200° C. Fracture of castings malleablized in packing material is compared with that of castings heat treated by the new method. 9 ref. (J23b, Q6n, 2-61, Q26; CI-S)

66-J. New Carburizing Steels in German Automobiles. H. U. Meyer. Metal Progress, v. 79, Jan. 1961, p. 70-75.

Comprehensive research into the nature of case hardenability has led to the development of carburizing steels in which the major alloying element is Mo. These new steels have been successful to the point where they have replaced standard carburizing grades in German automobiles despite their higher cost. (J28g, J5, 2-60; AY, Mo)

67-J. Stress-Relieving Large Weldments by Radiant Heating. Tom Bishop. Metal Progress, v. 79, Jan. 1961, p. 124.

Halves of turbine castings, measuring about 21 x 17 x 18 ft., are stress-relieved after welding by 68 single phase radiant heating elements each of 7 1/2 kw. rating. (J29a, W11m, 7-51)

68-J. (English.) Difference Between Single Isothermal Annealing and Successive Isothermal Annealing Effects in Cold Worked Aluminum. Genjino Mima. Osaka University, Technology Report, v. 10, Mar. 1960, p. 489-503.

Recovery and recrystallization processes in Al specimens as a function of annealing time, temperature (100-550° C.) and cycle determined by room temperature measurements of internal friction and tensile properties and by metallographic analysis. Relation between softening phenomena and annealing temperature. 10 ref. (J23s, N4, N5, Q22, Q27; Al-a)

69-J. Low Temperature Annealing Stages of Irradiated Copper. Ryukiti R. Hasiguti. Japan Academy, Proceedings, v. 36, June 1960, p. 335-339.

Various low temperature stages of lattice defect annealing in Cu are interpreted in terms of the trapping of interstitial atoms by impurity atoms. (J23, 1-67; Cu)

70-J. A Basic Guide to Spectifying Surface Hardening of Steels. Pt. 1. Hardening Methods. L. F. Spencer. Machine Design, v. 33, Jan. 19, 1961, p. 148-154.

Study of two general classifications of surface-hardening procedures, those that involve a chemical reaction between the surface of the steel and an external medium and those that develop surface hardness by selective heating and quenching. (J28; ST)

71-J. Heat Treatment of Cast Stainless Steel. Pt. 2. W. P. James. Precision Metal Molding, v. 19, Jan. 1961, p. 39-41.

Effect of heat treating variables on 17-4PH stainless with special reference to investment castings. Ferrite formation; austenite retention; influence of Cu content on mechanical properties. (J-general; SS, 5-60)

72-J. Working the Exotic Alloys. Gilbert C. Close. Modern Machine Shop, v. 33, Jan. 1961, p. 116-121.

Review of production problems involved in heat treating, joining, grinding and chemical milling of high-temperature, high-strength alloys. (J-general, K-general, G17, G24b; SGA-h, SGB-a)

73-J. Specialized Heat-Treating Cuts Die Costs. Donald F. Griffin. Metalworking Production, v. 104, Dec. 28, 1960, p. 53-56.

Outline of a five stage heat and freeze cycle in a controlled atmosphere furnace which permits production of die steels according to application. Dies are used in thread rolling and cold forming. (J2k; TS)

74-J. Heat-Treating Electrical Steels. John J. Lawless, Jr. Metalworking Production, v. 105, Jan. 11, 1961, p. 56-58.

Heat treatment of high Ni, high Si steels for cores and shielding in protective and reactive atmospheres at up to 2050° F. taking into account the effect of alloy composition on the heat treatment procedure. (J2k; ST, SGA-n, Ni, Si)

75-J. (German.) Surface Hardenability as a Criterion for Case Hardening Steels. Hans Ulrich Meyer. Berg- und Huttenmannische Monatshefte, v. 105, Nov. 1960, p. 292-301.

Presentation of surface hardness curves for various German and American case hardened Mn, Cr, Ni and Mo alloyed steels. Calculation of hardenability by factors related to concentration of alloying elements. Assessment of steel quality in terms of surface hardenability. (J28; AY)

76-J. Some Experiments in Controlled Low Temperature Stress Relief. R. N. Parkins. British Welding Journal, v. 8, Jan. 1961, p. 24-29.

Controlled low-temperature stress relieving (Linde Process) is applied to welded mild steel pipes in which the transverse residual stresses are high. Subsequent stress corrosion tests and stress analyses are conducted to determine the residual stress. 10 ref. (J1a, R11s; CN, 4-60, 7-51)

77-J. (Russian.) Cooling Base of Thick-Walled Cylindrical Billets. Z. V. Kovalevskaya, P. I. Karandashov and V. P. Kachanov. Stal', Nov. 1960, p. 1038-1041.

Cooling rate of 38KhN4MF steel cylinders (120-200 mm. wall thickness) is studied using oil, water and air as quenching media at 900° C. Quenching parameters are developed for temperature drop in various sections of the billet. (J26; ST, 4-52)

78-J. High Temperature Carburizing. T. W. Ruffle. Metallurgia, v. 62, Nov. 1960, p. 183-186.

Discussion of equipment required and means of controlling the atmosphere when carburizing at temperatures up to 1000° C. Test runs are made to evaluate the possibility of elevated temperatures for carburizing bearing retainers. Tables show the influence of furnace dewpoint on the carbon content of the steel. (J28g, 1-66; ST)

79-J. Properties of Ni-Al Age Hardening Steel. J. B. Seabrook. Metal Progress, v. 79, Feb. 1961, p. 80-83.

Because the Ni-Al steels (usually used for nitrided parts) have interesting aging properties, they do not overage despite long times at high temperature, they have been the source of much speculation and research. In this article the author concludes that the 5% Ni, 2% Al steel is potentially useful for precision gears despite its moderate impact strength. (J27d, Q-general; AY)

80-J. Heat Treating and Sintering Stainless in an Atmosphere. Bernt A. Ruediger. Metal Progress, v. 79, Feb. 1961, p. 101-105.

Hydrogen and dissociated ammonia are often used for protective atmospheres when bright annealing or sintering stainless steel parts. This article discusses the characteristics of such atmospheres and describes the various types of furnaces and gas generators which can be used. (J2k, H15q; SS)

81-J. Vacuum Furnaces are Versatile. H. W. Westeren. Metal Progress, v. 79, Feb. 1961, p. 106-109.

For tricky heat treating applications, brazing stainless steel parts, for example, vacuum "atmospheres" can be very useful. This article details the characteristics and applications of vacuum heat treatments. (J2k, 1-73)

82-J. The Selection and Heat Treatment of Tool Steels. J. G. Ritchie. Australian Institute of Metals, Journal, v. 5, Nov. 1960, p. 264-276.

Properties important in toolsteel and their determination; classification of toolsteels based on hardenability, hot hardness and carbon content, toolsteel specifications, basic principles of heat treatment. 18 ref. (J-general; TS)

83-J. (Japanese.) Recent Advances in Case Hardening Techniques. Kiyokazu Ogawa. Metal Finishing Society of Japan, Journal, v. 11, Oct. 1960, p. 523-529.

Review of carburizing, nitriding, cementation, induction hardening, flame hardening, hardfacing and spark hardening methods for increasing hardness, wear resistance and corrosion resistance of steel machine parts. (J28, Q29n, R-general, T7; ST)

84-J. (Japanese.) Status of Liquid Carburizing. Atsuo Ohmori and Kihei Imaizumi. Metal Finishing Society of Japan, Journal, v. 11, Oct. 1960, p. 529-536.

Case hardening of alloy, carbon and stainless steels by carburizing in a NaCN bath, heating in either electric, gas or oil furnace, quenching, annealing and straightening. Regulation of the salt bath. Properties of the hardened case as influenced by C concentration. (J28g, J-general; AY, CN, SS)

85-J. (Japanese.) Gas Carburizing and Heat Treatments in a Protective Atmosphere. Shin Yuuki. Metal Finishing Society of Japan, Journal, v. 11, Oct. 1960, p. 537-544.

Description of gas carburizing in which steel is carburized in CO, H_2 and N_2 gas prepared from propane or natural gas. Surface carbon concentration is determined by dew point measurement. Enriching, diffusing and bright heat treatments are carried out in a similar gas. (J28g, J2k; ST)

86-J. (Japanese.) Flame and Induction Hardening. Kan-ichi Wariishi and Hachiroh Homma. Metal Finishing Society of Japan, Journal, v. 11, Oct. 1960, p. 545-550.

Flame or induction hardening of steel gears, followed by annealing, quenching and tempering to improve hardness and mechanical properties. (J2g, J2h, T7a; ST)

87-J. Increasing the Strength and Wear Resistance of Rails by Quenching in Oil. P. S. Plekhanov, T. Ya. Kravchenko and V. A. Koshkin. Paper from "Contemporary Problems of Metallurgy". Consultants Bureau, Inc., New York, 1960, p. 501-508.

Mechanical properties of carbon steel rails after sorbitization (oil quenching) treatments at 780-950° C. with subsequent tempering at 550-570° C. Data are given for fatigue, impact, rupture, wear, fracture and deformation resistance and elongation, Brinell hardness, resilence and microstructure. (J26, Q-general, T23q; CN)

88-J. (Translation-ConBur.) Effect of Heat Treatment on Decarbonization and Cracking of Steels Subjected to Hydrogen at Temperatures Between 500 and 600° C. and a Pressure of 800 kg/cm^2. Yu. I. Archakov, I. D. Grebeshkova and V. P. Teodorovich. Journal of Applied Chemistry of the USSR, v. 33, Jan. 1960, p. 86-90.

3 ref. (J4a, Q26q, 2-64; ST)

89-J. Effect of Carbide Stringers on the Distortion of Die Steels During Heat Treatment. K. Sachs. Metal Treatment and Drop Forging, v. 28, Jan. 1961, p. 31-36.

Causes and mechanism of distortion of die steels during heat treatment. Influence of the structure of the steel. Relation of carbide distribution to coefficient of linear expansion. (J-general, 9-74, P11g, 3-71; TS)

90-J. (French.) Isothermal Hardening and Its Applications. Metallurgie et la Construction Mecanique, v. 92, Dec. 1960, p. 1013-1015, 1017, 1019-1021.

Davenport and Bain methods of determining the isothermal transformation diagrams of steels. Applications in hardening, tempering and special thermal treatments. Description of furnace for salt-bath quenching. (J26, N-general; ST)

91-J. Heat Processing of Silicon Iron Alloys or Electrical Steels. Pt. 1. B. A. Ruediger. Industrial Heating, v. 28, Jan. 1961, p. 26-28, 30, 32, 34, 36.

Hot rolling, cold reduction, annealing, normalizing and stretching processes used in the production of grain oriented or nonoriented, fully or semiprocessed electrical steels. Effect of composition on electrical and magnetic properties. (J-general, F23, F29s, P15, P16, 2-60; Fe-b, Si, ST-f)

92-J. Automatic Production of Nonferrous Tubes With Modern Induction Heating and Extruding Facilities. L. M. Duryee. Industrial Heating, v. 28, Jan. 1961, p. 56-57.

Induction heating of large Cu, brass and cupro-nickel billets prior to extrusion to prevent scale formation. Description of heaters, conveyorized line and extrusion equipment. (J2g, F24; Cu-b, Ni, 4-52)

93-J. Bright Annealing Stainless Tubing in Twin Muffle Furnace. Industrial Heating, v. 28, Jan. 1961, p. 64-67.

Bright annealing of welded tubing in a controlled atmosphere furnace having muffles which completely enclose the work during the heating and cooling cycles. (J23a, J2k, W27; SS, 4-60)

94-J. (Spanish.) Nitriding and the Application of F-124 Cr-Mo Steel as Nitriding Steel. Enrique Garcia Sardinero. Tecnica Metalurgica, v. 16, Sept-Oct. 1960, p. 189-205.

Composition of specimens; hardness tests; surface structure; depth of nitrided layer. 35 ref. (J28k, Q29; AY)

95-J. Annealing of Cold-Reduced Sheet and Coil at the Steel Company at Wales Ltd. H. H. Ascough. Paper from "Production of Wide Steel Strip". Iron and Steel Institute, London, England. May 1960, p. 128-143.

Batch, open coil, roller hearth and single stack annealing of low carbon steel at 1610-1650° F. in atmospheres of DX, NX and HNX generator gas and ammonia. Influence of hot strip mill temperature variations, annealing time and temperature and cold reduction on ductility and microstructure. (J23, 2-61, 3-68; CN-g, 4-53)

96-J. Fast Heating Accomplishes Uniform Speroidizing of Heading Stock. John Tschopp. Blast Furnace and Steel Plant, v. 49, Feb. 1961, p. 184-185.

Spheroidization of pearlite in the structure of 1038, 1041 and low alloy steels, using a continuous pusher type furnace. (J23r; AY)

97-J. Stress-Relieving Fabricated Girders. Welding and Metal Fabrication, v. 29, Feb. 1961, p. 67-70.

Resistance heating of welded steel fabrications to 650° C. using a furnace having mats composed of ceramic beads threaded on Ni alloy resistance wire. Latter are linked together to provide a mat surface temperature of 1000° C. (J1a; ST, 4-57)

98-J. (Japanese.) The Gas Carburizing Capacity of Some Practical Case-Hardened Steels. Kingo Kiyonaga and Toshio Okuno. Japan Institute of Metals, Journal, v. 24, Nov. 1960, p. 727-731.

Specimens of S15 CK, SCM 22, SNC 22, SNCM 21 and SNCM 23 alloy steels are carburized in a batch furnace at 875-925° C., with measurement and calculation of the effect of dew point, carburizing temperature and holding time on the carbon distribution curve. The relation of surface carbon content, case depth and the diffusion coefficient of carbon are determined in terms of the carburizing conditions and composition of each steel. 8 ref. (J28g; AY)

99-J. Surface Hardening of Steel. Lester F. Spencer. Machine Design, v. 33, Feb. 2, 1961, p. 110-114.

Material selection factors related to surface hardening of steel, including data on average core and surface properties after various carburizing cycles. 9 ref. (J28; ST)

100-J. (Russian.) Structural Steels With Lower Hardenability. K. Z. Shepelyakovskii. Metallovedenie i Obrabotka Metallov, Dec. 1960, p. 8-15.

Induction melting, technology and resultant composition and mechanical properties of EI937, 55PP and 65PP structural steels of low hardenability. Gears (3-6 mm.) or small cross section parts of these steels can be successfully surface quenched subsequent to induction heating, eliminating carburizing operations. 9 ref. (J5, J26, D6, Q-general; ST, SGB-s)

101-J. Fluidized Beds: New Heat Treating Medium. Metalworking Production, v. 105, Feb. 1, 1961, p. 56.

Steel is heat treated at 100-1500° F. in a fluidized bed composed of a dense dispersion of highly turbulent refractory particles. Comparison of heat transfer rates in the fluidized bed to those in Pb and salt baths. Quenching rates for steel are compared in fluidized bed, H_2O, oil and air. (J-general, J26; ST)

102-J. Technical Control in Steel Foundries in North America. Clyde B. Jenni. Foundry Trade Journal, v. 110, Feb. 2, 1961, p. 133-144.

Survey of heat treatment, welding, inspection, quality control and other plant practices in the production of steel castings. 49 ref. (J-general, K-general, 18; ST, 5)

103-J. (Japanese.) Hot Bath Quenching at Low Temperature of Eutectoid Carbon Steel. Pt. 3. Length Changes in Hot Bath Quenching at Low Temperature and Aging at Room Temperature of Eutectoid Carbon Steel. Itsuro Tatsukawa. Japan Institute of Metals, Journal, v. 24, Dec. 1960, p. 782-785.

Expansion and microstructural charge in an 0.8% C steel as a result of hot bath quenching above and below the Ms temperature, tempering and annealing (250° C.), aging and cooling (0° C.) Relation to austenite stabilization and decomposition, martensite transformation and bainite reactions. 7 ref. (J26, J27, N8, P10d; CN)

104-J. Gaseous Decarburization of White Cast Irons. J. Burke, J. Bell and D. R. Bourne. Acta Metallurgica, v. 8, Dec. 1960, p. 864-870.

Decarburization of two white cast irons differing in microstructure is studied using a 20% carbon dioxide-80%

carbon monoxide atmosphere. Carbon loss and depth of decarburization at 1000 and 1050° C. are measured as a function of time. A mathematical analysis of decarburization is developed and from comparison with the experimental results it is concluded that the diffusion of carbon in austenite is the rate controlling process. 10 ref. (J4a, N1, N8, 3-67; CI-p)

105-J. The Heat Treatment of Steel. Edwin Gregory and Eric N. Simons. Edgar Allen News, v. 40, Jan. 1961, p. 9-10.

Hardening of flat disks and long tools of high speed steel by liquid heating baths. Description, output, rating, etc., of an electrode salt bath. (J27a; TS-m)

106-J. For Stronger Missile Cases... Decarburize! John M. Lynch. Metal Progress, v. 79, Mar. 1961, p. 78-81.

The trend to higher strength in sheet steels for rocket cases has been slowed by two drawbacks: the drop in toughness and the increased susceptibility toward notch sensitivity which goes along with these greater strengths. Surface decarburization is suggested as a means for toughening the sheet surfaces. (J4a; ST, AY)

107-J. (Russian.) Heating of Titanium Alloy Parts. G. S. Sakharov and N. G. Evlanov. Vestnik Mashinostroeniya, Dec. 1960, p. 41-43.

VT3-1 Ti-base alloy blades are heated at 850-1050° C. in an argon protective atmosphere in a muffle furnace. Metallographic study, microhardness measurements and mechanical tests show the efficiency of this atmosphere in preventing oxidation or nitrogen absorption. (J2k; Ti-b)

108-J. The Heat Treatment of Steel. Edwin Gregory and Eric N. Simons. Edgar Allen News, v. 40, Feb. 1961, p. 33.

Design and operation of a suspended pot-type salt bath furnace having its thermal efficiency increased by waste heat recuperator. Comparison of salt and Pb baths. (J2j, W27m; ST)

109-J. Effect of Carbide Stringers on the Distortion of Die Steels During Heat Treatment. K. Sachs. Metal Treatment, v. 28, Feb. 1961, p. 59-62.

Thermocouple measurements and X-ray examination to determine effect of temperature gradient, retained austenite, anisotropic dilation and carbide distribution on microstructure and distortion mechanism. (J-general, 9-74, M27; TS)

110-J. Precipitation Hardening of Low-Carbon Steel. Mirko Klesnil and Premysl Rys. Metal Treatment, v. 28, Feb. 1961, p. 63-73.

Examination by optical and electron microscopy of structural changes in a super-saturated solution of alpha iron during heat treating experiments at temperatures to 700° C. with low-carbon steel. Effect of hardening time and temperature on hardness, ferritic grain boundries and tensile strength. (J27, Q29n, Q27, M27; CN-g)

111-J. (Italian.) An Age-Hardenable Nitriding Steel. W. S. Mounce and A. J. Miller. Nickel, Aug. 1960, p. 14-16.

Nitriding characteristics, hardness and high-temperature properties of an alloy steel containing 5% Ni and 2% Al. (J5, J28k, N7a, Q29n, 2-62; AY, Ni, Al)

112-J. (French.) Nitriding of Mg at Elevated Temperatures. The Mg-NH_3 System. I. G. Murgulescu and D. Cismaru. Revue de Chimie, v. 5, Feb. 1960, p. 289-297.

Mg samples are nitrided in NH_3 at 490-600° C. for 0-500 min. Computation of the reaction velocity, using Arrhenius' law. Weight increases as a function of time. Structure tests. 11 ref. (J28k; Mg)

113-J. (French.) Heat Treatment of Cast Iron. Journal d'Informations Techniques des Industries de la Fonderie, Feb. 1961, p. 1-3.

Cast iron parts containing 3.17-3.65% C, 2.49-3.15% Si, 0.56-0.77% Mn, 0.06-0.12% S, 0.10-1.13% P, 0-0.22% Cr, 0-0.41% N and 0-0.13% Ti are heat treated at 820-900° C. for 15 min. to 1 hr. to reduce hardness for machining purposes. (J-general; CI)

114-J. (Pamphlet.) Heat Treatment. Paper from "Federated Aluminum Casting Alloys Handbook". American Smelting and Refining Co., New York, 1960, p. 8-11.

Effects of solution treatment aging and stress relief on mechanical properties, structure and dimensional stability of Al alloy castings. Optimum temperature and process parameters are specified for various alloys according to composition. (J-general, Q-general; Al-b, 5)

115-J. A Recent Solution to the Problem of Stress Relieving of Welds Under Site Conditions. R. B. L. Tindall. South African Mechanical Engineer, v. 10, Jan. 1961, p. 141-146.

Use of induction heating for stress relief of welded steel rotary furnace riding rings and stainless steel clad scrubber towers. (J1a, W18b; ST, 7-51)

116-J. Preheating and Stress-Relieving of Pipes and Vessels. P. J. Cooper. Welding and Metal Fabrication, v. 29, Mar. 1961, p. 95-100.

Preheating and stress-relieving of welded carbon steel and Cr alloy steel tubes and vessels using induction, inductive radiant or noninductive radiant heating. (J1a, T26; AY, CN)

117-J. (French.) Nitriding of Magnesium at Elevated Temperatures. I. G. Murgulescu and D. Cismaru. Revue de Chimie (Rumania), v. 5, Feb. 1960, p. 251-258.

Cleaned and polished Mg samples are nitrided in pure nitrogen for 4-168 hr. at 500° C. Reaction velocity as a function of temperature and time. 12 ref. (J28k; Mg)

118-J. The Decarburization of Steel Wire. Peter Fischer. Wire and Wire Products, v. 36, Mar. 1961, p. 336-339, 383-385.

Influence of rim-decarburization of spring steel on the machinability, hardness, elastic properties and fatigue bending behavior. (J4a, G17k, Q29, Q7, Q21; ST, 4-60)

119-J. New Die Hardening Method Reduces Distortion. Howard E. Jackson. Western Metalworking, v. 19, Mar. 1961, p. 45-46.

Development of a bright hardening process for die casting cores which minimizes distortion and results in bright, clean surfaces. Tool and stainless steels are hardened by heating in an electric bell-type furnace, cooling through the hardening cycle and tempering. (J2k; SS, TS)

120-J. Some Features of the Use of Molybdenum in Alloy Steels. Aciers Fins & Speciaux Francais, Dec. 1960, p. 21-26.

Effect of Mo as alloying element on the hardenability, temper brittleness and segregation of steels. (J5, Q26s, 2-60, 9-69; ST, Mo)

121-J. Heat Treating Rohr's Runway Stretchers. Thomas A. Dickinson. Metal Treating, v. 12, Feb-Mar. 1961, p. 15, 40.

Thrust reversers of A286 stainless steel are heat treated in a conventional box type furnace to improve ultimate tensile strength and yield strength. (J-general, T24b; SS, 17-57)

122-J. (Italian.) Heat Treatment of Light Alloys for Plastic Forming. Pt. 3. E. Hugony. Trattamenti Termici, v. 3, Nov-Dec. 1960, p. 19-26.

Heat control and optimum design of furnace charging facilities for heat treatment of Al-Cu-Mg alloys. 14 ref. (J-general; Al-b, Cu, Mg)

123-J. (Italian.) Dynamic Oil Method for Mechanizing Temper Quenching. Trattamenti Termici, v. 3, Nov-Dec. 1960, p. 36-42.

Comparison of a conventional oil quenching technique in water cooled oil vats with a dynamic method having forced oil circulation and heat exchange. Application to steel products. (J26; ST)

124-J. (Italian.) Stress Relieving in Weldable Heat Resistant Steels. Pietro Brozzo. Revista Italiana della Saldatura, v. 12, Sept-Oct. 1960, p. 209-221.

Stress relieving of heat resistant, weldable Cr and Cr-Mo 14CD3, 10CD910, X10CD5 and X15C13 steels investigated by torsion relaxation tests. Effect of degree of deformation, temperature and rate of rolling and chemical composition on stress relieving. 14 ref. (J1, G23, Q1c, 2-60, 2-61, 3-68; AY)

125-J. Heat Treating: Key to Production of Investment Castings. Edward M. Broad. Industrial Gas, v. 39, Mar. 1961, p. 10-13.

Mold making and curing techniques and investment casting of stainless, alloy, tool and regular steels and nonferrous

metals including Al alloys, brasses, bronzes and Be-Cu. Application of gas atmosphere generators and pit and horizontal muffle furnaces to carburizing, annealing, normalizing and hardening of the castings. (J-general, 1-52, E15; Al-a, Cu-b, ST)

126-J. Thermal Distortion in Steel Plates for a Proton Synchroton Magnet. R. J. Wakelin. Research Applied in Industry, v. 14, Mar. 1961, p. 100-106.

Warping difficulties in the annealing of 10 ft. wide steel plates for parts of a 7000 ton proton synchroton magnet as caused by residual stress systems existing in the plates after annealing. Calculations of transformation and thermal stress for achieving closer control of temperature and selection of optimum heating rates and equipment. 11 ref. (J23, Q25p, 9-74; ST, 4-53)

127-J. (French.) Preliminary Aging of Aluminum-Magnesium-Silicon Alloys. Martial Renouard and Roland Meillat. Memoires Scientifiques, v. 57, Dec. 1960, p. 930-942.

Influence of the time lapse between quenching and aging and the effect of a short preliminary aging treatment immediately after quenching on the mechanical resistance of drawn or rolled A-SG, A-SGM and A-GS Al-Mg-Si alloys. 6 ref. (J26, J27d, N7a; Al-b, Mg, Si)

128-J. Annealing in Hood Furnaces With Movable Annealing Hoods. Wire Industry, v. 28, Mar. 1961, p. 285-286.

Bright annealing of wire, strip, tube and sheet in an annealing furnace heated by gas or electricity having an annealing hood made from heat resistant nickel chromium stainless steel. An inert gas provides a nonoxidizing atmosphere within the hood. (J23a, J2k, 1-52)

129-J. Heat Processing Stainless Steels. B. A. Ruediger. Metal Treatment and Drop Forging, v. 28, Mar. 1961, p. 105-107.

Stainless steels are annealed, brazed, sintered and, in some cases, fully hardened without discoloration or oxidation by performing operations in a dry atmosphere of hydrogen, dissociated ammonia or vacuum at a controlled dewpoint. Recommendations are made for types of gas generating equipment and furnaces. (J2k; SS)

130-J. Effect of Carbide Stringers on the Distortion of Die Steels During Heat Treatment. K. Sachs. Metal Treatment and Drop Forging, v. 28, Mar. 1961, p. 115-119.

Comparison of distortion figures for quenched and martempered specimens specially designed to show the influence of carbide distribution. Effect of homogenizing treatments on the distortion behavior of forged bars. (J-general, 3-71; TS)

131-J. (Japanese.) Spheroidized Graphite Cast Iron. Takeomi Okumoto and Shiroh Iijima. Japan Society of Mechanical Engineers, Journal, v. 64, Jan. 1961, p. 25-34.

Data are given for composition, structure, mechanical properties, wear, corrosion, heat resistance and weldability of the cast iron. Discussion of hypothetical growth mechanisms during spheroidizing. (J23r, Q-general; CI-r)

132-J. (Translation-Brutcher no. 4657.) Quenching of Carbon Steel Tools in Fused Salts. B. G. Gol'dshtein and A. I. Vinograd. Metallovedenie i Termicheskaya Obrabotka Metallov, July 1959, p. 45-49.

Details of a stepped-quenching practice for carbon-steel tools up to 100 mm. diameter in vigorously stirred salt baths at 110-125° C. containing a certain amount of water. Advantages are slow cooling through martensite range; complete elimination of quench cracking and distortion, minimum finishing work on heat treated tools and wider use of carbon toolsteels. (J26; CN)

133-J. (German.) Heat Transfer Parameters in Quenching. V. Paschkis. Harterei-Technische Mitteilungen, v. 15, Apr. 1960, p. 189-201.

Heat flow and heat transfer are measured during quenching of an Ag sphere of 50.8 mm. diameter from temperatures of 870° C. in varying amounts of water, oil and NaOH solutions (0-5% NaOH) at 16-85° C. Cooling curves; change of heat transfer during cooling. (J26, P11k; Ag)

134-J. (German.) Heat Treating by Induction Heating. W. Brunst. Harterei-Technische Mitteilungen, v. 15, Apr. 1961, p. 233-234.

Automatic induction hardening (heating to 620° C. and water quenching) of

unalloyed steel (0.35% C) coupling boxes using 10-station round table machine. Subsequent automatic hardness testing. (J2g; ST)

135-J. (German.) Chemical Reactions Between Furnace Atmosphere and Annealed Materials in Plant Annealing of Cold Worked Steel Under Protective Atmosphere. Theodor Schmidt and Joachim Wunning. Stahl und Eisen, v. 81, Mar. 16, 1961, p. 361-366.

Continuous concentration measurement is used to control the protective atmosphere during annealing of cold rolled, degreased Sn strip in a hood-type furnace and of low-Si transformer steel in a continuous furnace. Decarburization of deep drawing sheet in protective atmosphere as influenced by annealing temperature (700-920° C.). (J2k; Sn, ST, SGA-n)

136-J. Strengthening Mechanisms in Nickel-Base High-Temperature Alloys. C. H. Lund and D. C. Drennen. Defense Metals Information Center, Battelle Memorial Institute, DMIC 95, Apr. 4, 1961. (Available as PB 161245 from U. S. Office of Technical Services, Washington 25, D. C.)

A review of the various mechanisms from which Ni base superalloys derive their high-temperature strength. Discussed are solid-solution hardening, precipitation hardening and strengthening imparted by additions of B and Zr. Each strengthening mechanism is discussed briefly in terms of dislocation theory. Also a discussion of failure, heat treatment and related grain boundary behavior. 14 ref. (J27; Ni-b, SGA-h)

137-J. (French.) Modern Thermal Treatments. L. Villard. Metallurgie, v. 22, Mar. 4, 1961, p. 111-115.

Surface tempering, sulphide treatment and nitriding of carbon and Cr-Mo steels. 4 ref. (J29, J28k; ST, Cr, Mo)

138-J. Principles of the Fluid Bed. J. D. Stauffer and C. O. Pedersen. Metal Progress, v. 79, Apr. 1961, p. 78.

When a thick layer of small particles of refractory (silica sand, for example) is heated in a container and subjected to a blast of gas from the bottom, it will billow, boil and flow much like a fluid. This characteristic is the basis for the "fluid-bed" furnace, a new type of heating device which heats parts rapidly and cleanly. (J-general, B15q)

139-J. Heat Treating in the Fluid Bed Furnace. Charles Bennett and Charles Jung. Metal Progress, v. 79, Apr. 1961, p. 82.

Among other successful applications, the fluid bed furnace has been used in austenitizing intricate parts of alloy steel and for removing residual stresses from Al parts. (J-general, B15q)

140-J. Fluidized Bed Speeds Super Alloy Heat Treat. Robert Austin. Western Metalworking, v. 19, Apr. 1961, p. 46.

Heat treatment and quenching of super and refractory alloys such as Rene 41, Inconel X, HS-25 and MO at -110 to 2000° F. in a fluidized bed furnace containing minute refractory particles on the furnace floor which are agitated by air or inert gas, the turbulence causing rapid heat distribution in the furnace. (J-general, W27; SGA-h, EG-d37)

141-J. The Effect of Flow Rate on the Cooling Ability of Liquids for Steel Quenching. Masayoshi Tagaya and Imao Tamura. Osaka University, Technology Reports, v. 10, Oct. 1960, p. 797-804.

The effect of flow rate in turbulent streams on the cooling ability of water and three kinds of oil is quantitatively examined in the case of cylindrical Ag specimens at 800-300° C. The cooling ability of the liquid is determined as a function of the Reynold's number and the Prandtl's number. The relation is suggested as a foundation for designing a quench tank and its agitation for optimum quenching of steel. 17 ref. (J26, W28p, 3-67; ST, Ag)

142-J. Surface Carbide Formation in Blackheart Malleable Iron. C. T. Moore. BCIRA (British Cast Iron Research Assoc.) Journal, v. 9, Mar. 1961, p. 244-262.

Investigation of annealing atmosphere and temperature conditions as they affect formation of surface carbides. Comparison with low carbon steel and Armco iron samples. 9 ref. (J23; CI-s)

143-J. It's "Submerged" Hardening for These Gears. Metalworking Production, v. 105, Apr. 5, 1961, p. 47-50.

Induction hardening of EN 8D and EN 24T steel gears to increase wear resistance and strength. (J2g, T7a; ST)

144-J. (Pamphlet.) A Study of Temperature Uniformity in Heat Treating. Harold N. Ipsen. Ipsen Industries, Inc., 715 S. Main St., Rockford, Ill. 1961, 6 p.

Effect of temperature uniformity, time and addition of ammonia to the heating atmosphere on the Rockwell hardness, case hardness, core properties, carbon solubility and penetration rate during case hardening and carbonitriding of B 1112 steel and 1045 steel. (J28; ST)

145-J. Quench Side Rails for Hardness. Iron Age, v. 187, Apr. 27, 1961, p. 109.

Development of a die quench process for light side rails up to 40 ft. long. Knockout rods are used to lower the rail into the quench and straightening unit where a punch enters the rail and expands as the outer wall of the die contacts the side rail. A water quench circulates against all sides of the rail. (J26; 4-57)

146-J. How to Surface Harden Large Sprockets. Canadian Metalworking, v. 24, Apr. 1961, p. 32-35.

Tooth areas of 1045 or 1141 steel sprockets are hardened using heat treatment coils composed of Cu tubing. Detailed instructions are given for forming coils. (J28, T7; ST, 17-57)

147-J. Fast Heating Accomplishes Uniform Spheroidizing of Heading Stock. John Tschopp. Wire and Wire Products, v. 36, Apr. 1961, p. 463, 515.

Carbon and low alloy steel coils spheroidized in continuous pusher type furnace. (J23r; AY, CN, 4-61)

148-J. High Vacuum Annealing: Its Use in Steel Wire Drawing and Cold Rolling Mills. Werner Herdieckerhoff. Wire and Wire Products, v. 7, Apr. 1961, p. 470-473, 518-519.

Advantages of clean, dry surfaces and uniform properties produced by vacuum annealing. Conditions for bluing of wire and strip in vacuum furnaces. (J23, 1-73; ST, 4-53, 4-61)

149-J. Heat Processing of Silicon-Iron Alloys or Electrical Steels. Pt. 2. B. A. Ruediger. Industrial Heating, v. 28, Feb. 1961, p. 262-266.

Discussion of user heat treatments such as stress relief anneals, heat treatment to obtain maximum magnetic properties and bluing. (J-general; ST-f)

150-J. Carburizing and Carbonitriding in Exposed Element Furnaces. C. H. Stevenson. Industrial Heating, v. 28, Feb. 1961, p. 282-286, 288, 290, 292.

Operation of carbonitriding furnace at low voltage with increased current to remove problem of electrical leakage due to carbon saturating the brick-work and settling on the walls and resistors. (J28g, J28m, W27)

151-J. Continuous Spheroidizing of Cold-Heading Coil Stock. John Tschopp. Industrial Heating, v. 28, Apr. 1961, p. 672-674.

Report on the spheroidizing of steel coil stock (SAE 1038, 1035, 1041 and 4140) by a continuous pusher-type furnace. By a rapid heat treating cycle, stock structure is transformed to enhance subsequent cold heading fabrication operations. (J23r; ST)

152-J. Ultra-Long Anti-Aircraft Rifle Components Vertically Heat Treated in Salt Bath. Industrial Heating, v. 28, Apr. 1961, p. 676, 813.

Report on heat treatment (1575° F. for 65 min.) of 15 ft. long anti-aircraft rifle barrels. Vertical immersion in salt baths eliminates warpage through gravitational forces and prevents stresses due to localized temperature variations. (J-general, T2m)

153-J. Heat Processing of Silicon-Iron Alloys or Electrical Steels. Pt. 3. B. A. Ruediger. Industrial Heating, v. 28, Apr. 1961, p. 680-688.

Report on heating equipment for stress relieving, annealing and blue oxidizing with data given for load limitations, furnace capacity and processing effects on electrical properties of Si-Fe alloys. (J23, J1a, P15; Fe-b, Si)

154-J. Aluminum Alloy Coils Annealed Automatically in Car-Type Radiant-Tube Furnace. Industrial Heating, v. 28, Apr. 1961, p. 690-694.

Report on the automatic annealing of 5005 Al alloy coil by means of a two-zone, car-type radiant-tube, gas-fired recirculating furnace with a 30,000 lb. per load capacity. Temperature tolerances of $\pm$ 10° F. are maintained in the 500-1200° F. range. (J23, W27; Al-b)

155-J. Seamless Oil Tubing Quenched and Tempered to High Strength in Continuous Barrel Furnace Line. Industrial Heating, v. 28, Mar. 1961, p. 501-502, 504, 506, 508.

Production of carbon steel high-strength oil well casing on a hardening and tempering line consisting of a charge table, gas-fired barrel furnace units, an annular quench and conveyor equipment. (J26, J29, T26r; CN, 17-57)

156-J. Carbon Control During High Temperature Carburizing. Robert W. Krogh. Metal Treating, v. 12, Apr-May 1961, p. 10-11, 23, 32.

Regulation of dewpoints and atmospheres in batch type furnaces carburizing various steels. The generator is operated at a nominal dewpoint, adjustment being made at the various furnaces with natural gas or air additions to obtain required potentials. (J28g; ST)

157-J. Annealing Pearlitic Blackheart Malleable Iron Castings. Metallurgia, v. 63, Mar. 1961, p. 115-116.

Annealing of pearlitic blackheart castings by a successful system comprised of a high-temperature furnace, tray dumper, cooling conveyor, low-temperature furnace and a control gear. (J23; CI-s, 5)

158-J. (French.) Beilby Layer and Damage Caused by It. Pt. 13. Cayere. Machine Moderne, v. 55, Mar. 1961, p. 31-38.

Layer of adsorbed gas, oxide and nitride fragments and carbide crystals is formed during super-refining of steel surfaces. Remedies. (To be continued.) (J4; ST)

159-J. Induction Heating in the Metal Industries. Edgar Allen News, v. 40, Apr. 1961, p. 78-79.

Melting and alloying pure metals and alloys using a vacuum induction furnace. (J2g, 1-73)

160-J. The Heat Treatment of Steel. Edwin Gregory and Eric N. Simons. Edgar Allen News, v. 40, Apr. 1961, p. 84-85.

Measurement of temperature while heat treating steel using pyrometer, expansion thermometers and electrical resistance thermometers. (J-general, 1-53; ST)

161-J. Die Quenching. Production, v. 47, May 1961, p. 62-63.

Die quenching is compared with flame hardening, induction hardening and vertical quenching for production of truck frame rails from high-alloy steel, SAE-8620 steel and Mn alloy steel. Measurements of tensile strength, yield strength and grain structure. (J26, Q27a, Q23b, M27c, T21e; ST)

162-J. Best Heat Treatment for PH Stainless Steels. D. C. Ludwigson. Product Engineering, v. 32, May 8, 1961, p. 32-34.

Solution annealing, austenitic conditioning, martensitic transformation, aging and refrigeration hardening of sheet, brazed sandwich panels, springs and simple shapes of 17-7 PH and PH 15-7 Mo stainless for control of room and elevated temperature tensile strength, bearing and shear strength, ductility and wear and corrosion resistance. (J22, J27, Q-general, R-general; SS-e)

163-J. The Mechanism of Hardening in 17-7PH Stainless Steel. E. E. Underwood. Battelle Memorial Institute (Wright Air Development Division). U. S. Office of Technical Services, PB 161850, June 1960, 54 p. $1.50.

The unique hardening found in precipitation-hardening stainless steels is investigated both in commercial sheet alloys of 17-7PH and high-purity ferrite single crystals of Fe-17Cr-7Ni-2Al. Profuse precipitation of needle-shaped particles is responsible for maintaining the high hardness level in the aged crystals. (J27; SS)

164-J. Heat Treatment of Metals. OTS Selective Bibliography SB-454. (Available from U. S. Office of Technical Services, Washington 25, D. C.) $.10.

Reports of the Army, Navy, Air Force, Atomic Energy Commission and other government agencies in addition to foreign research literature from West Germany, France, the Soviet Union and other nations dealing with heat treatment of high-strength steels, Ti alloys, U-Mo alloys, Zr alloys and heat treatment research in general. (J-general; ST, SGB-a, Ti-b, U-b, Mo, Zr-b)

165-J. Levitation Heating and Its Metallurgical Possibilities. B. Harris, E. G. Price and A. E. Jenkins. Paper from

"Australian Atomic Energy Symposium". Melbourne University Press, Melbourne, Australia, 1958, p. 221-225.

Specially designed induction coil is used for the simultaneous lifting and heating of Ag, Cu, Zr, U and Ti. Levitation melting is performed using high-frequency current and a controlled atmosphere of O_2, N_2, or H_2. A study is made of the variables associated with the levitation process. 7 ref. (J2g; Ag, Cu, Ti, U, Zr)

166-J. The Heat Treatment of Grey-Iron Castings. W. M. Lord. British Foundryman, v. 54, Apr. 1961, p. 170-179.

Techniques employed in the stress relief, normalizing, annealing, hardening and tempering of gray and spheroidal graphite Fe castings. (J-general; CI-n, CI-r, 5)

167-J. (Pamphlet.) 400 Cycle Induction Heating With Proportional Control for Preheating and Stress Relieving of Welded Joints. 1961. 32 p. Hobart Brothers Co., Troy, Ohio. $.50.

Stress relief of carbon steel, martensitic steel, austenitic steel, ferritic steel, carbon molybdenum steel, CrNi steel and Cr stainless steel using an induction coil. (J2g; CN, SS)

168-J. (French.) Case Hardening. Pt. 10. Sulphur Case Hardening. G. de Smet. Pratique des Industries Mecaniques, v. 47, Feb. 1961, p. 32-40.

Composition of the salt bath, method of heating and agitation of bath for combined sulpho-cyanidation process. Wear tests of treated steel specimens. Applications and restrictions. (J28; ST)

169-J. (German.) Importance of Static Frequency Transformation in Induction Heating and Melting. R. Lethen. Elektrowarme, v. 19, Jan. 1961, p. 2-8.

Selection of proper frequency ranges in heating and melting as influenced by metal (light metal, nonferrous heavy metal, austenitic or ferritic steel) and size of workpiece or melt. Control of frequency by static frequency changers. (J2g; SS, EG-a39, EG-a38)

170-J. Distortion Control During Heat Treatment of Aircraft and Missile Components. A. L. Kitchin and H. Mansfield. Society of Automotive Engineers, Paper no. 340C, 1961, 8 p.

Distortion of aircraft and missile components caused by heat treating is controlled by restraint, reduction of temperature gradients and stresses, control of case distribution and corrective machining or straightening. (J-general, 9-74, T24)

171-J. (German.) Inductive Heat Treating of Welding Seams. H. Reinsch. Technik und Betrieb, v. 13, Feb. 1961, p. 25-27.

Stress-free annealing of nonferrous metal and austenitic and ferritic steel circular and longitudinal welds by alternating current induction. Selection of proper frequency and power range with temperature control by thermocouples. (J1a, 1-69; ST, EG-a38, 7-51)

172-J. (French.) Heating of Steels to High Temperatures for Thermal Treatment. M. Assonov. Revue de Metallurgie, v. 58, Mar. 1961, p. 267-270.

Mechanical properties of steels heated to 1100° C. and above the Ac_3 transformation temperature before forging, case hardening or carbonitriding. (J2, Q-general; ST)

173-J. Spark-Hardening of Cutting Tools, Austenite Formation and Edge Erosion. N. C. Welsh and P. E. Watts. Iron and Steel Institute, Journal, v. 198, May 1961, p. 30-37.

Description of the metallurgical changes which occur when steel is sparked with an electrode of tungsten carbide. The hardening produced by the transfer of carbide is offset by the softening effect of retained austenite. Also, the process becomes erosive and tends to blunt the cutting tool. 12 ref. (J4c, Q29n, T6n; ST)

174-J. Does Carbide Impregnation Work? L. C. Gaunt. Cutting Tool Engineering, v. 13, May 1961, p. 19, 22.

Impregnation of high-speed tool and die steels with tungsten carbide by electric-spark deposition. Effect of carbide impregnation on wear resistance, tool life, galling and surface finish of material machined. (J4c, T6n; TS-m)

175-J. (German.) Decarburization of Steel Wire. Peter Fischer. Draht-Welt, v. 46, Feb. 1960, p. 85-93.

Effect of decarburization on chipless shaping and machining, work hardening and mechanical properties of steel wire. Causes, detection and elimination of decarburization. (J4a, Q-general, Q29n, G17, 2-64; ST, 4-61)

176-J. (Pamphlet.) Heat Treatment of Eaton Permanent Mold Iron. Edward P. Rowady. 8 p. May 1961. Eaton Manufacturing Co., Cleveland 10.

Austenitizing, quenching, tempering, annealing, flame and induction methods for heat treating and surface hardening of cast Eaton iron. Influence of austenitizing temperature and quenching medium (H_2O, oil) on hardening. Effect of section size on furnace or salt bath heat treatment parameters. Influence of heat treatment on mechanical properties and microstructure. (J-general, Q-general; CI)

177-J. Salt Bath Promises Low Alloys New Horizons in Design. Iron Age, v. 187, June 1, 1961, p. 68-69.

New method of salt bath treating--Tufftriding--gives low-alloy steels both wear and fatigue strength. Service lives of SAE 1046 steel diesel engine crankshafts have been lengthened by Tufftriding them at 1050° F. for 150 min. Fatigue life of the parts has been raised 70%. (J2j; AY)

178-J. How Forst Heat-Treats Long Broaches. David Fishlock. Metalworking Production, v. 105, May 10, 1961, p. 78-81.

Production of high-abrasion resistance broaches composed of high-speed steel containing 0.85% C, 6.00% W, 4.00% Cr, 2.00% V and 5.25% Mo. Broaches up to 6 ft. long are heat-treated from 600-1250° C. in Cassel salt baths in refractory-lined furnaces and in stainless-lined preheat furnaces. (J2j, T6n; TS-m, 17-57)

179-J. Open-Coil Annealing. V. J. Gibbons. Sheet Metal Industries, v. 38, May 1961, p. 341-348.

Pilot plant studies of the temperature distribution, absorption of gases and recrystallization during open-coil annealing of 20 gage sheet steel coils in a rotary hearth furnace. Data are given for Rockwell hardness yield and tensile strengths, elongation and grain size of annealed steel. (J23, J2k, 1-52, Q-general; ST, 4-53)

180-J. Heat-Treating Springs by Shaker-Hearth. Metal Treatment and Drop Forging, v. 28, May 1961, p. 182.

Hardening of springs by heating in a mobile, oscillating hearth furnace having closed quench facilities and using a controlled atmosphere to prevent oxidation and decarburization. (J2k, T7c)

181-J. Vauxhall Commissions Mammoth Gas Carburizing Furnace. David Fishlock. Metalworking Production, v. 105, May 17, 1961, p. 71-74.

Gears, rear-axle crown wheels and pinions cut from nickel-molybdenum steel forgings are carburized and hardened in a continuous gas carburizing furnace with carburizing zones of 840° C. using propane gas for controlled atmosphere of constant composition. (J28g, J2k, T21b, 1-52; AY, 17-57)

182-J. Take the "Art" Out of Heat Treating. George H. Schubert. American Jewelry Manufacturer, v. 6, May 1961, p. 8-9, 16-19.

Review of principles and kinetics of ferrite-to-austenite and austenite-to-martensite transformations and resultant structure and hardness changes in steels by heat treatment. Transformations are shown to depend on temperature and cooling rates with optimum parameters suggested for tempering and quenching. (J-general, J26, J29, N8; ST)

183-J. Trends in Heat Treatment Observed Overseas. R. H. Atkin. Australian Institute of Metals, Journal, v. 6, Feb. 1961, p. 21-32.

Comparison of shop size, equipment, rectification methods and other aspects of heat treatment methods in Australia and overseas. Discussion of salt bath, carburizing, quenching and nitriding practice. (J-general)

184-J. (Russian.) Boriding of High-Alloy Steels. Yu. M. Lakhtin and M. A. Pchelkina. Metallovedenie i Termicheskaya Obrabotka Metallov, Mar. 1961, p. 27-35.

1Kh18N9T, Kh18N12M3T, Kh18N25S2, Kh23N18, Kh25N20S2, Kh25N25T and

Kh15N37V3T steels are borided for 2-10 hr. in B_2H_6 + H, mixed in the ratio 1:25 at 850-1100° C. and subsequently held for 4 hr. at the same temperature. Depth of borided case as a function of the Cr, Ni, Ti and Cb contents. Microstructure, microhardness and phase composition of case. 4 ref. (J28, 2-60, Q29q, M27; SS)

185-J. (Russian.) Effect of Ultrasound on the Nitriding Process. G. V. Zemskov, L. K. Gushchin, E. V. Dombrovska, A. K. Parfenov and V. T. Yarkina. Metallovedenie i Termicheskaya Obrabotka Metallov, Mar. 1961, p. 40-42.

Samples of 35KhYuA steel are nitrided at 500-550° C. in an ammonia atmosphere or in a fused salt mixture containing 48% calcium chloride, 31% barium chloride and 21% sodium chloride with or without the simultaneous application of ultrasound. Effect of ultrasound on the hardness depth and change of microhardness with the depth. (J28k, 1-74, Q29n; ST)

186-J. (Russian.) Case Hardening in the Oxy-Acetylene Flame. V. G. Podoinitsyn Metallovedenie i Termicheskaya Obrabotka Metallov, Mar. 1961, p. 58-59.

Part made from 20 steel containing 0.20% C, 0.70% Mn, 0.30% Si, 0.023% S and 0.020% P is rotated in a reducing flame. A carburized case of 0.8-1.0 mm. depth is obtained after treatment for 20-30 min. at 1050-1100° C. surface temperature. Fine grain forms in subsequent normalization at 890-950° C. Microstructure, hardness, tensile and impact strengths. (J28; ST)

187-J. Induction Heating in the Metal Industries. Edgar Allen News, v. 40, May 1961, p. 103-104.

Technological parameters for through-heating of steel stock, Al or Cu alloy billets by induction methods. Design, operation and industrial applications of induction heaters. (J2g, 1-52; Al-b, Cu-b, ST)

188-J. How Residual Stresses From Heat Treatment Affect Your Product. M. F. Spotts. Machinery, v. 67, June 1961, p. 110-112.

Thermal and transformation effects and their reactions with mechanically induced stresses are discussed for various heat treatments. (J-general)

189-J. Overcoming Distortion and Cracking in Heat Treating Tool Steels. Richard F. Harvey. Metal Progress, v. 79, June 1961, p. 73-75.

Internal stresses developed during quenching can crack or warp toolsteels. These effects may be overcome or minimized by the use of air-hardening steels or techniques such as interrupted quenching or ultrasonic agitation. (J26; TS, 9-72, 9-74)

190-J. Heating Stainless Steel Flat Products. M. R. Ogle. Metal Progress, v. 79, June 1961, p. 107-109, 131-b, 132.

Today, most strip, sheet and plate of stainless steel is annealed in continuous furnaces. Many of the factors to be considered in the production of flat products are discussed. (J23, F23; SS, 4-53)

191-J. Conventional Batch Annealing. Gerome Gordon. Iron and Steel Engineer, v. 38, May 1961, p. 71-72.

Investment cost per ton, production capacity and quality of product obtainable during batch annealing of steel sheet, tin plate and strip. (J23, 1-62; ST, 4-53)

192-J. Use of Open Coil Process to Change Composition and Improve Sheet Steels. J. A. Bauscher. Iron and Steel Engineer, v. 38, May 1961, p. 73-84.

Open coil annealing in gases of various compositions allows control and change of steel analysis during the annealing process. Data from pilot studies show mechanical properties and grain size of annealed materials. (J23; ST)

193-J. Processing Equipment for Stainless Steel Bright Annealing. S. Friedlander. Iron and Steel Engineer, v. 38, May 1961, p. 85-91.

Aspects of process development which have made bright finish and corrosion resistance requirements for stainless obtainable by bright annealing. Operation of equipment lines. Furnace design. (J23a, 1-52; SS)

194-J. Heat Treatment of Welded Joints. A. L. Brown. Welding Fabrication and Design, v. 4, Apr. 1961, p. 9-13.

Preheating, stress relieving by oxy-acetylene, resistance and induction methods and post-heat treatment of weld-

ed joints in high-alloyed, heat resistant steels. 4 ref. (J-general; SS, SGA-h, 7-51)

195-J. Designing Heat Treatment Procedure. Colin Harris. Australasian Engineer, v. 52, Mar. 1961, p. 77-80.

Heat treating and hardening of alloy steel and stainless steel bearing cups including carburizing, case hardening, refining and quenching processes used to produce the desired hardness in the bearing cup surface and core and to prevent shrinkage and distortion. (J-general, T7d; AY, SS)

196-J. Difficult Heat Treatment Accomplished by Selective Induction Heating and Quenching. Industrial Heating, v. 28, May 1961, p. 914, 916.

Controlled high frequency heating and quenching of oblong guide bar for a chain saw is achieved with hardness depth and Rockwell C hardness held within close tolerances. Equipment is designed with automatic heating cycle control (J2g, J26, 1-69, 1-52, Q29, W24m; ST, 4-55, 17-57)

197-J. Pattern Heating of Diversified Load in Hood Type Annealing Furnace. P. F. Berg. Industrial Heating, v. 28, May 1961, p. 921-922, 924, 926.

Mixed loads of steel sheets, coils, weldments and castings are annealed. Portable cover is lifted after completion of a heating cycle on one base to another base to heat work while the first load cools. Coke oven gas is used and uniformity of heat input is provided by Duradiant type burners arranged in two horizontal rows in the side walls of the furnace. (J23, W27g; ST, 4-53, 7-51, 5)

198-J. Muffle-Less Furnace for Stainless Steel. Metalworking Production, v. 105, May 24, 1961, p. 79.

Bright annealing of stainless steel strip by a furnace which dispenses with a muffle and allows the elements to radiate directly on the work. (J23a, W27; SS, 4-53)

199-J. Heat Treatment of Eaton Permanent Mold Iron. Edward P. Rowady. Eaton Engineering Forum, May 1961, 8 p.

Tensile and impact strengths and Rockwell hardness of Eaton Permanent Mold Iron can be increased by heat treatment (either by furnace or salt bath techniques or by induction heating). The response of Eaton Iron to rapid heating techniques is due to the fine graphite distribution. Hardened cases up to 58 Rockwell C can be obtained by induction heat treatment. (J2g, J2j; Fe)

200-J. (German.) Heat Treatment of Uranium. G. J. Sergeev, V. V. Titova, Z. P. Nikolaeva and A. M. Kaptel'cev. Kernenergie, v. 4, Mar. 1961, p. 196-201.

Investigation of microstructure and mechanical properties of cast and hot rolled uranium as influenced by various heat treatments, including annealing and quenching from temperatures of the beta and gamma phase. Examination of creep in the alpha phase (300-500° C.) as influenced by heat treatment and deformation. 7 ref. (J-general, M27, Q3, Q-general, 3-68; U)

201-J. (Spanish.) Heat Treatment and Techniques of Shaping and Casting Some Aluminum Alloys. Alvaro Quiroga Correa. Instituto del Hierro y del Acero, v. 14, Feb. 1961, p. 181-204.

Mechanical properties of some experimental Al-Cu-Zn alloys. As-cast and heat treated properties of castings. 12 ref. (J-general, Q-general, E-general; Al-b, Cu, Zn)

202-J. (Rumanian.) Carburization of Iron in the Cupola. Roman Krzeszewski. Studii si Cercetari de Metalurgie, v. 5, Apr. 1960, p. 443-469.

Explanation of the relationship between carbon content of cast iron and that of the charge, chemical composition of the Fe, its temperature, working conditions in the cupola and quality of coke. 63 ref. (J28g; CI)

203-J. Heat Treating Goes Automatic. R. H. Eshelman. Iron Age, v. 187, June 8, 1961, p. 79.

Piston rods of cold drawn 1040 steel are heat treated, selectively hardened and finish ground on an automated continuous flow production line. (J-general, G18, 18-74; ST)

204-J. Hardening Process Keeps Tools Bright. Steel, v. 148, June 19, 1961, p. 91.

Outline of an automatic hardening process for high-speed toolsteels that produces a bright part finish. Process

maintains correct surface carbon concentration, holds distortion to a minimum and reduces costs. Basic equipment is a modified vacuum heat treating furnace. (J28, T6n; TS-m)

205-J. (German.) Age Hardening and Precipitation of an Fe-Mo and Fe-W Alloy. Guido Elsen and Gunter Wassermann. Zeitschrift fur Metallkunde, v. 52, Apr. 1961, p. 263-269.

Investigation of precipitation-hardening of rolled and homogenized (1260-1290° C.) specimens (17.5% Mo, 0.3% Mn, 0.2% Si and 14.7% W, 9.3% Mn, 0.2% Si) aged from 500-900° C. by hardness, dilatometric and resistivity measurements and by X-ray investigation. (J27, Q29n, M23b, P15g; Fe-b, Mo, W)

206-J. (German.) Effect of Cold Pre-Aging on Aging of Various Alloys. Heinz Borchers, Max Kainz and Siegfried Pixner. Zeitschrift fur Metallkunde, v. 52, Apr. 1961, p. 276-279.

Homogenized and water-quenched sheet and plate specimens of alpha-Fe (0.014% C), $PbSb_2$, $PbSb_8$, AlMgSi and AlCuMg alloy are cold pre-aged from -20 to -195° C. and subsequently aged from 20-80° C. Investigation of effect of cold pre-aging on aging in terms of hardness measurements. (J27d; Al-b, Fe, Pb-b, Cu, Mg, Sb)

207-J. (Italian.) Siliconizing of Steel. L. Mateoli. Trattamenti Termici, v. 4, Jan-Feb. 1961, p. 3-9.

Survey of methods including packing in powdered SiC + ferrosilicon, immersion in a liquid Na-K alloy containing Si, electrolysis in fused NaF containing sodium trisilicate at 1100° C. or gas siliconizing in $SiCl_4$. Microstructure, case depth and phase composition, hardness and resistance to wear, corrosion and heat. 11 ref. (J28; ST, Si, 17-57)

208-J. (Italian.) Heat Treatment of Drawing Dies. M. Tossi. Trattamenti Termici, v. 4, Jan-Feb. 1961, p. 18-20.

Dimensional changes occurring in the hardening of 13% Cr-steel dies at 930-1010° C. with subsequent oil quenching or air cooling. Effect of the texture of starting materials. (J-general, P10d, T6r; SS-e, 17-57)

209-J. (French.) Continuous Annealing and Descaling of Brass Strip. P. Guesne. Cuivre, Laitons, Alliages, no. 60, Mar-Apr. 1961, p. 13-17.

Automated heat treatment of strip in vertical annealing furnace with automatic regulation of the temperature and the composition ratio of a propane-air mixture used as a fuel. The process includes quenching after air cooling to a certain temperature, passage through descaling, polishing and rinsing baths. Micrographs are presented for resultant structure and grain size. (J23, J-general, L-general, M27; Cu-n, 4-53)

210-J. (German.) Properties of Direct Hardenable 20 MoCr 5 Case Hardening Steel as Compared With Conventional Steels. E. Stecher. Maschinenbau, v. 10, Mar. 1961, p. 110-113.

Carburizing at 900° C. during case hardening of 20 MoCr 5 steel and fatigue testing of notchless specimens of 7.52 mm. diameter after direct and core hardening at 920° C. and subsequent 180° C. annealing. Comparison of results with properties of conventional steels including K 13 NiCr 14, 22 MnCr 6, 16 CrMo 4, 22 CrMo 4 and 16 MnCr 5 steels. (J28g, Q7; ST)

211-J. (German.) Surface Hardening of Cast Iron Guide Tracks on Machine Tools. Schlegel, Seifert and Koch. Maschinenbau, v. 10, Mar. 1961, p. 100-105.

Surface hardening of a cast iron guide tract in a 20 kw. high frequency induction plant from 700-1000° C. Temperature distribution during hardening, distortion due to hardening and microstructure, case depth and form of carbon on specimen surfaces. 7 ref. (J28, W25; CI)

212-J. (German.) Immersion Hardening of Camshafts. K. Fuchs. Maschinenbau, v. 10, Mar. 1961, p. 105-107.

Salt bath hardening of 350-400° C. preheated normalized CK 45 steel camshafts with subsequent stress-free annealing at 180° C. Elimination of defects such as distortion due to hardening and soft spots. (J2j, J23; ST)

213-J. (German.) Gage Stabilization of Hardened Toolsteel. H. Bruckner and G. H. Harnisch. Maschinenbau, v. 10, Mar. 1961, p. 113-115.

Gage stabilization of 840-860° C. hardened 100 Cr 6 and 105 Cr 4 steel specimens by transformation of tetragonal martensite during annealing from 200-250° C. and cooling to low temperatures (-40 to

-75° C.). Dimensional changes in stabilized specimens after annealing from 100-200° C. (J23q; TS)

214-J. (German.) Application and Prerequisites for Flame Hardening. Kurt Frode. Maschinenbau, v. 10, Mar. 1961, p. 108-109.

Flame hardening by acetylene-oxygen or city gas oxygen flames is discussed in terms of workpiece, case depth and material requirements (0.35-0.55% carbon steels, Cr and Mn alloyed and heat treatable steels). (J2h; ST)

215-J. Precipitation Hardening of Co-Base Alloys by an Intermetallic Co-Mo Phase. B. Lux and W. Bollmann. Cobalt, no. 11, June 1961, p. 4-20.

Hardening of Co-base alloys by precipitating Co_3Mo and Co_7Mo_6 compounds ranging from 12-17.5% Co and from 15-20% Mo. Data are given for hardness changes during aging, microstructure, phase relationships between matrix and precipitate, oxidation and thermal shock resistance and forgeability. (J27, Q29n, M27, R1h; Co-b)

216-J. A New Nitriding Process From Germany. Metal Progress, v. 80, July 1961, p. 77-82.

Medium carbon and alloy steels can be nitrided in less than 2 hr. in a cyanate-containing salt bath to produce a case which is both file-hard and rough. Much intensive investigation has indicated that the method is suitable for applications where resistance to fatigue and wear are of concern. (J28k; AY, CN)

217-J. Gas Nitriding of Stainless Steels. V. J. Coppola. Metal Progress, v. 80, July 1961, p. 83-84.

Direct nitriding of stainless steel parts is practical. No special surface preparation is needed other than finish grinding, vapor honing or lapping. (J28k; SS)

218-J. Heat Treating Stainless Steel Tubing and Wire. C. H. Vaughan. Metal Progress, v. 80, July 1961, p. 108-111.

Five types of furnaces--salt bath, bell, wire-mesh belt conveyor, roller-hearth conveyor and muffle tube--are used in annealing stainless steel wire and tubing. Article discusses advantages and limitations of each type. (J23, W27; SS, 4-60, 4-61)

219-J. Metal Stampings Gain Toughness From Automatic Austempering. Ray Howland. Iron Age, v. 187, July 6, 1961, p. 72-73.

Carbon steel toe caps and shanks are austenitized to hardness levels of 45-50 Rc on a heat treat line which includes a continuous belt furnace and a belt-type austenitizing salt bath. (J22; CN)

220-J. Heat Treating and Shot Peening Increases Torsion Strength of Automobile Shafts. Industrial Heating, v. 28, June 1961, p. 1098, 1100, 1102.

Review of the evolution of the torque-resistant steel shaft from original uniformly heat treated solid bar and tubular shaft to the surface heat treated and cold worked solid shaft. (J-general, G23n, T21b; ST)

221-J. Huge Facility for Continuous Normalizing of Electrical Steel Strip Made Operational at Allegheny Ludlum Plant. Industrial Heating, v. 28, June 1961, p. 1127-1128, 1130, 1132.

New 1040 ft. line for continuous normalizing of grain oriented Si electrical steel strip at the Bagdad, Pa. plant. Strip from 0.010-0.030 in. in thickness and up to 34 in. in width is normalized at speeds up to 300 ft. per min. (J24, 1-53; ST, SGA-r, 4-53)

222-J. (German.) Occurrence of Bands of Different Temperature in Induction Heating. J. Georges. Harterei-Technische Mitteilungen, v. 16, Apr. 1961, p. 1-6.

Nonuniform temperature distribution on the surface of steel cylinders during induction heating below the Curie temperature is investigated for pure Fe and steel of varying carbon content. Correlation between band formation and frequency and evaluation of methods for elimination of band formation. (J2g, 2-61; Fe-b)

223-J. (German.) Control of Carbon Potentials of Furnace Atmospheres. Th. Schmidt and J. Wunning. Harterei-Technische Mitteilungen, v. 16, Apr. 1961, p. 7-12.

Indirect and direct measurement of carbon potential of gas mixtures in gamma iron and in alloy steel. Method and apparatus for automatic measurement and control of carbon potentials and application in carburization of roller bearings of 13 NiCr 18 steel and

tubes of C45 steel. (J28g, J2k; Fe-a, ST)

224-J. (German.) Investigation of Decarburization Characteristics of Alkaline Annealing Baths. P. Birk. Harterei-Technische Mitteilungen, v. 16, Apr. 1961, p. 18-20.

Measurement of decarburization of unalloyed steel foil specimens containing 1-1.32 initial per cent C, after annealing from 620-900° C. in an alkaline salt bath (melting point 560° C.) and exposure to air, CO_2, N_2, O_2 atmospheres. Influence of temperature and atmosphere on decarburization phenomena. (J2j, J4a, 2-61, 2-66; ST)

225-J. (German.) Decarburization Characteristics of Salt Baths. H. Ornig. Harterei-Technische Mitteilungen, v. 16, Apr. 1961, p. 21-22.

Thermodynamic analysis and experimental methods are used to determine whether decarburization of steel in the salt bath is caused by dissolved oxides or by dissolved oxygen-gas. (J2j, J4a; ST)

226-J. (German.) Salt Bath Carburization at Extremely High Temperatures. C. Albrecht. Harterei-Technische Mitteilungen, v. 16, Apr. 1961, p. 32-35.

Salt bath carburization from 930-980° C., using an activated two-salt carburization bath (8-11% KCN), and subsequent case hardening of C15 and 16 MnCr 5 steel. Influence of temperature on microstructure, hardness and carburization depth. (J2j, J28g, Q29n, 2-62; ST)

227-J. (German.) Nitriding by Inductive Heating in Aqueous Ammonia Solution. R. Palme and W. Track. Harterei-Technische Mitteilungen, v. 16, Apr. 1961, p. 42-48.

Nitriding of unalloyed CK15 steel specimens in dilute ammonia solution by inductive heating (550-1250° C.) at a frequency of 10,000 cps. Investigation of nitriding characteristics including nitriding rate, case depth and hardness after case hardening as influenced by temperature and nitriding time. (J28k, J2g, Q29n, 2-61, 3-67; ST)

228-J. Aluminum Alloys for Deep Drawing. C. J. Smith. Metal Industry, v. 98, June 16, 1961, p. 477-478, 480.

Cold reduction, annealing, rolling and tempering of Al alloys for deep drawing. Description and comparison of specific reduction and partial and differential annealing. (To be continued.) 8 ref. (J23, J29, F23, G4b; Al-b)

229-J. Special Tooling Extends Use of Induction Heaters. G. C. Close. Modern Machine Shop, v. 34, July 1961, p. 100-105.

Application of a coil fixture assembly in brazing Ag, Au, Cu and Ni alloy and in soldering and heat treatment operations using induction heating with coaxial extension cables, permitting work coils to be used up to 60 ft. from the machine. (J2g, K7, K8, 1-52; Ag, Au, Cu, Ni-b)

230-J. (Russian.) Influence of Transformation Heat on Heating of an Infinitely Large Plate, Endless Cylinder and Sphere. G. P. Boikov. Izvestiya VUZ--Chernaya Metallurgiya, Feb. 1961, p. 148-150.

Theoretical calculation of amount of heat necessary to heat steel bodies, taking in consideration amount of heat necessary to decompose the old phase and create the new one. (J-general, N-general; ST)

231-J. (German.) Comparative Investigation of Properties of Molybdenum Case Hardening Steels Used in Automobile Construction. Adolf Rose, Hans Sigwart and Erich Theis. Stahl und Eisen, v. 81, June 8, 1961, p. 800-808.

Investigation of carburization, direct hardening, hardenability and case hardness of case hardenable 20 MoCr 4, 20 CrMo 2 and standard DIN 17210 chromium-molybdenum steel using disk specimens or employing the end-quench test and statistical evaluation of blank hardenability and end-quench properties of 20 MoCr (S) 4 and 20 CrMo(S) 2 steel. Determination of fatigue strength and machinability and investigation of effects of bending fatigue stressing on gear wheels. (J5, J-general, G17k, Q-general, T21; AY, 17-57)

232-J. (English.) Automatic Temperature Control in Progressive and Spin Flame Hardening. S. Matsuoka. Werkstatt und Betrieb, v. 94, May 1961, p. 107-111.

Temperature control by pyrometer readings in flame hardening square samples, gears and rollers of various steels from 600-1200° C. (J2h, S16, 1-52; ST)

233-J. (English.) Hot Quenching of Steels With a Carbon Content of 0.18 and/or 0.30% at Temperatures Above the A_3 Point. Julius Reschka. Werkstatt und Betrieb, v. 94, May 1961, p. 112-114.

The effect of the hold-in period in the heat treating furnace and the temperature of the salt bath on the notch impact strength at standard and low temperature. Brinell hardness and tensile strength of two steels having different carbon content in a nonaged and aged stage. (J26, Q-general; CN-g)

234-J. (Translation-Brutcher no. 4928.) Combined Heat and Ultrasonic Treatment of Chrome-Manganese-Silicon Steel. E. A. Al'ftan. Izvestiya VUZ--Chernaya Metallurgiya, July 1960, p. 129-134.

Microstructures obtained after various heat treatments under ultrasound; mechanical properties and conditions under which a maximum improvement in impact toughness is assured. (J-general, 1-74; ST)

235-J. (Translation-Brutcher no. 4982.) Heat Treatment in Drawing of Titanium Wire. V. Z. Shilkin. Metallovedenie i Termicheskaya Obrabotka Metallov, Oct. 1959, p. 20-23.

Study of most favorable conditions for homogenizing Ti wire during cold drawing. Best homogenizing temperature and time in electric air furnaces and salt baths; relative merits of the various media. (J21, F28; Ti, 4-61)

236-J. Heat Treatment of Engineering Components. E. Mitchell. Iron & Steel, v. 34, July 1961, p. 352-356.

Influence of processes which precede or follow actual heat treatment operation. Effect of carbon pickup during annealing and on subsequent plating. Description of a new method of medium frequency heating for annealing. 4 ref. (J-general; ST)

237-J. Radius Hardening Made Easy With Conduction Heating. Ed Nugent. Canadian Metalworking, v. 24, July 1961, p. 38.

Smooth hardness pattern in a radius between two different diameters in various carbon and alloy steels is achieved by heating the area on either side of the radius and quenching before the whole area drops below the upper critical temperature while avoiding overheating or burning. (J26, Q29n; CN, AY)

238-J. (Translation-Brutcher no. 5153.) Wear Resistance of Iron and Steel Improved by Electrolytic Sulfurizing. S. S. Chernyak. Izvest. Sibir. OTD. Akad. Nauk SSSR, Jan. 1961, p. 25-30.

Electrosulphurizing of toolsteels and cast irons with special reference to optimum current density and treatment time for highest wear resistance and anti-seizing properties. Advantages of electrolytic over conventional sulphur impregnation. (J28, Q9; TS, CI, S)

239-J. Isothermal Heat Treatment. Alan D. Hopkins. Metal Treatment and Drop Forging, v. 28, June 1961, p. 225-230.

Discussion of the transformation characteristics of plain carbon or alloy steel yielding pearlite, bainite and martensite through isothermal annealing, austempering and martempering. Time-temperature-transformation curves determined and discussed in relation to Davenport and Bain's studies. 19 ref. (J-general, N8g; ST)

240-J. (Translation-Brutcher no. 4978.) Determination of Optimum Heat Treatment of Cast 13% Mn Steel G13-L. Ya. K. Alekseev and P. T. Khokhlov. Metallovedenie i Termicheskaya Obrabotka Metallov, Sept. 1959, p. 60-62.

Previously abstracted from original. See item 303-J, 1959. (J-general, Q27a, 3-67; AY)

241-J. (Translation-Brutcher no. 5008.) Structure and Hardness of Surface Hardened Spheroidal Graphite Cast Iron. M. M. Klimochkin. Metallovedenie i Termicheskaya Obrabotka Metallov, Dec. 1959, p. 39-43.

Previously abstracted from original. See item 60-J, 1960. (J28, J2g, Q29; CI-r)

242-J. Heat-Treating Electrical Steels. Australasian Manufacturer, v. 46, June 10, 1961, p. 76-79.

Various parameters including effect of composition, dew point, rates of heating and cooling, surface conditions and

environment are reviewed to bring theoretical and practical experience into closer accord. (J-general, 2-60, 2-66, 2-67; ST)

243-J. Dual Atmospheres Team Up to Cut Heat Treat Costs. Iron Age, v. 187, July 13, 1961, p. 92-93.

Bright treating and brazing in a dual atmosphere of hydrogen or dissociated NH_3 plus a dry exothermic gas. Applications include bright treating of stainless steel, Cu or Ni brazing and ceramic-to-metal brazing. (J23a, K8, 2-66; SS, Cu, Ni, NM-f)

244-J. (German.) Austempering of Welded Joints of High-Strength Heat Treatable Steels. H. Tauscher and H. Buchholz. Schweissen und Schneiden, v. 13, June 1961, p. 230-233.

Austempering procedures as derived from TTT diagrams and their influence on steel properties. Fatigue testing of austempered and stress-free annealed K 30 SiMnCr 4 steel welded sheet. (J2p, N8g, Q7; ST, 4-53, 7-51)

245-J. (Japanese.) Comparative Test on the Rapid Softening of High-Speed Steels (SKH_2 and SKH_9) by Water or Air Annealing. Isothermal Transformation Annealing and Stepped Annealing. Pt. 2. Study on High-Speed Toolsteel. Hideji Hotta. Tetsu-to-Hagane (Iron and Steel Institute of Japan), v. 47, June 1961, p. 823-828.

Hardness tests and micrographic examination are used to determine the effects of the time, temperature and rate of heating and cooling in various annealing methods on the softening of quench hardened specimens. T-T-T curves are constructed with microstructures presented for austenite, pearlite, sorbite, troostite and martensite transformations from 400-900° C. (J23, J29, N8g, Q29, 2-61, 3-67; TS-m)

246-J. (Japanese.) Improvement of Various Properties of 20% Cr-Mn-Fe Alloys by Nitrogen-Absorption Treatment. Pt. 10. Function of Nitrogen as an Alloying Element in Heat-Resisting Materials. Omi Miyakawa and Masazo Okamoto. Tetsu-to-Hagane (Iron and Steel Institute of Japan), v. 47, June 1961, p. 834-840.

The formation of nitrogen-bearing austenite in 20% Cr-Mn-Fe alloys, containing up to 10% Mn, by nitrogen absorption treatment at 1250° C. for 4 hr. and subsequent water-quenching. Thermal behavior of the austenite is studied by differential dilation with test determination of elevated creep and tensile properties and oxidation resistance of the alloys as a function of Mn content. 8 ref. (J28k, M23r, M27, N8n, Q3, 2-60, 2-62, 2-64; Fe-b, Cr, Mn)

247-J. Iron Powder Part Hardness Gains Through Carbonitriding. Steel, v. 149, July 17, 1961, p. 134-135.

Production of sintered Fe powder compacts with increased, more uniform hardness by carbonitriding at 1500° F. in an atmosphere containing NH_3. The N picked up by the Fe acts as an alloying ingredient so that quenching is more uniform. (J28m, Q29n; Fe-b, 6-72)

248-J. Revise Process, Equipment, Step Up Heat-Treat Output. G. M. Seifert. Canadian Machinery and Metalworking, v. 72, July 1961, p. 62-63.

Heat treating and quenching N155 alloy steel aircraft power recovery turbines before and after welding to prevent fatigue cracks. Design and operation of heat treating oven. (J-general, W11m, W27; AY)

249-J. (Czech.) Heat Treatment of Cast Iron Shot. Antonin Tizek. Slevarensti, v. 9, May 1961, p. 180-181.

To increase its economy and effectiveness in the cleaning of castings, shot containing 3.50% C, 0.40% Mn and 0.60% Si is held at 620° C. for 5 hr. and furnace cooled to obtain a sorbitic matrix with embedded ledeburitic cementite. (J-general; CI, 6-67)

250-J. Vacuum Heat Treating. Harold P. Ipsen. Metal Finishing, v. 12, June-July 1961, p. 11-15.

Heat treating stainless steel and toolsteel parts. Design, size, operation, capacity and speed of the vacuum system. Mechanical properties of vacuum heat treated parts. (J-general, 1-73, Q-general; SS, TS)

251-J. Heat Treatment of a Special Stainless Alloy. Metal Treating, v. 12, June-July 1961, p. 16, 34.

Heat treatment of a modified 440-C stainless steel called LESCO BG41, composed of 1.05% C, 0.30% S, 0.50% Mn, 14.50% Cr, 0.12% V and 4.00% Mo. Effects of the austenitizing and tempering on hardness. (J22, J29, Q29: SS)

252-J. (German.) Descaling of Rolled and Drawn Wire of Austenitic Steel and Chromium-Nickel Alloys With Particular Reference to Vacuum Annealing. R. Ergang and H. Huppertz. Metall-Reinigung + Vorbehandlung, v. 10, June 1961, p. 89-91.

Metallographic investigation of surface structure of vacuum annealed (1050° C) Ni coated rolled and drawn wires of 80-20 NiCr and 60-20 NiCr alloys and 30-20 NiCr and 18-8 CrNi steel. Descaling effect of vacuum annealing. (J23, M28p, 1-73; Ni-b, Cr-b, SS-e, 4-61, 8-62)

253-J. Principles and Practices for Making Very Low Carbon Steel by Open-Coil-Annealing. D. J. Blickmede. Blast Furnace and Steel Plant, v. 49, July 1961, p. 639-647, 688.

Sequence of operations in making very low-carbon sheet by open coil decarburization. Open winding, spacing of laps, coil diameter and heating rate. Decarburization problems and their solutions. 12 ref. (J4a; CN, 4-53)

254-J. (German.) Nitriding of Iron, Nickel and Iron-Nickel Alloy Powders by Ammonia. G. Rienacker and K.-H. Kohl. Monatsberichte der Deutschen Akademie der Wissenschaften zu Berlin, v. 2, Feb. 1960, p. 105-108.

Powder specimens are heated at 600° C. in the presence of various catalysts with subsequent investigation of the composition and structure nitride phases by chemical analysis and X-ray examination. 9 ref. (J28k, M-general; Ni-b, Fe-b, 6)

255-J. Quenching Device Eliminates Warpage and Distortion in Induction Hardening of Stainless Steel Cutter Blades. Industrial Heating, v. 28, July 1961, p. 1298.

High frequency induction machine incorporates a quench press which receives the part after being heated to 2000° F. by the work-coil. Quench dies hold the part in position while it is cooled by air under pressure and quenched by water. (J2g, J26, 1-52, T6n; SS)

256-J. Electron Furnace Anneals Strip. Iron Age, v. 188, July 27, 1961, p. 117.

Electron beam heating of sheet metal strip composed of reactive metals such as Ta, Cb, Ti and Zr using a continuous annealing furnace in which heating is almost instantaneous and a high degree of vacuum is maintained. (J23, J2g, 1-73; Ta, Cb, Ti, Zr, 4-53)

257-J. (Russian.) Heat Treatment of Railroad Axles. Yu. V. Grdina, D. I. Tarasko and V. S. Kaigorodtsev. Izvestiya VUZ--Chernaya Metallurgiya, Apr. 1961, p. 97-106.

Strength, fatigue resistance, hardness, percussion viscosity, yield point, elongation, contraction and phase transformations as affected by new heat treating methods. (J-general, N-general, P10f, Q-general, T23)

258-J. Observation Concerning the Structure of Scale and the Mechanism of Formation During the Heating of Steel. Sten Modin and Erik Tholander. Metal Treatment and Drop Forging, v. 190. July 1961, p. 261-270.

Scale formation on 0.1%, 0.2% and 0.7% carbon steel during heating (1000-1300° C.) in an electric furnace with an air atmosphere and in an oil-fired furnace. Formation sequence and properties. 8 ref. (J2g; CN, 9-52)

259-J. Avoidance of Distortion in Heat Treatment. K. Sachs. Metal Treatment and Drop Forging, v. 28, July 1961, p. 281-287.

Analysis of extent of change, stress, plastic yielding, external forces, heating, quenching, cold treatment and tempering relative to characteristics, causes and prevention of volume and shape changes and warping of steel. (J-general, 3-66; ST, 9-74)

260-J. Heat Treating in the Fluid Bed Furnace. Metal Treatment and Drop Forging, v. 28, July 1961, p. 289-290.

Heat treating of superalloys and refractory metals. Austenitizing of intricate parts and removal of residual stresses from Al parts. Bed can be

heated by electricity, gas or oil and can be induction or radiant heat. Applications include austempering of alloy steel and inverse quenching. (J-general, 1-52, Q25h; SGA-h, EG-d37, AY)

261-J. Apparatus for Controlled Slack Quenching. N. L. Carwile, M. R. Meyerson and S. J. Rosenberg. Materials Research & Standards, v. 1, July 1961, p. 532-536.

Apparatus and technique for producing any desired slack-quenched structure in a cylindrical specimen of a steel of medium hardenability. Data are presented to show effectiveness of apparatus and technique and influence of different degrees of slack-quenching on tensile properties of AISI 9440 steel. (J26n, 1-52; ST)

262-J. (French.) An Industrial Application of the Continuous Heat Treatment of Aluminum Alloys. Y. Bresson and P. Guesne. Revue de Metallurgie, v. 58, Apr. 1961, p. 345-350.

Description of a continuous heat treatment plant. Mechanical properties of Al alloys (A. U4G, A. U4G1, A. SG and A. Z5GU) are improved by heat treating at 465-545° C. (J-general, 1-52, Q-general; Al-b)

263-J. (Japanese.) The Annealing of Cold Rolled High-Purity Aluminum Polycrystal. Isamu Igarashi and Tamotu Igarashi. Light Metals, v. 11, Mar. 1961, p. 96-100.

The isothermal softening, recovery and recrystallization of the metal are studied by measuring the diffracted X-ray intensity count number of all Debye-Scherrer rings after annealing from 160-350° C. for various times. 5 ref. (J23s, M22g, N5, Q22n, 2-64, 3-68; Al)

264-J. (Russian.) Annealing of Cold Deformed Chromium and Manganese Steels. Yu. A. Sysuev. Fizika Metallov i Metallovedenie, v. 10, Dec. 1960, p. 907-911.

Samples of 10G12 and ShKh15 steels are deformed and subsequently heated from 300-700° C. The shape of magnetization graphs and the change of coercivity and hardness with various annealing temperatures are used to determine phase composition and mosaic block disintegration. 8 ref. (N8a, M26, P16, 2-61, 2-64, 3-68; AY, Cr, Mn)

265-J. The Effect of Low Temperature Heat Treatment on the Static Mechanical Properties of Spring Wires. Wire Industry, v. 28, July 1961, p. 691.

Relief of textural (grain structure) stress in carbon spring steel wire by heat treatment at 175-350° C. Influence of treatment on strain age-hardening and recovery of mechanical properties including tensile and shear strength, elastic limit and number of twists to failure. (J1a, N7a, Q-general; SGA-b, CN, 4-61)

266-J. (German.) A New Process for Softening Copper Wires. F. Frungel. Draht, v. 12, June 1961, p. 259-262.

Continuous softening of Cu wire specimens by short-time annealing by electrical resistance heating in cooling mediums such as stirred inert gas, water, oil and trichlorethylene. Evaluation of results by comparative hardness measurements and microstructure investigation. (J23; Cu, 4-61)

267-J. Treat the Surface for Longer Tool Life. Edward A. Steigerwald. Tooling & Production, v. 21, Aug. 1961, p. 31-34.

Reduction of edge wear on tool-steels by nitriding, Cr plating, steam oxide treatments, sulphurizing and chromizing. Treatments alter surface chemistry of the tool to produce surfaces of hardness, low coefficient of friction and good wear resistance. (J28k, L14, L17, L23, Q9n; TS, Cr)

268-J. Computer Helps Speed Heat Cycles. C. L. Feng. Metal Progress, v. 80, Aug. 1961, p. 79-82.

An analog simulator, termed "Thermolog", has proved useful in obtaining hard-to-get information necessary for designing and evaluating thermal systems. Specialized heat problems can be solved in a few hours after set up of the simulator circuitry. (J2, 18-74, W23k, W24n)

269-J. Metal-Metal Oxide Composites for High-Temperature Use. Klaus M. Zwilsky and Nicholas J. Grant. Metal Progress, v. 80, Aug. 1961, p. 108-111, 122, 124.

Given the same base metal, dispersion-strengthened composites are stronger (at higher temperatures and for longer times) than their counterparts in age-hardening alloys. (J27, Q-general; 6-70)

270-J. (Italian.) Heat Treatment of Nickel Steels at a Temperature Above and Below the Top Critical Point. G. Mayer. Metallurgia Italiana, v. 53, June 1961, p. 279-289.

Effects of direct hardening, pseudo hardening, single and double hardening and martempering on the mechanical properties of nickel steels. The results show that the case hardened layer has a carbon content between 0.06-1% The influence of heat treatment, at temperatures between Ac and Ac_3 critical points, on the low temperature properties of 9% Ni steel is described for rolled and welded steel. (J26p, J28, Q-general; AY, Ni, 4-53, 7-51)

271-J. (Italian.) Heat Treatment of Light Alloys. E. Hugony. Metallurgia Italiana, June 1961, p. 290-298.

Influence of heat treatment under different heating and cooling conditions on light alloys are reported and some structural changes are discussed. Practical considerations on light alloy heat treatments are expressed and applications to electromechanical construction industries are pointed out. (J-general, 17-57; Al-b, Cu)

272-J. (Italian.) Considerations on the Rapid Efficiency of Some Hardening Media. T. Natale. Metallurgia Italiana, v. 53, June 1961, p. 299-306.

C 20 steel is subjected to water, oil, Na_2SiO_3 solution and salt bath (KNO_3+ $NaNO_2$) hardening at different temperatures. Experiments show that the salt bath has a hardening power intermediate between that of oil and water and is able to cool steel pieces at a very low rate, giving the least deformations. Methods of calculating efficiency of the most common hardening media are discussed. (J2j, J26n; ST)

273-J. (Italian.) Recent Developments in the Use of Salt Baths for Case Hardening and Heat Treatments. F. D. Waterfall. Metallurgia Italiana, v. 53, June 1961, p. 307-318.

Large documented survey of case-hardening, hardening and tempering heat treatments in salt baths. Emphasis is given to high temperature case-hardening, austempering of high-speed steels and to sulphurization. (J-general; TS-m)

274-J. (Italian.) Heat Treatment Metallography for Zinc and Lead Alloys. L. Matteoli and A. Bianchini. Metallurgia Italiana, v. 53, June 1961, p. 326-346.

Examination of the influence of heat treatments on Zn and Pb alloys, and precipitation phenomena of beta fcc. components from a supersaturated hexagonal solid solution and eutectoid decomposition of beta component at 272° C. are discussed. Study of crystallization of Pb-Sb alloys and cable alloys and factors affecting them where subjected to hardening and aging. 47 ref. (J-general, M-general; Zn-b, Pb-b)

275-J. Cast Ferrous Alloy, Hardened in Air, Shows Little Distortion. Steel, v. 149, July 24, 1961, p. 90-91.

Parts of AQ Meehanite alloy are machined as-cast and hardened in air from an austenitizing temperature of 1650° F. to minimize cracking or dimensional change. Brinell hardness and tensile strength are determined after quenching. (J2h, J26, Q29, Q27; Fe-b, 5)

276-J. Heat Treatment of Engineering Components. E. Mitchell. Birmingham Metallurgical Society, Journal, v. 41, June 1961, p. 22-44.

Review of various heat treatment methods including case hardening, induction heating, pack carburizing, annealing, tempering, austempering, Cu brazing, flame hardening, post weld heat treating and others. Techniques, equipment and applications of each method to various steels. 5 ref. (J-general, 1-52; ST)

277-J. Gaseous Annealing of Malleable Castings. C. G. W. Overton. Current Engineering Practice, v. 3, May 1961, p. 18-22.

Annealing of ferritic blackheart, pearlitic blackheart and whiteheart castings using elevator, bell, pit and log hearth batch furnaces. (J23, W27; CI)

278-J. (German.) Heat Treatment of Forgings. Herbert Bittermann and Dieter Metzner. Fertigungstechnik und Betrieb, v. 11, June 1961, p. 366-371.

Technology and equipment for heat treating (soft annealing, homogenizing, hardening and annealing, stress-free annealing) of steel forgings discussed in terms of heating rate, soaking time and temperature and cooling medium as influenced by composition and dimensions of forging; various kinds of heating furnaces. (J23, F21b, 2-60, 2-61, 3-67, 3-73; ST, 4-51)

279-J. (Translation-Brutcher no. 4995.) Steels for Surface Hardening. K. Z. Shepelyakovskii. Metallovedenie i Termicheskaya Obrabotka Metallov, Nov. 1959, p. 24-39.

Previously abstracted. See item 63-J, 1960. (J28, J2g, Q26s; CN)

280-J. (Translation-Brutcher no. 4998.) Experiences With the Introduction of Progressive Heat Treating Processes. A. A. Dubasov. Metallovedenie i Termicheskaya Obrabota Metallov, Nov. 1959, p. 45-48.

Previously abstracted. See item 64-J, 1960. (J2g, J2j, J28; ST)

281-J. (Translation-Brutcher no. 5161.) Unused Production Reserves. B. I. Shashkin. Metallovedenie i Termicheskaya Obrabotka Metallov, Nov. 1959, p. 50.

Possibility of loading carburizing boxes with up to 35% of their total useful volume with carburizing stock (instead of the present 10-15%) without detriment to product quality. Amount of carburizing compound actually needed. (J28g, 1-52)

282-J. (Russian.) Electrical Tempering of Chromium Steel. V. N. Gridney and Yu. Ya. Meshkov. Metallovedenie i Termicheskaya Obrabotka Metallov, June 1961, p. 2-4.

15 Kh, 38 KhA and ShKh6 steel wires of 1.8-2.5 mm. diameter are quench hardened and then tempered by direct passage of industrial a-c. from 200-800° C. and cooled at a rate of 1500-2000° C. per sec. by water quenching. Effects on mechanical properties and hardness. 6 ref. (J29, 1-68, J26, Q-general; SS, 4-61)

283-J. (Russian.) Hardness Depth After Interrupted Quenching. E. K. Kovshikov and F. N. Tavadze. Metallovedenie i Termicheskaya Obrabotka Metallov, June 1961, p. 5-7.

To determine the depth of hardness, the heating and cooling conditions are reconstructed under which a steel part of more than 600 mm. cross section is hardened by interrupted quenching. Samples are end quenched and in some cases subsequently tempered. Quenching media are water, oil or fused saltpeter of 275-375° C. (J26p, Q29n, 1-54; ST, 4-61)

284-J. (Russian.) Kinetics of the Heating of Steel Parts in Fused Salt Baths. E. A. Smolnikov. Metallovedenie i Termicheskaya Obrabotka Metallov, June 1961, p. 7-13.

Spherical, cylindrical and prismatic samples of several steels are heated in various salt baths. Effects of steel composition, bath temperature, preheating and shape on heat flow and the immersion time needed for heating the sample up to bath temperature. (J2j; ST, 3-73, NM-a33, 2-60, 2-61)

285-J. (Russian.) The Fluid Bed as a Cooling Medium. N. N. Yaryain. Metallovedenie i Termicheskaya Obrabotka Metallov, June 1961, p. 13-18.

Experimental cooling of a Ag sphere in quartz sand fluidized by a stream of air. Control of cooling power by regulating the speed of air. Effect of bed composition and particle size on cooling power. 12 ref. (J2, W28p, 2-60, 3-73; Ag, NM-f45)

286-J. (Russian.) Heat Treatment of Steel in an Exothermic Furnace Atmosphere With an Increased Carbon Potential. N. P. Petrov and I. T. Troshkin. Metallovedenie i Termicheskaya Obrabotka Metallov, June 1961, p. 18-21.

Samples of St. 40, 30KhGSA, 30KhGSNA, 40KhA and U8A steels are heat treated for 0.5-1.5 hr. in an atmosphere containing 0.4-0.6% CO_2, 6.5-15% CO, 13-21% H and 0.3-21.5% CH_4. Effect of the CH_4 content on recarburization and fatigue strength. (J2k, 2-66; ST)

287-J. (Russian.) Effect of the Austenitic Grain on the Ductility of 9KhF Steel. G. M. Belkov and N. T. Litenko. Metallovedenie i Termicheskaya Obrabotka Metallov, June 1961, p. 21-24.

Samples are held in a furnace at 900-1230° C. for 1 hr., transferred to a second furnace and held at 750-1180° C. for 30 min. and immediately deformed in a forging press by a force of 50 tons. Effect of overheating on austenitic grain size, ductility and deformation resistance in forging. (J-general, M27c, 2-64, 3-68; ST)

288-J. (Russian.) High-Speed Tool Steels With a Lower Carbide Inhomogeneity. Yu. A. Geller, L.S. Kremner and Ts. L. Olesova. Metallovedenie i Termicheskaya Obrabotka Metallov, June 1961, p. 25-35.

Steels containing 0.72-0.87% C, 3.63-17.8% W, 2.18-4.2% Cr, 1-2.26% V, 0-0.9% Ni and 0-0.26 N are quenched from 1180-1260° C. and tempered at 200-600° C. Bend strength, retained austenite, hardness and carbide inhomogeneity as functions of the W, Cr, Ni and N contents. Thermodynamic decomposition of subcooled austenite. Service life of toolsteels containing 7-12% W and 3% Cr. 15 ref. (J26, J29, N8n, N8r, Q5g, Q29n, 2-60, 2-64; ST, W, Cr, Ni, N)

289-J. Nitrogen in Metalworking. Metalworking Production, v. 105, July 26, 1961, p. 50-52.

Utilization of nitrogen in metalworking applications including freeze fitting of male and female metal components, degassing of Al and Cu and their alloy production of inert atmosphere and desulphurizing and recarburizing of steel. (J2k, F-general, G-general; N, 17-57)

290-J. Induction Heating Solves a Variety of Production Problems. Nicholas G. Gagliardi. Machinery, v. 67, Aug. 1961, p. 95-101.

Application of induction heating to hardening, brazing and annealing of automotive wrist-pins and aircraft fuel lines produced from plates of 1020 hot rolled steel and hollow high carbon steel tubing and cast Al alloy at 1400-1500° F. (J2g, K8k; ST, Al, 4-53, 4-60)

291-J. Three-Stage Heat-Treating Line Adds to Product Uniformity. F. F. Bach and J. Jones. Iron Age, v. 188, Aug. 24, 1961, p. 70-71.

Wear resistance of forged steel grinding balls is improved by a heat-treat line which carries them through a hardening furnace, into a quench tank and finally through a 750° F. draw furnace. (J-general, 1-52, Q9; ST, 6-67)

292-J. How to Get Better Heat Treated Work. Steel, v. 149, Aug. 21, 1961, p. 60-63.

Review of part requirements, mechanical properties and materials selection factors, heat treatments and inspection techniques for use in treating steel parts with a minimum of distortion and cracking. (J-general, 10-54; ST)

293-J. How to Induction Harden Axle Spindles. Pt. 7. Ed Nugent. Canadian Metalworking, v. 24, Aug. 1961, p. 60-61.

Hardening SAE 1340 spindles to Rockwell C40 at a minimum depth of 0.096 in. and maximum of 0.160 in. over both radii and for almost the full length of the shaft. (J2g, T7j; AY)

294-J. Decarburization by Open-Coil Annealing. D. J. Blickwede. Journal of Metals, v. 13, Aug. 1961, p. 548-554.

Decarburization-annealing of steel coils to make porcelain enameling sheet. Procedures for open and tight winding of coils, gases used for decarburizing and major problems encountered. 12 ref. (J4a; ST; 4-53)

295-J. Continuous Annealing of Brass Tubing Sixty Feet Long. Gordon E. Signor and Douglas M. Estelle. Industrial Heating, v. 28, Aug. 1961, p. 1470-1472, 1474, 1476, 1478.

Production of cupro-nickel and brass tubing using two modern continuous roller hearth bright annealing furnaces in connection with drawing routines. Control of temperature, time and furnace atmosphere permits production of tubing from 1/8-3 1/2 in.diameter in length up to 60 ft. to exact requirements of surface finish, hardness and grain size. (J23a, F26r; Cu-b)

296-J. Heat Treating and Finishing Cold-Rolled Steel Strip and Strapping at the Stanley Works. Industrial Heating, v. 28, Aug. 1961, p. 1507-1508, 1510, 1512.

Description of bright annealing, normalizing, heat treating, lithographing and japanning process for cold rolled steel strip and strapping. (J-general, L-general; ST, 4-53)

297-J. Continuous Electric Furnace Installation Bright Heat Treats 40'-Long Stainless Tubing at H&R Metal Treating Company. Industrial Heating, v. 28, Aug. 1961, p. 1589-1590.

Use of a continuous controlled-atmosphere electric furnace for bright annealing and bright hardening of stainless steel and other high temperature alloys. The conveyor-belt furnace comprises a charging area, a retort for preheating and soaking and a cooling chamber. (J23a, J2k, 1-52; SS, 4-60)

298-J. Atmosphere Annealing Cuts Aluminum Coil Rejects. Steel, v. 149, Aug. 28, 1961, p. 83.

Controlled atmosphere annealing of Al in a gas-fired furnace designed with a high recirculation rate and automated temperature cycling. Use of a N-H-CO atmosphere prevents oil staining. (J2k, J23; Al, 4-53)

299-J. The Patenting Process in the Production of High Quality Patent Steel Wire. A. Cooper. Wire Industry, v. 28, Aug. 1961, p. 771-773.

Review of the air patenting process for low-carbon steel rod. Evaluation of carbon influence on possible reductions and of cooling rate on microstructure. Survey of equipment for air and Pb patenting. (J25, 1-52, 2-60; ST, 4-61)

300-J. (German.) Austempering of Welding Joints of High-Strength Heat Treatable Steel. H. Tauscher and H. Buchholz. Schweissen und Schneiden, v. 13, July 1961, p. 278-281.

Austempering of welded K 30 SiMnCr 4 steel specimens at 320-425° C. for 1 hr. with subsequent tensile and fatigue testing and hardness investigation of mechanical properties as influenced by austempering temperature. (J26p, Q-general; AY, 7-51)

301-J. (Italian.) Department of Physics. Istituto Sperimentale dei Metalli Leggeri--Rapporto Annuale 1960, 1961, p. 58-66.

Effect of aging on various Al alloys. Influence of lattice vacancies, introduced by annealing, on the kinetics of Guinier-Preston zone formation. Preparation of Al by the fused-zone method, determination of impurities (Fe, Mg, Si) and measurements of thermal conductivity. (J27d, M26, P11h, S11; Al-b)

302-J. (Italian.) Researches on the Effect of Boron on Low-Alloyed and Carbon Steels. A. Bargone, L. Marchesini and G. Libondi. Technica Italiana, v. 26, June 1961, p. 247-261.

Examination of the effect of boron on hardenability, mechanical properties after hardening and tempering, structure and transformation point of Uni C 40, 32 CD 4, 15 CD 3, 35 CM 4 and 38 NCD 4 steel castings, showing changes in specimens subjected to the hardening process do not appear in specimens subjected to the normalizing process. Relation between boron, carbon and hardenability is investigated. (J5, N8, Q-general; AY, CN, B)

303-J. (German.) Trends of Development in Electric Sheets. G. Rassmann. Elektrie, v. 15, June 1961, p. 176-181.

Improvement of electrical and magnetic properties particularly, high inductivity at low magnetization losses, of dynamo and transformer sheets (Fe-Si alloys containing up to 4.5% Si) by control of texture through proper annealing and nitriding techniques. (J23, J28k, P15, P16; SGA-n)

304-J. Observations on the Decarburization of Mild Steel by Reaction With a Surface Scale. Donald J. Knight. Metallurgical Society of AIME, Transactions, v. 221, Aug. 1961, p. 891.

Vacuum heat treatment at 1500° C. of oxidized 0.1% mild steel specimens having cracks in the oxide scale surface layer. The mechanism of the observed ferrite layer growth on the metal-oxide-void interface is explained in terms of the decarburization reaction in which carbon reacts with oxygen at the interface forming CO_2 and reducing the oxide to metal. In turn, oxygen diffuses through the ferrite film to react with carbon at the newly formed ferrite-void interface causing thickening of the film. (J4a, 1-73, N8, 9-52; CN-g)

305-J. Investigations of the Influence of Thermal Treatments on the Performance of Mould Irons. D. K. Hill. Glass Technology, v. 2, June 1961, p. 110-113.

Field trials of gray cast iron molds subjected to various heat treatments (annealing, stress relief, normalizing) indicate a beneficial effect on mold performance. (J1a, J23, J24, T29a; CI-n, 17-52)

306-J. Oxygen-Free Ovens Anneal Coils. Iron Age, v. 188, Sept. 21, 1961, p. 100.

Medium sized ovens with accelerated heating and cooling rates are used to anneal Al at 775° F. in an oxygen-free atmosphere. The oxygen level is maintained at less than 0.5% by an automatic analyzer and recorder. The atmosphere is supplied by two 15,000-cfh. exothermic generators. (J23, J2k, 1-55; Al)

307-J. Nitriding in a Salt Bath. Metalworking Production, v. 105, Aug. 1961, p. 43.

Nitriding of low-carbon steel, heat-resisting steel and cast iron using molten salt composed of potassium cyanide and potassium cyanate at 1050° F. (Tuffriding). Properties affected include fatigue life and corrosion and wear resistance. Industrial applications are noted. (J2j, J28k, Q-general, 17-57; ST, CI)

308-J. Castings Annealed in Molds by Controlled Cooling in Automatic Line. Steel, v. 149, Sept. 11, 1961, p. 114.

Annealing of tractor and implement castings of nodular cast iron while still in the molds by automatically programed storage and cooling lines which can hold the castings for 1/2-1 3/4 hr. (J23, 1-52, T3n; ST, 5-63, 17-57)

309-J. The Ferritization of S.G. Cast Iron by the Controlled-Cooling Process. G. J. Cox. Metallurgia, v. 64, July 1961, p. 15-21.

Investigation of composition of Fe and amount of pearlite permissible as factors affecting the cooling rate during controlled cooling of S.G. iron to develop the ferritic matrix necessary where increased ductility and shock resistance are required. (J26, 2-60, 3-71; CI-r)

310-J. (Italian.) The Commercial Heat Treatment of Large Stampings, Drawn Parts and Forgings. Trattamenti Termici e Protettivi dei Metalli, v. 4, May-June 1961, p. 3-8.

Technological and economic parameters of a plant of six furnaces heated by naphtha, two quenching machines and one loading machine which transports heavy coarse parts automatically from one furnace to the other. Oil and water quenching are both carried out. (J-general, 1-52; 4-51, 4-55, 4-59)

311-J. The Anatomy of a Specification. John M. Kelso. Metal Treating, v. 7, Aug-Sept. 1961, p. 10-12.

The importance of heat treating specifications for processing austenitic, martensitic and alloy steels are outlined in regard to temperature control, carburizing, nitriding, hardening, cooling, quenching, tempering and stock removal. (J-general; ST)

312-J. Effect of Different Types of Heat Treatment on the Mechanical Properties and Structure of Hard-Rolled and Hard-Drawn Stainless Chromium-Steel Wire. K. H. Kayser. Wire World International, v. 3, June 1961, p. 129-137.

Testing of stainless chromium-steel wire of ferritic, semiferritic and martensitic grades suitable for quenching and tempering includes determination of soft annealing, recrystallization and maximum tensile strength temperatures. (J-general, Q-general; SS, Cr)

313-J. Heat Treatment of Cold Extrusions. Metal Treating, v. 7, Aug-Sept. 1961, p. 16-18.

Unheated Al, Cu and 4130 steel slugs are extruded into tubes, lugs, bosses, ribs, fluts and gears by cold steel impacting. Forward and backward impacting of an ambient-temperature die is combined with heat treatment prior to the final extrusion stage. (J-general, F24, G5; Al, Cu, ST)

314-J. (Japanese.) Electrolytic Hardening. Pt. 5. Abrasion Tests on Electrolytically Hardened SKS 7 Steel. Toshinori Kuroda and Haruki Kondo. Osaka Industrial Research Institute, Bulletin, v. 12, Jan. 1961, p. 41-44.

Comparison of electrolytically-hardened hack saws of SK-3 and SKS-7 steel with those hardened in ordinary furnaces or by high frequency methods. Superior sawing quality of the former is due to rapid heating, strong quenching, low decarbonization, carbonization and tip heating of saw teeth at high temperatures. (J2, Q9, T6p, 1-54, 2-64; ST)

315-J. (French.) Heat Treatment of SG. Cast Iron. Semin and Strub. Trempe, no. 39, Sept. 1961, p. 17-21.

Pearlitic iron containing 3.34% C, 2.61% Si, 0.16% Mn, 0.1% P, 0.05% Cr

and 0.007% S is heat treated at 700° C. for 2 hr. to produce a ferritic structure, allowed to cool, held at 820-920° C. for 0-4 hr., 45 min. and subsequently quenched in water or oil or allowed to cool in the furnace or in air. Tempering of water quenched samples at 450° C. Flame hardening with water shower of ferritic samples. Effect of heat treatment on microstructure and hardness. (J-general, N8, Q29n, 2-64; CI)

316-J. Some New Developments in the Application of Furnace Atmosphere. P. Burtenshaw. Wild-Barfield Heat Treatment Journal, v. 8, June 1961, p. 2-5.

High-pressure hydrogen and atmosphere-protected brazing furnaces are used for heat treatment of high-strength, high-temperature Ni and steel alloys to prevent chemical reactions, surface oxidation and vapor gas absorption during the heating and cooling stages. (J2k, 1-52; Ni-b, ST, EG-n, SGA-h, SGB-a)

317-J. Overcoming the Downtime "Hurdle". Production, v. 48, Sept. 1961, p. 59-61.

Heat treatment of replacement gears for production machines by flame hardening prior to hobbing and shaping. Use of portable equipment permits fabrication of the gears on site using a minimum of time. (J2h, G17, T7a)

318-J. (German.) Heat Treatment of Antifriction Bearing Steel. Development of a New Process Using Inert Gas. Karl-Heinz Skarupke, Helmut Marschner, Manfred Gross and Curt Bager. Neue Hutte, v. 6, July 1961, p. 399-410.

Soft annealing of rolled high-carbon 105Cr4 and 100Cr6 steel without preceding pickling at temperatures from 600-720° C. under a protective $CO/CO_2/H_2$ atmosphere (50 -75% CO, 1% CO_2, 8-10%) which is continuously regenerated in a closed circuit. Thermodynamics of Fe gas equilibria. (J2k, J23, N15f; CN-r)

319-J. (Italian.) Practical Contribution to Heat Treatments of Light Alloys. Eugenio Hugony. Fonderia Italiana, v. 10, July 1961, p. 274-280.

Annealing, tempering, aging, casting and homogenizing of Al and Al alloys with special emphasis on structural phenomena that occur in the material during heating and cooling processes under different conditions. (J-general, E25; Al, Al-b, 9)

320-J. (German.) Consequences of Selective Oxidation of Binary and Ternary Alloys. Harald Pfeiffer. Zeitschrift fur Metallkunde, v. 52, July 1961, p. 481-488.

Annealing of NiCr (80/20 and 30/20) and CrAl (20/5) alloy sheet and wire specimens with and without small concentrations of B at 1200° C. under atmospheres of varying H and O content. Measurement of length changes, caused by selective oxidation during annealing, as influenced by B content of specimens and O content of annealing atmosphere. (J2k, P10d, 1-53, 2-62, 2-66; Ni, Cr, Al, 4-53, 4-61)

321-J. Stress Relieving of Steel Weldments. Louis J. Larson. Machine Design, v. 33, Sept. 14, 1961, p. 179-183.

Discussion of corrosion and caustic embrittlement, machinability and stability, flaws of fabrication and brittle fractures of pressure vessels, boilers and other steel structures in terms of welding codes and the utility of thermal stress relieving. (J1a, Q26s, R1, T26q; ST, 7-51)

322-J. (Translation-Brutcher no. 5094.) Induction Hardening of Metal Powder Compacts (Especially Iron Powders). I. N. Kidin. Izvestiya VUZ-Chernaya Metallurgiya, v. 11, Nov. 1960, p. 113-120.

Kinetics of induction heating on their structure and hardness after quenching. Induction heating curves for Fe compacts of 80-90% density and with 0.63-0.76% C compared with curve for a 0.60% C fusion made steel. (J2g; Fe-b, C, 6)

323-J. (German.) Descaling of Rolled and Drawn Wires of Austenitic Steels and Chromium-Nickel Alloys With Particular Reference to Vacuum Annealing. R. Ergang and P. H. Huppertz. Metall-Reinigung + Vorbehandlung, v. 10, July 1961, p. 108-113.

Vacuum annealing at 1050° C. of wire (0.4-6 mm. diameter specimens of 18/8 CrNi, 30/20 NiCr, 60/20 NiCr and 80/20 NiCr alloy and powders of Ni, Cr, Si and Fe with and without prior oxidation treatment for investigation of oxidation and evaporation equilibria. Influence of 0-0.1% C on scale formation. (J23, 1-73, L10, R1h; SS-e, Ni-b, Cr-b, 4-61)

324-J. (Russian.) Annealing of Sheets and Strips in Hood and Shaft Furnaces. A. K. Chertavskii, B. S. Tikhonov and V. P. Katasonova. Tsvetnye Metally, Apr. 1961, 1. 61-65.

Annealing of Cu, Ni, Cu-Ni and brass sheets and strips for automotive applications. Strip rolls are annealed in shaft furnace with compulsory air circulation to provide uniform temperature distribution throughout the roll. (J23, T21, 1-52; Cu, Ni, 4-53)

325-J. Strain-Free Annealing Aluminum Sheet for Big or Small Orders. Modern Metals, v. 17, Sept. 1961, p. 36-39.

High heating and cooling rates of oxygen-free ovens permit the production of high-volume, quality Al sheet while reducing annealing time by 1/3 to 1/2. Controlled atmosphere prevents breakdown of rolling lubricants when oxidized at high temperature and thus avoids staining and oxidation of sheet. (J2k, 1-52; Al, 4-53)

326-J. Heat Treating Aluminum in Steam Atmosphere Cuts Finishing Costs. F. L. Spangler and M. E. Lackey. Modern Metals, v. 17, Sept. 1961, p. 68.

Nonferrous metal parts are treated in a steam atmosphere using a sealed, forced convection type furnace. Finishing costs are reduced since steam atmosphere inhibits oxidation and subsequent cleaning operations are reduced or eliminated. (J2k, 1-52; Al)

327-J. Stress-Relieving First Pressure Vessel at Hunterson. Engineer, v. 212, Aug. 25, 1961, p. 331-333.

An 1800-ton steel pressure vessel, at a mean height of 85 ft. above ground, is stress relieved by heating to 550° C., soaking for 13 hr. and slow cooling with radiant heating applied mainly by bare strip elements. Design considerations are given for heating system, power and thermocouple cabling and thermal insulation. (J1a, T26q; ST, 17-57)

328-J. Largest Flame-Hardening Plant Makes Excavator Components. Industrial Gas, v. 40, Aug. 1961, p. 8-9.

Design of automatic oxygen-town gas machine to harden track links. Another application is a spinning method for hardening large gears. (J2h, T4a, T7a, W27g, 1-52)

329-J. Induction Device Hardens Parts for Huge Construction Machines. Steel, v. 149, Oct. 2, 1961, p. 66-67.

Parts fabricated from 1045 carbon steel are induction hardened and tempered without excessive distortion in a single scanning process, followed by oil quenching. (J2g, J26n, T4; CN)

330-J. New Era in Heat Treating. O. E. Cullen. Metalworking, v. 17, Oct. 1961, p. 17-19, 30.

Improved metallurgical control of metal products obtained through better atmospheres, quenching techniques and process controls achieved in modern heat treatment equipment. Effect of process variables during annealing, quenching and marquenching on transformation microstructures, distortion growth and mechanical properties of 1060, 1025, 1040 and 1141 steels. Evaluation of carbon control occurring during gas-carburization of medium and high carbon steels. (J-general, 1-52; ST)

331-J. Vacuum Heat Processing. John H. Durant. Metalworking, v. 17, Oct. 1961, p. 20-23.

Design criteria for selection of vacuum furnaces for annealing, degassing, hardening, homogenizing, sintering, tempering, brazing, diffusion bonding, soldering, refining and other operations requiring close metallurgical control of materials and prevention of contamination. Application to refractory and high temperature metals and alloys. Effect of process control on physical and mechanical properties of materials. (J-general, C-general, W18, W27, 1-73, 17-51; EG-d37, SGA-h)

332-J. (Japanese.) Sulphurizing Treatment of Cast Iron With H_2S and Wear Resistance Property of the Sulphurized Layer. Taketomo Yamazaki. Imono (Japan Foundrymen's Society, Journal), v. 33, July 1961, p. 503-511.

Cast iron specimens containing 3.10% C are heated in H_2S atmospheres at 200-600° C. for 1-5 hr. with conditions of sulphide formation on and beneath the surface being studied by X-ray, metallography and chemical analysis and hardness measurements, followed by wear testing. Surface films (determined as pyrrhotite) and sulphide diffusion layers

affect wear properties according to sulphur content and thickness, both being functions of diffusion temperature and time. (J28, M-general, N1, Q9, 2-60, 2-61, 3-67; CI)

333-J. (Italian.) Flame Hardening of Lathe Beds. J. Obrebski. Trattamenti Termici e Protettivi dei Metalli, v. 4, Mar-Apr. 1961, p. 3-8.

Flame hardening and decarburizing of lathe beds made of pearlitic cast iron (C = 3.30%, Mn = 0.7-0.9%, Si = 1.2-1.5%). Effect of flame distance and temperature on the microstructure and hardness. (J2h, M27, Q29; CI-r)

334-J. (Italian.) Phenomena Occurring During the Annealing of Cold Rolled Mild Steel Plates. G. Odone and V. Berruti. Trattamenti Termici e Protettivi dei Metalli, v. 4, Mar-Apr. 1961, p. 17-24, 35.

Effect of thermal cycling and annealing time and temperature (350-500° C.) on the structural modifications, grain size and Rockwell and Vickers hardness of mild steel plates used for producing deep drawing sheets. (J24, M27c, Q29; ST, 4-53)

335-J. Steel Sheets for Single Coat Porcelain Enameling. R. S. Burns and R. L. Myers. Paper from "Regional Technical Meetings, 1960". American Iron and Steel Institute, New York 17, 1961, p. 171-186.

Design requirements for production of a nonfishscaling enameling sheet including controlled carbon content in the ingot, coiling temperatures of the hot band which is high enough to form massive carbides and cold reduction that is adequate to produce microscopic voids. Decarburization and microscopic roughening procedures are used to prevent enamel boiling and improve bonding. (J-general, L27, 2-60, 17-52; ST, 4-53, 17-51)

336-J. Computerized Control of a Continuous Annealing Line. Robert H. Smith. Paper from "Regional Technical Meeting, 1960". American Iron and Steel Institute, New York 17, 1961, p. 313-331.

Continuous annealing of steel strip on a line having a digital control computer system, a package control system and processing line tensiometer regulators. (J23, 1-61, 18-74; ST, 4-53)

337-J. Heat Treatment of Stainless Steel Tubing and Wire. C. H. Vaughan. Industrial Heating, v. 28, Sept. 1961, p. 1664-1670, 1672, 1674, 1676.

Facilities (equipment and atmospheres) used for annealing the 200, 300, 400 and 500 series stainless steels. (J23, 1-52; SS)

338-J. Tower-Type Electric Furnaces Continuously Bright Anneal Stainless Strip Up to 27 In. Wide. Industrial Heating, v. 28, Sept. 1961, p. 1678, 1680.

Production of "bright annealed" stainless steel with a mirror like finish and improved corrosion resistance at Allegheny Ludlum Steel Corp. using furnace facilities 100 ft. high. (J23a, W27, 1-52; SS)

339-J. Processing of Stainless Steel Flat Products. M. R. Ogle. Industrial Heating, v. 28, Sept. 1961, p. 1701-1716.

Annealing, descaling and surface conditioning of sheet, plate and strip. (J23, L10, 1-52; SS, 4-53)

340-J. (English.) Controlled Furnace Atmospheres and Heat Treatment. Werner J. Hahn. Werkstatt und Betrieb, v. 94, July 1961, p. 169-171.

Calculation of air-gas proportions, split-gas compositions and expansion factors as a function of physical chemistry interrelationships, especially the neutral nonoxidizing hardening procedure applied to steel. (J2k, 1-53; ST)

341-J. (French.) Gas Carburizing. W. T. Goves. Traitements Thermiques des Metaux, v. 2, Jan-Feb. 1961, p. 3-15, 18.

Carburizing of carbon and low-alloy steels containing 0.20-1% carbon at 1500-1750° F. in an atmosphere containing approx. 20% CO. Steel is examined to determine depth of case as a function of time and temperature, tensile and compressive residual stresses and hardness of case as a function of carbon content. $CO-CO_2$ mixing ratios are indicated to be in equilibrium with various carbon contents at a given temperature. (J28g, 1-53; CN, AY)

342-J. Applications of Electron Bombardment Heating in Metallurgy. Metal

Treatment and Drop Forging, v. 28, Aug. 1961, p. 327-330.

Intense and controlled heating over small areas without contamination of the material as obtained with electron bombardment heating. Use of electron beam techniques in zone melting, single crystal growth, welding and ingot production of refractory, reactive and semiconductor metals. (J2h, C28k, K6, 10-54; EG-d37, EG-h, EG-j31)

343-J. Heat Treatment Research at A.E.I.-Birlec. Metal Treatment and Drop Forging, v. 28, Aug. 1961, p. 336-338.

Review of annealing, quenching and tempering projects including bright annealing of stainless steel strip for furnace lining, operation of pilot sealed-quench and shaker-hearth furnace units and testing of radiant tubes. Gas plant operations include improved exothermic gas generators, removal of CO_2 from gas and air mixtures, catalysts for endothermic gas generators and dryers for compressed air and gases. (J-general, A9m, 10-54; ST)

344-J. (German.) Die Cast Malleable Iron, Its Quality, Testing and Standardization. Josef Czikel and Karl Stolzel. Freiberger Forschungshefte, no. B 59, July 1961, p. 45-63.

Sand and die cast rods of malleable iron containing up to 0.5% Si are annealed at 900° C. and subjected to controlled cooling and subsequent mechanical testing, in an effort to standardize methods of testing for quality control. (J23, J2, Q-general, 1-54, 17-54; CI-s, Si)

345-J. (German.) Heat Treating of Cast 13% Cr Steels. Stanislav Drapal. Freiberger Forschungshefte, no. B 59, 1961, p. 99-121.

Heat treatment at 750-1150° C. of steel with carbon content varying from 0.05-0.34%, the austenitization temperature being magnetically measured, is followed by investigation of grain size and mechanical properties. (J-general, N8; CN-g)

346-J. Hunterston Vessel Stress Relieved. Electrical Times, v. 140, Aug. 24, 1961, p. 259-260.

The vessel is heated to 550° C. and its heating pattern is recorded and logged by 400 thermocouples fed into digital typewriters and strip chart recorders. Elements of the reactor individually studied during the process include the inner heat shield, graphite core support grid and main gas seals. (J1a, T11, T26q, 1-52; ST)

347-J. What Steels Shall I Use...for Heat-Treated Parts in Business Machines and Home Appliances? Metal Progress, v. 80, Oct. 1961, p. 77.

Though manufactures make many different types of items, heat treatment processes are usually restricted to case-hardening methods because wear resistance is the chief property desired. (J-general, T10c, X14; ST, 17-57)

348-J. What Steel Shall I Use...for Nitrided Parts? Wilson Leeming. Metal Progress, v. 80, Oct. 1961, p. 82.

As a means of imparting wear resistance at elevated temperatures, nitriding is receiving much consideration. For example, H11 gears for long-time service at 500° F. are now being nitrided. (J28k, Q9h; CN, AY)

349-J. Hardenability Bands for 1041 and 1045 SAE Recommended Practice. Metal Progress, v. 80, Oct. 1961, p. 96B.

These bands are applicable to semifinished products for forging, hot rolled and cold finished bars, wire rods and seamless tubing. (J5, 15-69; ST, 4)

350-J. The Heat Treatment of Steel--Base-Metal Thermo-Couples. Edwin Gregory. Edgar Allen News, v. 40, Sept. 1961, p. 207-208.

Properties of combinations of Cu-Ni alloys with wires of Cu, Ag, Ni or Fe, with data given for temperature ranges and resistances. Prevention of oxidation of thermocouple wires at high temperatures using a protective sheath. Method of calibrating thermocouples and converting emf. values into temperature. (J-general, P-general, 2-62; SGA-a)

351-J. Carbon Restoration in Investment Castings. E. M. Broad. Precision Metal Molding, v. 19, Oct. 1961, p. 86-87.

Review of carbon restoration process to bring the carbon content of the surface layer of steel up to the level of the core and the case carburization process to bring the carbon content of the surface layer to a level above that of the core. Effect on final mechanical

properties and service life of the part. (J3n, J28g, E15, Q-general; ST)

352-J. Mechanized Heat-Treatment Installation for Transmission Parts. Herbert Chase. Machinery (London), v. 99, Sept. 13, 1961, p. 633-639.

Equipment layout, assembly line operations and processes including annealing, carbonitriding, oil quenching, washing and tempering. (J-general, 1-52, 18-67, T21)

353-J. Open-Coil Process Makes Bid for Stainless Market. Iron Age, v. 188, Oct. 19, 1961, p. 133-135.

"Alphatizing", a process of diffusing Cr into the surface of mild steel and low carbon steel coils by the circulation of Cr-halogen gases around the coils in a furnace. Alphatized steel samples are tested to determine tensile properties, weldability, oxidation resistance and case depth and ductility. Automotive applications. (J2k, K9s, Q23p, Q27a, R-general, T21; CN, Cr, EG-k)

354-J. A Special Induction Hardening Installation. Wild-Barfield Heat-Treatment Journal, v. 8, Sept. 1961, p. 8-10.

Induction hardening of 0.35% carbon steel shafts horizontally and in pairs on an automatic and continuous production line. (J2g, T7j, 1-52, 1-61; CN)

355-J. Bright Annealing Copper Wire and Strip. Metal Industry, v. 99, Sept. 8, 1961, p. 186.

Production line equipment includes 8 bell 32 base installation with four exothermic generators and an automatic control system. Annealing is done at temperatures up to 550° C. (J23a, 1-52; Cu, 4-53, 4-61)

356-J. (German.) Improved End-Quench Test and Its Application in High-Precision Testing. Heinz Borchers and Hans Schlicht. Archiv fur das Eisenhuttenwesen, v. 32, Sept. 1961, p. 637-643.

Design of end-quench testing equipment which permits control of cooling rate and which yields results of improved repeatability. End-quench testing of heat treated 100 Cr 6 steel specimens for various austenitizing temperatures, annealing temperatures and quenching media. Repeatability of results. (J5; ST)

357-J. (German.) Correlations Between Gas Content of Hardening Salt Baths and Decarburization of Toolsteels at Bath Temperatures of 1000-1100° C. Siegfried Wilmes and Helmut Taxhet. Archiv fur das Eisenhuttenwesen, v. 32, Sept. 1961, p. 645-649.

Measurement of gas content (H, CO_2 and O) of graphite-containing or carbon-free $BaCl_2$ or $BaCl_2$-KCl salt baths at 1000-1100° C. and investigation of decarburization of foils of unalloyed steel containing 1% C and of BMo 9, C 100 W 1 and 105 WCr 6 steel. Decarburization as influenced by gas content of hardening bath. (J2j, J28; TS, 4-56)

358-J. Industrial Applications of Induction Heating. Engineer, v. 212, Sept. 1, 1961, p. 384-386.

Use in forging, extrusion, brazing, soldering and strip heating for axle, crankshaft, tool bit and cable production. Other applications of induction heating include zone refining, growing and doping of semiconductor materials. (J2g, C28k, F22, F24, K7, N3, 1-69, 10-54)

359-J. Stress Relief of Butt Welds in Rectangular Plates by Local Heating. B. Cotterell. British Welding Journal, v. 8, Oct. 1961, p. 485-490.

Uniform heating to 650° C. of a strip somewhat greater than the width of the plate so that the maximum residual stress at the center is of the order of half the cold yield stress. 6 ref. (J1a, 1-52, 7-51)

360-J. (Book-French.) Oxy-Acetylene Flame Hardening. Marcel Vilez. 1961. 160 p. Dunod, 92 Rue Bonaparte, Paris 6e, France.

Review of surface hardening by deformation, cementation, nitriding, carbonitriding, hard facing, metal spraying, electrolytic deposition or flame hardening. Surface hardness and hardness depth as a function of gas-oxygen ratio, distance and angle between flame and surface. Thermal flow in heating and water cooling and its effect. Applications of process to various carbon and alloy steels, gray cast iron, SG. cast iron and special cast irons. 57 ref. (J-general, J2h, 10-54; CN, AY, CI-b)

361-J. (Italian.) Heat Treatment of Alloyed and Gray Cast Iron. G. Somigli. Fonderia Italiana, v. 10, Aug. 1961, p. 299-332.

Hardening, stress relieving, casting, annealing, normalizing, carburizing, austempering, sulphonizing and aging of cast iron below and above the critical point. Tensile strength, yield point, wear resistance, resilience and T-T-T diagrams. (J-general, E-general, N8g, Q9, Q23; CI-n, CI-q)

362-J. (Italian.) Heat Treatment of Cast Iron. D. Fortino. Fonderie Italiana, v. 10, Aug. 1961, p. 333-340.

Stress relieving, annealing, hardening, tempering and normalizing of castings made of gray and nodular cast iron in order to improve workability and resistance to static and dynamic stresses. Determination of Brinell and Rockwell hardness, tensile strength and structure. (J-general, Q-general; CI-n, CI-r)

363-J. (Russian.) Dependence of Heat Treating Temperatures on Melting Temperatures for Nonferrous Metals. M. V. Zakharov. Izvestiya VUZ--Tsvetnaya Metallurgiya, Mar. 1961, p. 115-119.

Tabulation of correlations between recrystallization-annealing temperatures and melting temperatures for Al, Cu, Ni and Fe-based alloys. 8 ref. (J23c, P12n; Al-b, Cu-b, Fe-b, Ni-b)

364-J. Heat Treatment of a Reactor Pressure Vessel. Instrument Practice, v. 15, Oct. 1961, p. 1253-1254.

Vessels are heat treated for stress relieving to 800° C; temperature and strain data are recorded with thermocouples and strip chart recorders. The vessels are tested for weld quality and cracks. (J1a, 1-52, K9r, T11, T26q)

365-J. Hardening Gear Teeth for Paul Bunyan--Heat Treating Case Histories. No. 8. Joseph H. Bockrath. Metal Treating, v. 12, Oct-Nov. 1961, p. 31.

Use of a gradiation heating system permitting selective heating and quenching of each steel gear tooth under controlled gas-air rates, resulting in uniform diamond pyramid hardness of 500, controlled penetration depth and no scaling or decarburization. (J2k, Q29c, T7a, 1-52; ST)

366-J. High-Production Electric Furnace for Continuous Bright Annealing. Metal Treatment and Drop Forging, v. 28, Oct. 1961, p. 423.

Stainless steel strip is bright annealed in controlled hydrogen atmospheres in a continuous vertical furnace designed to exert minimum tension on the moving strip. The heated strip is cooled by high velocity hydrogen or dissociated ammonia streams with resultant low scale formation (J23a, 1-52; ST, 4-53)

367-J. (German.) Heat Treatment in Welding of Heat Resistant Chromium Steels Containing 12% Chromium. G. Faber. Brown Boveri Mitteilungen, v. 48, Aug-Sept. 1961, p. 485-489.

Tensile testing of nonwelded, austenitized specimens at 110-300° C. and of specimens welded at preheating temperatures of 150-350° C. Determination of favorable preheating temperatures. 4 ref. (J-general, K9p, Q27, 2-61; AY, Cr, SGA-h)

368-J. (French.) Effect of Cooling Conditions on the Mechanical Properties and Microstructure of Leaded Brass. F. Santini, A. Szyszkowski and D. Whitwham. Cuivre Laitons Alliages, no. 62, Aug. 1961, p. 27-31.

Samples of V-Z39Pb1 brass are heated to 700-850° C., furnace cooled at a velocity of 20° C. per hr., cooled in air or water quenched. Tensile and yield strengths, elongation, hardness, microstructure and phase composition are determined as functions of heating temperature and cooling velocity. (J26, M27, Q-general, 2-61, 3-67; Cu-n)

369-J. A Superior Microstructure for Optimum Induction Hardening. Richard J. Gould. Metal Progress, v. 80, Nov. 1961, p. 66-70.

In the development of the hardened and tempered microstructure of steel, as commonly used in induction hardening, there exists a critical carbide particle size. A slight deviation from this critical size will result in either optimum or inferior case hardnesses. Also, prolonged tempering times adversely affect the response of the microstructure to induction hardening. (J2g, N8, 3-67; ST)

370-J. Heat Treating in a Vacuum. Metal Progress, v. 80, Nov. 1961, p. 75-77.

Vacuum heat treating has much potential for producing parts which meet critical hardness, tolerance and surface finish requirements. (J2k; ST, SS, TS)

371-J. (German.) Measurement of Stress Relief in Steel at Elevated Temperatures. Jaakko Salokanagas. Valtion Teknillinen Tutkimuslaitos Statens

Tekniska Forskningsanstalt, no. 57, 1961, 19 p.

Investigation of stress relief during aging from 150-550° C. by measurement of force required to provide a defined elongation and by X-ray techniques for cold stretched and as-normalized steel specimens containing 0.11% C, 0.35% Si, 0.44% Mn, 0.011% P, 0.028% S. (J1a, J27d, 1-54; ST)

372-J. (German.) Lifetime and Economy of Rotary-Hardened Gears. H. G. Sossinka. Harterei-Technische Mitteilungen, v. 16, July 1961, p. 80-87.

Comparative rotary and case hardening of gears of 16 MnCr 5, 50 CrMo 4, 42 CrMo 4 steel, 18 CrNi 8 steel and 41 Cr 4 steel with measurement of resultant hardness distribution, fatigue strength, internal stresses and toughness. Evaluation of process economy. (J28, Q-general, T7a, 17-52; ST, 17-57)

373-J. (German.) Experiences in Case Hardening of Small, Ring-Shaped Parts by Controlled Drop-Gas Carburization. G. Stahli. Harterei-Technische Mitteilungen, v. 16, July 1961, p. 93-96.

Case hardening of small CK 15 steel rings by gas carburization at 820-900° C. with subsequent drop quenching in oil in an automatic plant. Design and mode of operation of plant are discussed, with measurement of hardness, carbon content and depth of case. (J28, 1-52; ST, 4-57)

374-J. (German.) Effect of Wrapping Material on Surface in Case Hardening of Toolsteel. A. Lundgren. Harterei-Technische Mitteilungen, v. 16, July 1961, p. 97-102.

Case hardening at 790-1150° C. of 0.98% carbon, MnCrWV, CrNiMo, CrW, SiCrMoV and free-cutting steel specimens in wrapping materials such as cast iron chips, newspaper, coke, charcoal, aloxite (Al_2O_3) and Cu-wool. Measurement of case hardness, carbon content and retained austenite in case as influenced by wrapping material. (J28; TS, ST)

375-J. (German.) Controlled Atmosphere in Annealing of Malleable Cast Iron. H. Muller. Harterei-Technische Mitteilungen, v. 16, July 1961, p. 105-110.

Annealing of castings of white and ferritic black malleable iron in continuous furnaces with controlled CO-CO_2, H_2-H_2O and inert gas (nitrogen) atmosphere. Design of furnaces and gas producers; and annealing technology. (J2k, J23, 1-52; CI-s)

SECTION K

JOINING

1-K. Friction Welding. Machinery, v. 97, Oct. 19, 1960, p. 892-896.

Description, technology, equipment and applications for a new form of pressure welding in which two workpieces are held in contact and rotated relative to each other, under pressure. (K6, 1-52)

2-K. Spot Welding Is the Key to Reliable Miniaturized Electronic Parts. Welding Design and Fabrication, v. 33, Nov. 1960, p. 34-35.

Spot welding of minute dissimilar parts composed of stainless steel, Ni, Cu and W to form electron beam. (K3n, T1; Cu, Ni, W, SS)

3-K. Leak-Free Welds Are the Key to World's Largest Stainless Steel Spheres. Welding Design & Fabrication, v. 33, Nov. 1960, p. 38-40.

Arc welding of 321 stainless steel spheres and carbon steel vacuum jackets for holding liquid oxygen at low temperatures. (K1, T26q; CN, SS)

4-K. Sea Will See More Aluminum Boats. Welding Design & Fabrication, v. 33, Nov. 1960, p. 43.

Fabrication of an all Al, all-welded passenger boat composed of 5086 H-32 Al alloy by consumable gas arc welding. (K1d, T22; Al-b, 17-57)

5-K. Why Have Fabricated Turbine Runners Replaced One-Piece Castings? Clayton R. Frounfelker, Jr. Welding Design and Fabrication, v. 33, Nov. 1960, p. 48-50.

Fabrication of water turbine wheels from smaller castings and steel plates by skip welding. (K-general, W11n; ST, 4-58, 5)

6-K. Why Martin Brazes in a Vacuum Furnace. Mel Schwartz. Welding Design and Fabrication, v. 33, Nov. 1960, p. 52-54.

Brazing, sintering, heat treating and annealing at 4500° F. using a specially designed cold wall vacuum resistance furnace. (K8, J-general, W29n, 1-66)

7-K. (German.) Problems in Welding High-Temperature Steels. E. Kauhausen, P. Kaesmacher and S. Sadowski. Werkstatt und Betrieb, v. 93, Oct. 1960, p. 653-661.

Welding of austenitic stabilized Cr, Ni, Cb, V, W and Mo alloyed heat resistant steels for gas turbines and high pressure boilers. Welding faults and susceptibility to crack formation. Selection of electrodes for joining ferritic and austenitic steels. 13 ref. (K1, W16; SS, SGA-h)

8-K. Welding of High-Strength Low-Alloy Structural Steel for Bridges. John L. Beaton and Paul G. Jonas. Welding Journal, v. 39, Nov. 1960, p. 1117-1123.

Fillet welding of structural components from T-1 ASTM A242 and ASTM A373 steels. Welding quality control; influence of welding practice on defects. 3 ref. (K-general, T26p; AY, SGB-s, SGB-a)

9-K. (German.) Arc Welding of a Complex Manganese Bronze. P. Schmidt and S. Zschotge. Metall, v. 14, Nov. 1960, p. 1093-1097.

Welding of a bronze containing 10-15% Mn, 7-9% Al, 2-4% Fe and 1.5-5% Ni with an electrode producing a filler metal composed of Cu, 13% Mn, 8% Al, 2% Fe and 2.5% Ni. Tensile strength, yield strength, elongation, hardness

bend strength and structure of the weld seam. 5 ref. (K1, Q-general; Cu-n, Mn)

10-K. Welding Centrifugal-Compressor Impeller Wheels. J. H. Matheny and E. L. Aul. Welding Journal, v. 39, Nov. 1960, p. 1127-1135.

Equipment and procedures for modified inert gas shielded metal arc welding of SAE 4340 steel components. Tooling, assembly and heat treatment of impeller wheels. (K1d, W13f; ST)

11-K. Weldment Failures Caused by Fabrication and Service. Helmut Thielsch. Welding Journal, v. 39, Nov. 1960, p. 1136-1144.

Examples of service failures in stainless steel pipe weldments caused by material discontinuity, decarburization, metallic contamination, mechanical notches, incorrect material identification and improper welding techniques. 3 ref. (K9; SS, 4-60, 7-51)

12-K. Welding of Nickel-Chromium-Iron Alloy for Nuclear-Power Stations. C. E. Witherell. Welding Journal, v. 39, Nov. 1960, p. 473s-478s.

Use of covered electrodes and filler wire for TIG welding 15% Cr-7% Fe-Ni alloy, joining Ni alloy to steel and for overlaying steel. Room and elevated temperature tensile properties, stress rupture strength, hardness and impact strength of weld metals. Effect of stress relieving heat treatments on weld metal properties. 6 ref. (K1d, Q-general, 2-64, W29h; Ni-b, ST)

13-K. Fabrication Principles for Welded Inconel X Structures. H. P. Schane and E. E. Weismantel. Welding Journal, v. 39, Nov. 1960, p. 479s-483s.

Inert gas tungsten arc welding and heat treatment of large size pressure vessels for operation at high stress levels above 1000° F. Elevated-temperature tensile properties of heat treated base and weld metals. (K1d, J-general, T26q, Q27a; Ni-b, 17-57)

14-K. Welding of High-Strength Steels for Rocket Cases. W. H. Kearns, J. W. Semmel and J. D. Marble. Welding Journal, v. 39, Nov. 1960, p. 484s-492s.

Inert-gas-shielded welding of 300M, X-200 and D6A steels. Preheating and post heating procedures. Influence of filler wire composition and grain refinement on mechanical properties and microstructure of the welds. 5 ref. (K1d, Q-general, M27, T2p, 2-59, 2-60; ST)

15-K. (Japanese.) Electro Slag Welding. Sato'o Kitani and Tsuneo Akutagawa. Metals, v. 30, Sept. 1, 1960, p. 44-47.

Submerged arc welding of very thick steel plates, using a slag melt in the gap. Structure and strength of the welded joint. (K1e, Q-general; ST, 4-53)

16-K. Welding Aluminum. R. R. Kottmeier. Canadian Welder, v. 51, Nov. 1960, p. 10-15.

Mechanical properties of welded and cut Al as improved by alloying with Mg, Mn, Cu, Si, Zn and magnesium silicide. Physical properties are compared with those of steel. (K-general, Q-general, 2-60; Al-b, Cu, Mg, Mn, Si, Zn)

17-K. Furnace Brazing Cuts Cost. Canadian Welder, v. 51, Nov. 1960, p. 16-17.

Brazing of stainless steel and cast iron with a Ni base alloy in a dry hydrogen furnace at 2150° F. in the production of jet engine turbine compressor and metal cutting blades. (K8; CI, SS)

18-K. Welding Technology in Russia. Canadian Welder, v. 51, Nov. 1960, p. 20-22.

Arc, inert gas, cold press, friction and diffusion welding of steel, Fe, Al alloys and Ti alloys. (K-general; Al-b, Fe, ST, Ti-b)

19-K. (German and French.) Welding in Fabrication of Gas Turbines. A. Luthy. Zeitschrift fur Schweisstechnik (Journal de la Soudure), v. 50, Sept. 1960, p. 273-277.

Welding gas pipes and distribution chambers in gas turbine plants by the "Mig" process, electrowelding with an additional currentless wire. Welds are tested for susceptibility to crack formation. (K1d, K9r, 9-72, W11n)

20-K. (German.) Resistance Welding of Carbon Containing Wire. H. Zech and G. Deubel. Draht, v. 11, Oct. 1960, p. 659-660.

Welding current, time and pressure specifications for condensor-butt welding, flash-butt welding and pressure-butt welding of drawn steel wire of varying diameter, carbon content and mechanical properties. (K3, 2-60; ST, 4-60)

21-K. (German.) Economics of Welding Processes in Production and Repair of Agricultural Vehicles. H. Wirtz. Schweissen und Schneiden, v. 12, Sept. 1960, p. 413-415.

Comparison of autogenous welding, flame cutting, arc welding and riveting processes for the repair of agricultural equipment. (K1, K3, K13n, G22g, T3)

22-K. Brazing Fuel Elements for the OMR. N. W. D. Chrimes. Nuclear Power, v. 5, Oct. 1960, p. 97-98.

Use of Pd-base brazing alloys with melting points above 800° C. to join fuel elements for organic moderated reactors. 4 ref. (K8j, T11g; SGA-f, Pd-b)

23-K. Short-Arc Welding Pinpoints the Heat. Canadian Machinery and Metalworking, v. 71, Nov. 1960, p. 108, 110.

Short arc consumable electrode inert gas welding of thin cross sections composed of carbon and stainless steel, Al and Cu. (K1d; CN, SS, Al, Cu)

24-K. Alberta Hydro Penstocks Fabricated From T1 Steel. Canadian Machinery and Metalworking, v. 71, Nov. 1960, p. 112.

Butt and fillet welding of steel shell plates to produce hydro penstocks. (K-general, T26r; TS)

25-K. (German.) Welding of Gray and Nodular Cast Iron. M. Puschner and G. Suchanek. Technica, v. 9, Oct. 7, 1960, p. 1295-1298.

Welding of gray cast iron by a cast iron electrode and by the "dot weld" process (modified spot welding process). Welding of nodular cast iron by Ni containing and pure Ni electrodes. Butt flash welding, electroslag welding and post heat treatments. Microstructure and hardness diagrams. 7 ref. (K-general, M27, Q29n; CI-n, CI-r)

26-K. Square-Butt Welding Costs Less. Iron Age, v. 186, Dec. 1, 1960, p. 139.

Data for wire diameter, welding speed and current, wire feed speed and number of passes. (K-general, F26p; Al)

27-K. (German.) Bonded Light Metal Aircraft Components and Structural Elements. H. Winter, H. Meckelburg and W. Althof. Aluminium, v. 36, Nov. 1960, p. 658-665.

Bonding of aircraft structures composed of AlMgCu alloys with thermosetting adhesives. Curing, inspection and fatigue testing of the bonds. 135 ref. (K12, Q7, T24a; Al-b, Cu, Mg)

28-K. Liquid Lock for Metal Parts. Australasian Manufacturer, v. 45, Oct. 15, 1960, p. 77-78, 80, 82-83, 85.

Properties and industrial uses of a liquid sealant for bonding metals, glass, ceramics and phenol plastics. (K11, K12; NM-d34, 17-57)

29-K. Electron Beam Welding of Nuclear and Electronic Parts. Western Machinery and Steel World, v. 51, Nov. 1960, p. 67.

Vacuum electron beam welding of light-weight stainless steel, Ni alloy and Cu containers using a remote controlled welder. (K6, 1-73; Cu, Ni-b, SS)

30-K. TIG Welding of Tantalum, Columbium, Molybdenum and Tungsten. Alan F. Busto. Fansteel Metallurgy, Oct. 1960, p. 2-3, 4.

Physical and mechanical properties of Ta, Cb, Mo and W compared to SAE 1020 steel. Effect of properties on weldability by the TIG welding process. Strength of the weldments. (K1d, K9s, P-general, Q-general; Cb, Mo, Ta, W, EG-d37)

31-K. Design Considerations in Welded Ship Construction. R. F. Pearce. Welding Fabrication and Design, v. 4, Oct. 1960, p. 19-23.

Comparison of welded and riveted joints in ships for steel weight and fabrication costs, structural strength and effects on hull resistance to propulsion. (K-general, T22; ST)

32-K. Welding Applications at Mount Isa Mines, Limited. S. A. Eyers. Welding Fabrication and Design, v. 4, Oct. 1960, p. 23-31.

Arc welding repair techniques applied to mining and smelting equipment such as cone crusher frames and adjustment rings, cast steel mine car wheels, cast steel ladles and mild steel mixer blades. (K1, W15, W18n, 18-72; ST)

33-K. Overseas Developments and Trends in Welding. W. Bernard. Welding Fabrication and Design, v. 4, Oct. 1960, p. 37-44.

Survey of welding techniques and equipment used for steels, Al, bronze, Ti, Zr, Ta and plastics, including manual, open arc, CO_2, plasma, oxy-acetylene, electroslag, resistance, ultrasonic and electron beam welding. (K-general, W29; ST, Cu-s, Ti, Zr, Ta, Al)

34-K. Trends in Structural Steel Designs. P. O. Miller. Welding Fabrication and Design, v. 4, Sept. 1960, p. 9-11.

Availability of stock, range of sections and methods of joining as they affect use of structural steel members. (K-general; SGB-s, ST)

35-K. On-the-Spot Welding With a New Transformer Welder. Welding Fabrication and Design, v. 4, Sept. 1960, p. 16.

Arc welding of mild, low-alloy and 18-8 stainless steel using a portable transformer welder. (K1, W29a, 1-52; AY, CN, SS)

36-K. (German.) Welding of Gray Cast Iron and SG Iron. M. Puschner and G. Suchanek. Industrie-Anzeiger, v. 82, Nov. 15, 1960, p. 1582-1585.

Arc welding, flash welding and electroslag welding practices. Effect of preheating at 100-600° C. and of heat treatments at 700-900° C. followed by cooling at various rates on structure tensile and hardness of weldments. Influence of filler material compositions. 7 ref. (K1, K3r, K6, Q-general, 2-64; CI)

37-K. Fundamentals of Projection Welding. Douglas D. Williams. Welding Engineer, v. 45, Nov. 1960, p. 40-42.

Projection welding of carbon and stainless steel, galvanized or tinned steel, Al and Al alloys and alloy steels, the welding area being subjected to pressure with the passage of secondary current governed by shape and size of the projections. (K3q; Al-b, AY, CN, SS)

38-K. TIG Welding Joins Small Stainless Tubes to Thick Tube-Sheet. J. M. Gerken and D. B. Kittle. Welding Engineer, v. 45, Nov. 1960, p. 46-48.

347 stainless steel tubing is internally butt welded to thick tube-sheets by the TIG process. Data for arc length, rotation time and welding speed. (K1d; SS, 4-60)

39-K. Welded Design, Process Control Guarantee Better Products. William C. Nemitz. Welding Engineer, v. 45, Nov. 1960, p. 52-54.

Manual metal-arc welding of a steel fan wheel using a low-hydrogen powdered Fe electrode. Weldments are stress-relieved before finish machining by heating and cooling at controlled rates. (K1g, J1a, W13e; ST)

40-K. Brazing Produces Smooth Surface for Cab Doors. George A. Medsker. Welding Engineer, v. 45, Nov. 1960, p. 60, 62.

Brazing of 18 gage SAE 1020 steel for door panels using a flame-fluxing process and a low fuming bronze filler metal. (K8, T21a; ST)

41-K. Inert-Gas Tungsten Arc Spot Welding in Missile Production. W. P. McGregor. Machinery, v. 67, Dec. 1960, p. 110-121.

Tests on several gages of 301 stainless steel with reference to current amperage, arc length, cycles, gas coverage and flow, electrode type and preparation, base metal preparation, contact of faying surfaces and various backup materials. (K1g, K3n; SS)

42-K. Welding Aluminum. Pt. 7. Torch, Furnace and Dip Brazing. Modern Metals, Nov. 1960, p. 62-67, 70.

Basic steps relating to preparation of materials and torch equipment, degreasing and cleaning, flux preparation and application. Brazing techniques; common types of brazed joints. (K8; Al)

43-K. Stud Welding System Speeds Curtain Wall Production. H. P. Blood. Modern Metals, Nov. 1960, p. 88-89.

System of stored energy percussive stud welding applicable to Al. Feasability studies indicate that it is also suited to Mg and Ti. (K1f; Al)

44-K. X-Ray Examination and Weld-Strength Factor. Olavi Eiro. Lastechniek, v. 26, Sept. 1960, p. 166-172.

Carbon steel containing 0.12% C, 0.01% Si, 0.31% Mn, 0.035% P and 0.02% S is welded with a low-hydrogen electrode producing a filler metal containing 0.10% C, 0.6% Si and 0.6% Mn or an electrode with acid coating producing a metal containing 0.10% C, 0.2% Si and 0.4% Mn. Comparison of X-ray and mechanical tests data. (K9r, S13e; CN, 7-51)

45-K. New Welding Methods Push State of Art in Joining. Thomas McElrath and Irwin Stambler. Space/Aeronautics, v. 34 Nov. 1960, p. 68-72.

Short arc welding of thin-gage materials to eliminate cooling period and permit welding of small diameter wire. Electron beam welding of advanced refractory alloys. (K1, K6; EG-d37, 4-61)

46-K. Joining With Adhesives in Automated Assembly Systems. J. W. Janson. Automation, v. 7, Dec. 1960, p. 73-79.

Description of methods and equipment for use of various types of adhesives in bonding, sealing and joining of metals, plastics, wood, paper or cement asbestos, or combinations of these materials. (K11, K12, 18-74)

47-K. Welded Penstocks for Hydro-Electric Power Stations. Pt. 2. Pipes and Pipelines, v. 5, Nov. 1960, p. 31-34.

Submerged-arc welding, testing and machining of steel pipeline sections, stiffening collars and branch pipes used in hydro-electric power station penstocks. (K1e, G17, T26r; ST)

48-K. Welder Repairs Dies on the Job. Tooling and Production, v. 26, Dec. 1960, p. 44.

Correction of defects in tools, dies and molds without disturbing the machine setup by resistance welding with a small, gun-type welding device. (K3, T6, W19)

49-K. Large Pipe Mill Put in Operation at Calgary, Canada. Iron and Steel Engineer, v. 37, Nov. 1960, p. 152.

Continuous resistance welding of cold rolled steel to form high strength transmission line pipe for oil, gas and water, using a high frequency resistance welder. (K3, T26r; ST, 17-57)

50-K. Remote Induction Brazing of Steel Tube Couplings in B-70 Bomber. Industrial Heating, v. 27, Nov. 1960, p. 2364, 2366.

Brazing of tube couplings in areas of aircraft components that are inaccessible to a large high-frequency generator using a remote portable induction brazing accessory. (K8k, W29q, T24; ST)

51-K. Applications for Ultrasonic Welding of Aluminum. J. R. Terrill, F. R. Collins and J. D. Dowd. American Society of Mechanical Engineers, Paper no. 60-WA-322 1960, 5p. $1.

New uses of ultrasonic welding in structural applications such as automobile, aircraft and missile construction, in electrical applications and in fabrication of consumer products. 7 ref. (K6r; Al)

52-K. (German-French.) Heavy Industry Maintenance and Repair Welding. Pt. 1. Zeitschrift fur Schweisstechnik, v. 50, Nov. 10, 1960, p. 343-353.

Repair welding of cast iron rolls and wobblers using electrodes with a high Ni content or, in the case of white cast iron surfaces or alloyed cast irons, low-alloyed Cr-Mn-C electrodes. Use of special electrodes for hardened steel rolls. Surfacing of soft steel rolls with high-alloyed austenitic-ferritic, or austenitic Mn-alloyed electrodes. (K1d, W23, W29h; CI)

53-K. How to Weld Graphitic Tool Steel. C. F. Jatczak and C. A. Pfouts. Steel, v. 147, Nov. 17, 1960, p. 116-117.

Surface preparation, selection of electrode, preheating, weld deposition and stress relieving during joining of graphitic toolsteels. (K1, N8r; TS)

54-K. Designing for Spot Welding Aluminum Alloys. Mechanical World, v. 140, Nov. 1960, p. 470-471.

Data for spot weldability of Al alloy sheets and minimum weld spacing, edge distance and clearance during welding. (K3n; Al-b, 4-53)

55-K. Wave Soldering Ups Output of Printed Circuits. Mill & Factory, v. 67, Dec. 1960, p. 106-107.

Use of a wave soldering method to deposit solder on work while the soldering equipment remains stationary. A pump creates a fountain of solder on the surface of the bath which is deposited at each of the fluxed joints of the circuit board as it moves across the bath. (K7, T1c)

56-K. Technique for Welding Very Thin and Thick Sections Together. Machinery, v. 97, Nov. 16, 1960, p. 1133-1135.

Resistance welding of thin stainless steel strips to thick stainless steel sheets of Ti alloy tube assemblies. Effect of electrode contact pressure on interface resistance of the materials. Microstructure of welds. (K3, M27; SS, Ti-b, 4-53; 4-60)

57-K. Design Factors for Lined Vessels and Piping. H. Thielsh. Petro and Chem Engineer, v. 32, Dec. 1960, p. C 50-51, C 54-56.

Plug, strip and through welding of thin stainless steel or Ni alloy to carbon or low-alloy steel backing materials formed into tanks, pressure vessels or piping. Data for electrode and welding-rod compositions. (K1, T26; AY, CN, Ni-b, SS, 4-53)

58-K. Joining of Tungsten. Defense Metals Information Center, Batelle Memorial Institute, DMIC Memo 74, Nov. 24, 1960, 8 p.

Procedures for cleaning tungsten. Brief comment on following welding techniques: Tig welding, electron beam welding, plasmajet welding, resistance spot welding, atomic hydrogen welding and brazing. 3 ref. (K-general, L-general; W)

59-K. Tig Welding Joins Copper to Stainless. J. M. Gerken, American Machinist/Metalworking Manufacturing, v. 104, Nov. 14, 1960, p. 126.

Stainless steel strips are joined to Cu tubes by a Tig welding process in which most of the heat is put into the Cu so that it is fused to the stainless rather than having the two metals melt together. (K1h; Cu, ST, 4-53)

60-K. (Italian.) Automatic Submerged Arc Welding. Pt. 4. Franco Calcaterra. Rivista di Meccanica, v. 11, Sept. 26, 1960, p. 13-16.

Data are given for edge preparation requirements, choice of backing materials, welding voltage, current intensity, welding speed and electrode consumption in connection with execution of butt, lap and corner joints in carbon steel. (K1e; CN)

61-K. (Italian.) Automatic Submerged-Arc Welding. Pt. 3. Franco Calcaterra. Rivista di Meccanica, v. 11, Sept. 12, 1960, p. 19-26.

Characteristics and applications of electrode wire, granular powders and backing materials; edge preparation techniques; welding positions; and positioning of electrodes in submerged-arc welding of steel. (K1e, W29h; ST)

62-K. How to Choose the Right Shielding Gas. I. D. Holster. Steel, v. 147, Dec. 12, 1960, p. 78-81.

Effect of various shielding gases on the TIG or MIG welding of Al, Mg and Ni alloys, mild, stainless and low alloy steels, bronzes and brasses. (K1d; Al-b, AY, CN, Cu-b, Mg-b, Ni-b, SS)

63-K. Automation Speeds Brazed Heating Units; Quality Up. Steel, v. 147, Dec. 12, 1960, p. 92-93.

Cu return bends are silver brazed to the ends of Cu tubes in heating and cooling convectors by an automatic brazing machine. (K8; Cu, 4-60)

64-K. (Pamphlet.) Projection Welding Low Carbon Steel With Embossed Projections. J. F. Harris and J. J. Riley. Bulletin SP-27, 1960, 20 p. Taylor-Winfield Corp., Warren, Ohio.

Welding techniques, projection forming tools, welding electrodes and joint design. Influence of weld current, electrode force, weld time, electrode design, part preparation and projection size and shape. Specific recommendations for welding of projections embossed in thicknesses from 0.011 to 0.245 in. (K3q; CN-g)

65-K. (Translation-Brutcher no. 4919.) Friction Welding of Metals. Pt. 3. V. I. Vill. Svarka Metallov Treniem, 1959, p. 36-60.

Principal variables of welding process; total upset. Recommended friction welding conditions; specific pressure; relative speeds of rotation. Welding conditions and characteristics of welded joints. Results of tensile, bend, impact and hardness tests on welds of similar and dissimilar ferrous and nonferrous metals. (K6)

66-K. (Translation-Brutcher no. 4920.) Friction Welding of Metals. Pt. 3. V. I. Vill. Svarka Metallov Treniem, 1959, p. 60-86.

Industrial equipment for friction welding; principal data on general-purpose machines MST-1, MST-2 and MST-3. Examples of industrial applications. (K6)

67-K. (German.) Welding of Nickel and Nickel Alloys. Kocher. Schweisstechnik, v. 14, Oct. 1960, p. 111-113.

Welding of pure Ni and Ni alloys (Monel, Inconel, Hastelloy and Remanit) by open-arc welding with coated electrodes and by protective gas welding. Elimination of sulphur and oxygen contamination during welding. (K1a, K1d; Ni-b)

68-K. (German.) Welding of Thin Steel Sheets by the Under-Powder Process. Stenke. Schweisstechnik, v. 14, Oct. 1960, p. 109-111.

General features of "Ellira" or "under-powder" welding of thin steel sheets using a Cu electrode. Application to welding of bushings, automobile components, expansion vessels and bearings. (K1, T7d, T21b; ST, 4-53)

69-K. (Italian.) Study of Welding Times. B. Perego and G. Bellettati. Rivista di Meccanica, v. 11, Aug. 29, 1960, p. 41-49.

Calculation of total time required to execute a joint in arc welding with fusible electrodes, automatic submerged-arc welding and oxy-acetylene welding. (K9)

70-K. (Italian.) Automatic Submerged Arc Welding. Franco Calcaterra. Rivista di Meccanica, v. 11, Aug. 29, 1960, p. 65-70.

Typical voltage regulators and starting mechanisms used on automatic welding equipment. Influence of voltage, current intensity and welding speed on width and thickness of bead and on weld penetration. (K1e, W29c)

71-K. (German.) Weldability of Various Sheet Qualities Under Protective CO_2 Atmosphere. R. Glockner and H. Wirtz. Schweissen und Schneiden, v. 12, Nov. 1960, p. 482-484.

Arc welding of ship and boiler steel plates (0.14-0.30% C, unalloyed) and subsequent mechanical, X-ray and metallographic testing and examination of welds to determine tensile and bend properties. (K1d, Q27, Q5, M-general; ST)

72-K. Recent and Current Developments in Electric Arc Welding. W. A. Wrate. Production Engineer, v. 39, Nov. 1960, p. 646-655.

Review of advances in semi-automatic and automatic electric arc welding. Use of newly designed electrical equipment and advantages of iron powder electrodes. Applications of the electro-slag process. (K1, W29h, 1-52)

73-K. Evaluation of Weld Quality on a Submarine Pipe Line. Paul W. Turner. Welding Journal, v. 39, Dec. 1960, p. 1215-1221.

Radiographic inspection and statistical quality control of welding on a submarine pipe line built for crude oil service. Joint design requirements and method of installation of the seamless pipe using portable shielded metal arc welding equipment. Types of defects and their repair or removal. (K1d, S13e, T26r)

74-K. Inert-Gas-Shielded Metal-Arc Spot Welding of Aluminum. S. Eric McFall. Welding Journal, v. 39, Dec. 1960, p. 1230-1236.

Adaptation of the inert gas shielded metal arc process to arc spot welding of Al alloy sheet. Preweld and postweld cleaning. Shear testing of spot welds; mechanical properties of arc spot welds. 3 ref. (K1d, K3n, Q2; Al-b, 4-53)

75-K. Properly Designed Weld Tooling and Fixturing Greatly Simplifies the Welding of Large Rocket Motors. J. E. Bartley and R. E. Frola. Welding Journal, v. 39, Dec. 1960, p. 1237-1243.

Gas tungsten arc welding and submerged arc welding of rocket motor cases by longitudinal and circumferential welding machines specifically engineered and designed for inside-out welding. Methods of stress relieving using induction heating coils and sizing of cylinders and heads by a stretch press. (K1d, K1e, J1a, T2p)

76-K. Superior Welds Make Superior Tanks. F. A. Henninger and W. F. Beldon. Welding Journal, v. 39, Dec. 1960, p. 1247-1248.

Fabrication of steel storage tanks in 6000 gallon capacities using submerged arc welding. Application as propane tanks and for storage of other liquified petroleum products. (K1e, T26q; ST)

77-K. Current Welding Research Problems. Welding Journal, v. 39, Dec. 1960, p. 547-s to 552-s.

A list of 152 research problems on the welding of carbon and low alloy steels, pressure vessels and piping, structural materials, stainless steel and high alloys and aircraft and missile components. (K-general, T24, T26q; AY, CN, SS, SGB-s)

78-K. (Russian.) Automatic CO_2 Shielded Arc Welding of a Steel Steam Turbine Diaphragm. D. S. Verbin and V. M. Shepilevskii. Energo-Mashinostronie, July 1960, p. 29-31.

Methods for eliminating porosity and slag inclusions and obtaining good weld penetration and minimum surface oxidation during welding of turbine diaphragms for operation at 300-540° C. (K1d, K9, W11k; ST, 17-57)

79-K. High-Temperature Base-Tab for Silicon. Leon Maissel. Electrochemical Society, Journal, v. 107, Dec. 1960, p. 1007-1009.

A Ni-Pt solder is used to bond a Mo base tab to Si. Tabs could not be separated from the Si below 800° C. 4 ref. (K7; Mo, Si)

80-K. How to Weld Columbium Alloys. Iron Age, v. 186, Dec. 15, 1960, p. 110-112.

Application of tungsten inert gas, resistance, electron beam and ultrasonic welding techniques. Effect of alloying elements on ductility and brittle-to-ductile transition temperature. (K-general; Cb)

81-K. (French.) The Oberems Aqueduct, First Argon Arc Welded Pressure Pipe in Peraluman 30 Alloy. R. Heglund, H. Hiltebrand, H. Walser, H. J. Rodewald and E. von Burg. Aluminium Suisse, v. 10, Sept. 1960, p. 231-259.

Fabrication, assembly, inspection and testing of 63-meter long, 1.65-meter internal diameter pipe replacing former concrete structure serving Swiss hydroelectric plant. (K1d, S13, T26r; Al-b, 17-57)

82-K. (German.) Friction Welding. Wilhelm Hofmann and Svein Jenssen. Zeitschrift fur Metallkunde, v. 51, Nov. 1960, p. 642-645.

Al and Cu tubing are friction welded to flanges of Al or Cu. Effects of angular velocity, contact pressure, surface treatment and friction coefficient on the tensile strength of weldments. Structure of welded seam. 5 ref. (K-general, Q27a; Al, Cu, 4-60)

83-K. Welding in Russia. Metal Treatment and Drop Forging, v. 27, Nov. 1960, p. 473-474.

Review of recent developments. Power economy. Example given for mass-produced storage tanks. Friction and diffusion welding. (K-general, T26q)

84-K. (German.) Welding of Heat Resistant Materials. Werner Weinmann. Industrie-Anzeiger, v. 82, Nov. 18, 1960, p. 1595-1601.

Resistance, gas-shielded arc and arc welding by electrodes with lime-basic covering and electron beam welding and heat treatment after welding of heat resistant 12% Cr steel, austenitic steel and Fe-Co-Cr-Ni alloy, Co alloy, Ni alloy and alloys of high melting metals such as Cb, Ta, Mo and W. Evaluation of welding faults such as crack formation and porosity. (K1, K6, J-general; SGA-h)

85-K. (German.) Auxiliary Equipment and Machines for Automatic Nonhorizontal Welding ("Zwangslagenschweissung"). F. Wiest. Industrie-Anzeiger, v. 82, Nov. 18, 1960, p. 1601-1603.

Automatic vertical and transverse arcless electroslag welding of thicknesses over 25-30 mm., using direct, alternating and three-phase current and 1-3 electrodes. (K6)

86-K. (German.) Automatic Nonhorizontal Welding Processes and Their Practical Uses. Th. Ammerling. Industrie-Anzeiger, v. 82, Nov. 18, 1960, p. 1603-1606.

Nonhorizontal under powder welding, He, Ar and CO_2 shielded welding, welding with folded slag containing electrodes and electroslag welding of large vessels. Methods of seam preparation. Computation of welding efficiency and welding rate. (K1d, K6, 1-52)

87-K. (German.) Metallurgy, Microstructure and Mechanical Properties of Automatic Machine Welded Nonhorizontal Welds. M. Puschker. Industrie-Anzeiger, v. 82, Nov. 18, 1960, p. 1606-1610.

Metal-slag reactions, temperature distribution and formation of shrink holes during under powder and electroslag welding. Microstructure as-welded and after annealing and tensile strength,

hardness and impact strength at -40 to 20° C. of electro-slag welds. (K6, K9, M27, Q-general, 2-61)

88-K. Dip Transfer Process. Airco News, v. 20, Feb. 1960, p. 6-7.
Fabrication of heavy-duty air filters composed of mild and low-alloy steel by CO_2 shielded dip transfer arc welding process in which a moving electrode comes into repeated contact with the weld pool creating a pulsed arc. (K1d, W13c; AY, CN)

89-K. Pre Packaged Liquid Rocket Engines. Airco News, v. 20, Feb. 1960, p. 8-10.
Gas-shielded metal-arc and Tig welding of liquid rocket engines containing fuel tanks, combustion chambers and propellant but no moving parts. (K1d, T2p)

90-K. Spot-Welded Steel Truss Sections. Airco News, v. 20, Feb. 1960, p. 11.
Fabrication of steel roof and floor sections up to 32 ft. in length by CO_2 shielded spot welding. (K3n; ST, 4-57)

91-K. Fashioning Steel Barrels. Airco News, v. 20, Feb. 1960, p. 12-13.
Fabrication of engine containers from mild steel drums by CO_2 shielded welding with flame cut interior brackets and gussets welded to the inside of the drums by dip treatment and skip welding. (K1d, T21b; CN)

92-K. Aircomatic Welding in the Far North. Airco News, v. 20, Feb. 1960, p. 16-19.
Sheet steel structures are spot welded at low (arctic) temperatures using complete welding units with control panels, wire feeders, pull guns and power supplies. (K3n, 1-67; ST, 4-57)

93-K. Girding the Globe. Airco News, v. 20, Feb. 1960, p. 24-25.
Pipe couplings, fittings, repair clamps and sleeves for gas engines are fabricated by shielded metal arc welding, Tig welding and flame cutting. (K1d, G22g, W11j)

94-K. The Problem of Welding High-Temperature Service Materials. E. Kauhausen, P. Kaesmacher and S. Sadowski. British Welding Journal, v. 7, Dec. 1960, p. 693-707.
Submerged-arc, inert-gas metal-arc and gas welding of ferritic steels containing 1-9% Cr and 0.5-1% Mo, 12% Cr steel and fully austenitic stabilized steels. Comparison of welding characteristics of basic lime-coated and acid rutile-coated electrodes. (K1d, K1e, K2; SS, SGA-h)

95-K. Hot Pressure Welding of Titanium. C. F. Wilford and R. F. Tylecote. British Welding Journal, v. 7, Dec. 1960, p. 708-712.
Values of deformation and pressure required for pressure butt welding of Ti bar at 20-900° C. Tensile strength and microscopic changes occurring at the interface of the weld as a function of heat treatment. (K5, Q27a, M27, 2-64; Ti, 4-55)

96-K. Inconel Piping Welded With "62" Filler Wire. Inco Nickel Topics, v. 13, no. 8, 1960, p. 5.
Fabrication of Ni-Cr alloy pipe and fittings for primary coolant components in atomic reactors by Tig and Mig welding. (K1d, T11; Ni-b)

97-K. The Metal-Arc Welding of Stainless Steel. M. C. T. Bystram. Edgar Allen News, v. 39, Nov. 1960, p. 253-256.
Metal-arc welding and mechanical finishing of austenitic stainless steels at ambient pressures and temperatures. Applications in appliances subjected to mild corrosion. (K1g, L-general; SS-e)

98-K. Friction Welding Studied. Canadian Welder, v. 51, Dec. 1960, p. 10-11.
Process for converting the mechanical energy of two metal, plastic or ceramic objects revolving or sliding in contact with one another into thermal energy, which under proper conditions and controls results in a weld at the place of contact. It is thought that a layer of fluid metal forms at the interface and that this layer acts as if it were a hydrodynamic thrust bearing or extreme pressure lubricant. (K6)

99-K. Space Metal Spotwelding. Ryan Reporter, v. 21, no. 3, 1960, p. 9-10, 24.
Resistance welding of very thin sheet metal (up to 0.016 in.) to plates of considerable thickness by a process in which a welding electrode is applied under heavy pressure at the spot to be welded, a heavy pulse of current

is shot to the electrode and the electrode contact pressure is continued until the weld nugget is sufficiently cooled. (K3n; 4-53)

100-K. Welding or Brazing Dissimilar Metals. Jay Bland. Product Engineering, v. 31, Dec. 19, 1960, p. 46-49.

Techniques used to secure integral joints in the welding or brazing of dissimilar metals including stainless steel, Inconel, Zircaloy and carbon steel. Mechanical and thermal properties of various weld combinations. Stress relief heat treatment is used to reduce weld distortion. 5 ref. (K-general, J1a; CN, Ni-b, SS, Zr-b)

101-K. How Friction Welding Joins Bar Stock and Tubing. R. R. Irving. Iron Age, v. 186, Dec. 29, 1960, p. 47-49.

Metals, ceramics and plastics are friction welded on a lathe-like machine by rotating one upon the other at 2000-12,000 rpm, under pressure of 10,000 psi. (K6; 4-60)

102-K. "Square Butt" Welding Aluminum. Light Metal Age, v. 18, Dec. 1960, p. 18.

Joining of heavy wall Al cylinders by a square butt welding process in which one pass welds are made on square machined joint edges at low current densities under Ar shielding. (K-general, K1d; Al, 4-60)

103-K. Aluminum Window Assembly Speeded by Change to Soldering. Light Metal Age, v. 18, Dec. 1960, p. 20.

An Al stick solder requiring no flux is used to join Al storm windows and screens previously assembled by mechanical methods. (K7; Al)

104-K. The Metal-Arc Welding of Stainless Steels. M. C. T. Bystram. Edgar Allen News, v. 39, Dec. 1960, p. 273-275.

Techniques for bonding corrosion resistant stainless steel linings to mild steel backings by square edged butt welding and for depositing a thin Cr-rich layer on mild steel by the chemical decomposition of Cr chlorides and fluorides at controlled temperatures. (K1g, L22; CN, SS, Cr)

105-K. Vickers Aircraft Engineers Adopt Iron-Powder Electrodes. D. Meredith Jones. Lastechniek, v. 26, Nov. 1960, p. 224-226.

Metal-arc welding operations using Fe powder electrodes in the construction of the Vickers VC10 airliner. (K1g, T24a)

106-K. Production of High-Strength Bellows. Metal Industry, v. 97, Nov. 18, 1960, p. 423-424.

Fabrication of bellows joint from stainless steel and Monel sheet by automatic welding. The joint is used in pipelines to accommodate linear thermal expansion and contraction. (K-general, T26r; Ni-b, SS, 4-53, 17-57)

107-K. Push Button Machines Improve Brazing. J. Van Opynen. Industrial Gas, v. 39, Dec. 1960, p. 8-9.

Stellite inserts are brazed into steam-turbine blades by an automatic machine with 14 toggle clamps and two groups of nine refractory lined burners. (K8, W29; SGB-q)

108-K. (German.) Novel Metal Adhesives and Their Application. E. Bader. VDI Berichte, no. 46, 1960, p. 51-56.

Use of metal adhesives (Agomet U, Agomet R, Agomet E, VP 292 and VP 456) for metal-metal, metal-plastics, metal-glass and metal-diamond joints by electric and precision mechanical engineering. Mechanical and electrical properties. Selection of adhesives. (K12)

109-K. (German.) Economical Welding in Repair Shop. E. Frei. Technica, v. 9, Oct. 21, 1960, p. 1371-1372.

Horizontal, vertical and over-head repair-welding with coated and noncoated contact electrodes. Mechanical properties of welds, welding rate and welding time for various electrode compositions. (K1, W29h)

110-K. Short Arc Welding Slashes Reject Rate. Steel, v. 148, Jan. 9, 1961, p. 64.

Production of front end cones composed of 1020 steel for practice bombs. Sheets are cut to size, rolled into a cone and short arc welded in a jig. After welding, the cone is stretched to shape in a form die with a contoured punch. (K1, T2k; ST)

111-K. Stouter Metal, Weld Design Upgrade Trailer Ore Feeder. Steel, v. 148, Jan. 9, 1961, p. 77.

Oxy-acetylene welding of steel back and wear plates to form a pan feeder which handles ore, rock or gravel from dump trucks. Strength is built in by bending the edges of the reinforcing plates and adding a horizontal stringer along the outside lower edge of the hopper. (K2h; ST, 4-53)

112-K. High-Strength Structural Adhesives. E. F. Hess. Machine Design, v. 33, Jan. 5, 1961, p. 149-152.

Thermosetting films of the elastomeric-phenolic type made in continuous form are used to join metals and plastics at -80 to 600° F. Data are given for shear and peel strength of modified-epoxy adhesives and film adhesives. (K12)

113-K. Welding Plays Key Role in Aluminum Fishway. Robert Austin. Western Metalworking, v. 18, Dec. 1960, p. 46, 49.

6061 T6 Al alloy I beams, panels, rotary gates and wing gates are fabricated by Mig welding into a U-shaped channel, 50 ft. high and 16 ft. wide. (K1g, Al-b, 4-57)

114-K. Continuously Welded Rails. M. G. R. Smith. New Scientist, v. 8, Dec. 15, 1960, p. 1577-1579.

Continuous flash and thermit welding of railroad rails to eliminate buckling in track joints. (K3r, K4, T23q)

115-K. When a Clean Weld Is Needed. Charles E. Reeb. American Machinist/Metalworking Manufacturing, v. 104, Dec. 26, 1960, p. 68-69.

Two forgings of 1050 steel are joined to form a tractor track-roller using automatic submerged arc welding to prevent flash or foreign matter from getting into a lubricant recess at its center. (K1e; ST, 4-51)

116-K. 45,000,000 Watts Fabricate Chrysler Floor Pans. Raymond H. Spiotta. Machinery, v. 67, Jan. 1961, p. 102-107.

Resistance welding of steel sheets to form floor pan assemblies using a bank of several press welders integrated by automation. (K3, T21c; ST, 4-53)

117-K. Designing Ferrous Parts for Furnace Brazing With Copper. E. C. Buckingham. Machinery, v. 67, Jan. 1961, p. 125-137.

Permanent joining of two or more ferrous parts above 800° F. by atomic bonding through the intermediation of a fused nonferrous filler metal whose melting point is lower than that of the base metal. Parts may be heat treated, annealed, carburized or nitrided after bonding. Data are given to show the relationship between brazed joint strength and temperature for Ni-Si-B alloy joined with Cu brazing fillers. (K8j; Ni-b, SGA-f, Cu-b, 17-57)

118-K. Single Pass Joining With Square Butt Welding. Pacific Factory, v. 101, Dec. 1960, p. 20.

Production of heavy wall Al cylinders using square butt Mig welding also known as high-current welding. Welding proceeds with less total heat input and at greatly increased speeds. (K1d; Al)

119-K. Welding Dissimilar Metals. Metal Industry, v. 97, Dec. 1960, p. 461-462.

Low temperature arc welding of metal combinations such as Cu to steel, Ni to steel and of ferrous materials in which the welding process is based upon diffusion phenomena and requires only low heat input. (K1; Cu, Ni, ST)

120-K. Foil Brazing of Honeycomb Panels. Modern Assembly Practice, v. 2, Jan. 1961, p. 5-6.

Graphite cloth brazing using a platen incorporating graphite cloth, heating elements and glass rock brazing with glass-ceramic platens of stainless steel honeycomb sandwich panels for airframes. (K8, T24a; ST, 4-57)

121-K. (German.) Experiences in Sigma-Welding With "Coxogen" (Protective Gas Mixture for Gas-Shielded Welding). S. Hausotter. Schweisstechnik, v. 14, 1960, p. 128-131.

Use of "coxogen" as protective gas in semi-automatic horizontal and nonhorizontal Sigma welding of unalloyed steels to eliminate susceptibility to porosity. Welding parameters such as efficiency, welding current, preparation of seam and gas and electrode consumption. Mechanical properties of welds. (K1d, K9; ST)

122-K. Ceramic Tooling and Honeycomb Brazing Fixtures for Supersonic Aircraft

Production. J. D. Walton and N. E. Poulos. American Ceramic Society Bulletin, v. 39, Dec. 1960, p. 740-748.

Simultaneous forming and heat treating of stainless steel using ceramic dies of bonded fused silica. Blanket brazing of honeycomb stainless steel panels at 1700° F. using fixtures of rebonded fused silica and an alloy of Ag, Cu and Li. Comparison with furnace brazing. (K8, G-general, J-general; SS, 4-57)

123-K. The Flash-Butt Welding of Wheel Rims for the Motor Industry. D. D. Williams. Current Engineering Practice, v. 3, Sept. 1960, p. 25-28.

Steel composed of 0.2% C, 0.5% Mn, 0.02% S and 0.03% P and supplied in hot rolled profiles is cut and bent, then flash butt welded on a rim welding machine. (K3r, G17, G6, T21e; ST)

124-K. New Boons to Brazing. Mill and Factory, v. 68, Jan. 1961, p. 79.

Development of Ag alloy brazing filler metal with a core of flux to assure correct combination of brazing alloy and flux. Description of a brazing and hard facing process in which powdered metals are simultaneously sprayed and fused on a base metal by an oxy-acetylene flame. (K8, L24)

125-K. Stainless Steel Foil Sticks Tight. Steel, v. 147, Dec. 26, 1960, p. 68-69.

302 stainless steel foil coated with a pressure sensitive adhesive is used as a corrosion resistant covering or trim. (K12; SS, 4-56)

126-K. (Slovakian.) Butt Welding of Thin Transformer and Dynamo Sheet. Ladislav Muncner. Zvaracsky Sbornik, v. 9, Mar. 1960, p. 259-276.

Sheets of 0.35-0.5 mm. thickness containing 0.04-0.13% C, 0.025-0.50% Mn, 1-4.6% Si, 0.015-0.07% P, 0.009-0.04% S, 0-0.03% Cr, 0.15-0.25% Cu and 0-0.15% Ni are Tig welded, oxy-acetylene welded or resistance welded. Data are given for tensile strength and alternate bend strength in the welded state and after annealing at 860° C. for 1 hr. followed by furnace cooling. 3 ref. (K1d, K2h, K3, Q27a, Q5g; SGA-n)

127-K. (Czech.) Strength of Weldments From 10523.3 Steel. Vladimir Gregor. Zvaracsky Sbornik, v. 9, Mar. 1960, p. 277-303.

15 mm. thick sheet is butt welded by the submerged arc process. Fatigue strength and notch sensitivity of weldments and base material are tested. Fatigue testing of 10523.3 steel structural shapes. (K13, Q7, Q23s; ST, 4-53)

128-K. (Slovakian.) Development of Ferritic Layer in Resistance Butt Welded Carbon Steels. Pavol Galan and Marcel Zitnansky. Zvaracsky Sbornik, v. 9, Mar. 1960, p. 367-381.

Micrographic tests performed on weldments of a steel containing 0.14% C, traces of Si, 0.43% Mn, 0.016% P and 0.005% S show that the ferritic layer has not formed. It is assumed that the decarburization occurring during welding is not sufficient for the formation of ferrite. 21 ref. (K3, N8j, M21; ST)

129-K. (Czech.) Soldering and Brazing. Otakar Moravek. Zvaracsky Sbornik, v. 9, Mar. 1960, p. 382-397.

Theory of soldering and brazing with Cu-base, Ag-base and Al-base solders. Quality of soldered assemblies depends on fluidity of solder, capillary effect, surface tension and diffusion. 7 ref. (K7, K8; SGA-f)

130-K. (Czech.) Welding of Nickel-Free Austenitic Stainless Steel of the CrMnN Type, in a Protective Atmosphere. Karel Lobl and Adolf Kabrhel. Zvaranie, v. 9, Oct. 1960, p. 286-290.

Sheet and tubing of CSN 17241 or CSN 17242 steel containing nominally 0.1% C, 15% Mn, 0.8% Si, 17% Cr, 0.5% Mo and 0.35% N are resistance or arc welded. Corrosion resistance of welds is measured in citric acid, CH_3COOH, NaCl, HNO_3, lactic acid, formic acid and oxalic acid. 7 ref. (K1, K3, R7; ST, 4-53, 4-60)

131-K. (Slovakian.) Procedures in Electroslag Welding. Pt. 1. Martin Mosny. Zvaranie, v. 9, Oct. 1960, p. 290-293.

Determination of welding parameters including amperage and voltage. Use of an auxiliary electrode or metal shavings to start the welding process. (K6)

132-K. (Czech.) Repair Welding of Reactor Vessels for Hydrogenation Damaged by Bomb Splinters. Rudolf Halbich. Zvaranie, v. 9, Oct. 1960, p. 296-301.

Material which showed cracks during electromagnetic or ultrasonic testing is removed by grinding. Reactors are then preheated to 350° C. in a gas-fired special furnace built around them, then welded with a 5-mm. diameter E-N5 electrode at a current of 200 amp. 5 ref. (K1, 18-72, G18; T26q)

133-K. Silver Brazing. M. W. McKinley. Welding Fabrication and Design, v. 4, Nov. 1960, p. 7-13.

Review of methods including selection of fluxes based on fused borax, borates, fluoborates and fluosilicaborates, selection of brazing material and methods of torch, furnace and electrogas brazing. (K8; SGA-f)

134-K. Welded Titanium Tubing Curbs Corrosive Attack of Acids. Iron Age, v. 187, Jan. 12, 1961, p. 68-69.

Ti legs, spacers and risers are arc-welded to heat exchanger units using a modified Heliarc welding gun, a cannister packed with Cu turnings to diffuse argon over the weld zone and a bronze diffuser to prevent argon from seeping away from the weld zone. (K1d, W13b; Ti, 4-60, 17-57)

135-K. (German.) Production Problems Caused by Welding in Ship Building. P. Werf. Industrie-Anzeiger, v. 82, Nov. 25, 1960, p. 1637-1639.

Faults caused by residual stresses in arc-welded ship parts where stress-free annealing is impossible. Approximate evaluation of stresses depending on ship construction. Control of deformation of ship-body by proper sequence of construction operations and by autogenous spot-wise heat adjustment. (K1, J1, T22g; 7-51)

136-K. Welding Research--Programme of the British Welding Research Association. Iron & Coal Trades Review, v. 181, Oct. 28, 1960, p. 935-937.

Review of welding research. Major topics covered are wide plate testing for brittle fracture of ferrous and nonferrous alloys; steel composition and microstructure as affected by aging; yield point, yield-ultimate ratio and microstructure of mild-steel weld metal; and heat affected zone studies. (K-general, Q-general; CN, ST)

137-K. Braiding Machines and Metal Braid. W. Douglass. Wire Industry, v. 27, Nov. 1960, p. 1087-1090.

Braiding of Cu or steel wire into narrow ribbons, cords or tubes using two types of maypole machines to produce symmetric or asymmetric diamond braids. (K13s; Cu, ST, 4-61)

138-K. (German.) Electroslag Welding. W. Krieweth. Industrie-Anzeiger, v. 82, Nov. 22, 1960, p. 1622-1629.

Process and machinery for automatic electroslag welding of vertical and tangential seams in steel machine parts over 40 mm. thick. Reactions between slag and metal under various welding conditions. (K6; ST)

139-K. (German.) Welded Aluminum Heavy Derrick for Sea-Going Freighter. Victor Rosch. VDI-Zeitschrift, v. 102, Dec. 11, 1960, p. 1752-1757.

Design and construction by sigma welding of a 6.2 ton AlMgSiF32 alloy derrick of 152 ton safe loading capacity. (K1d, T28n; Al-b, Mg, Si)

140-K. (German.) Aluminum Domes. Rudolf Lang. VDI-Zeitschrift, v. 102, Dec. 11, 1960, p. 1758-1761.

Construction of a plastic covered cantilever dome consisting of AlMgSi1-F32 alloy tubes of 70 mm. diameter and 3-4 mm. wall thickness joined into triangles by galvanized screw joints in AlMgSi1F20 circles. Data for buckling strength and rigidity of the structure. (K13p, T26; Al-b, Mg, Si, 4-60)

141-K. Electron Beam Welding Those Hard-to-Join Metals. Mars Hablanian. Assembly & Fastener Engineering, v. 4, Jan. 1961, p. 36-40.

Applications to metals that must be welded in vacuum or an inert gas atmosphere, dissimilar reactive and refractory alloys and extremely thin sections. Machine settings and results are tabled for welding of Zircalloy, Mo, stainless steel, Cb, Ta and V-Cb alloy. (K6; Cb-b, Mo, SS, Ta, Zr-b)

142-K. Soldering, Welding Miniature Products. Assembly & Fastener Engineering, v. 4, Jan. 1961, p. 44.

Description of an ultrasonic micro-joining unit for fluxless soldering and heatless welding. Micro-joining operations include the welding of 0.004 in.

diameter Au wire; welding 0.002 in. diameter CP Ni leads; soldering Au wire on 0.003 in. Al foil and joining 0.0015 in. Au-Ga alloy. (K7h, K6r; Al, Au-b, Ni, 4-61)

143-K. Axles Welded in a Vapor Shield. R. H. Eshelman. Iron Age, v. 187, Jan. 19, 1961, p. 78-80.

Control arm brackets are welded onto rear axle housings on a mechanized auto line using a new arc welding process in which a thick vapor shield, composed of vaporized compounds having different condensation temperatures, protects metal transfer through the arc. (K1d, T21)

144-K. Tooling Up to Weld Refractory Metals. Fansteel Metallurgy, Dec. 1960, p. 2-3.

Tig welding of W, Mo, Ta and Cb in an inert gas chamber by an automatic airline (Tig) welder with automatic lateral and vertical motion provided for the torch and automatic longitudinal and rotational motion for the carriage. (K1g; Cb, Mo, Ta, W)

145-K. Vapor-Shielded Arc Welding at 200 Rpm. R. A. Wilson. Welding Journal, v. 40, Jan. 1961, p. 13-17.

Welding sheet and plate metal using a cored bare electrode to provide a vaporized shield and clean surface for good electrical contact. The tubular wire is filled with granular and chemical ingredients which boil in the arc heat and then condense to a vapor which shields and deoxidizes the weld metal. (K1d, W29h; 4-53)

146-K. Electrode for Spatter-Free Welding of Steel in Carbon Dioxide. Everett Cushman. Welding Journal, v. 40, Jan. 1961, p. 14s-21s.

Metal-arc welding of mild steel using electrode wire coated with Cs and Na compounds forming a thin coating which does not interfere with electrical contact between the wire and welding equipment. Rigid control of arc length is no longer required. (K1d, W29h; CN)

147-K. Arc Welding of a Ni-Cr-Fe (Inconel) Alloy for Nuclear Power Plants. Jay Bland and W. A. Owczarski. Welding Journal, v. 40, Jan. 1961, p. 22s-32s.

Inert-gas metal-arc, inert-gas tungsten-arc and shielded metal arc welding of Inconel to clad carbon steel and form structural joints. (K1d, L22; CN, Ni-b)

148-K. Inert-Gas Spot Welding in the Aircraft and Missile Industry. R. L. Hackman. Welding Journal, v. 40, Jan. 1961, p. 25-33.

Fabrication of high-strength low-weight ratio structures from high-tensile steels such as 17-7 pH and 15-7 Mo by tungsten arc spot welding. Consideration of welding parameters including current, welding time, arc length and electrode shape. (K1, K3n, T24a; SS)

149-K. Bonuses From Welding With CO_2 and Flux-Cored Wire. Welding Journal, v. 40, Jan. 1961, p. 41.

Tensile and bend properties of carbon steel welds made on pressure vessels and bushings, using a combination of wire drive unit, air-cooled gun, CO_2 shielding gas and flux-cored wire. (K1d, Q27, Q5; CN)

150-K. (Italian.) Automatic Submerged Arc Welding. Pt. 1. Franco Calcaterra. Rivista di Meccanica, v. 11, Aug. 1, 1960, p. 9-16.

Definition and general features of process. Design and operation of an automatic installation, including welding, head, head and work positioners, and regulation and control devices. Factors in choice of a-c. or d-c. current. (To be continued.) (K1e, W29)

151-K. Status of Welding Processes in Europe. Maximilian Komers. Metal Progress, v. 79, Jan. 1961, p. 107-112.

Notable progress has been made in the production of strong, tough steels of good weldability and in devising various schemes for delivering powdered flux and protective atmospheres simultaneously to the arc. Electroslag welding is still under experimental study. (K1)

152-K. Bonding Steel With Plastics. Karl Mohler. Metal Progress, v. 79, Jan. 1961, p. 195-196. (Digested from VDI Zeitschrift, Jan. 1, 1959, v. 101, p. 1-8.)

Joining structural members of steel bridges by gluing together with phenolic resins, epoxy resins and unsaturated polyester resins. (K12, T26p; ST)

153-K. Adhesive Bonded Metal Tubing Holds Promise for Missile Bodies. Steel, v. 148, Jan. 16, 1961, p. 76-77.

Fabrication of missile engine cases by winding alternate layers of steel or Ti strips and adhesive around a cylindrical Al mandrel. Techniques used in curing the tubes and adding end rings. Dimensions and strength properties of the finished tubes. (K12, T24e; ST, Ti, 4-53)

154-K. Special Fasteners for Aluminum. Pt. 2. Bolt Type Fasteners. H. Hinxman. Metal Industry, v. 97, Dec. 16, 1960, p. 495-497, 504.

Mechanical fastening of Al sheets by Huckbolts consisting of an Al alloy bolt and locking collar; Jo bolts consisting of a heat treated steel nut and bolt and stainless steel sleeve and by stainless steel studs. Tables of chemical composition and mechanical properties of certain Al alloys used in the manufacture of rivets and fasteners. (K13; Al, 4-53)

155-K. Special Fasteners for Aluminum. H. Hinxman. Metal Industry, v. 97, Dec. 9, 1960, p. 475-477.

Mechanical fastening of Al by blind rivets and bolt-type fasteners made of B.S. L58, L69 and 3L37 Al alloys. Setting sequence for various types of rivets. (K13; Al, 4-53)

156-K. (Czech.) Starting Procedures in Electroslag Welding. Martin Mosny. Zvaranie, v. 9, Nov. 1960, p. 326-330.

Start is facilitated by addition of powdered Fe or Fe alloys to give the electrode end an adequate shape, addition of thermite mixture, use of an auxiliary electrode, insertion of a semiconductor material between electrode and bottom of weld or addition of liquid slag. 5 ref. (K6)

157-K. A Guide to Blind Riveting. Australasian Manufacturer, v. 45, Nov. 19, 1960, p. 52-53, 55.

Dimensions, ultimate tensile strength and recommended hole dimensions are given for blind rivets composed of Monel, mild steel and Al-Mg alloy. (K13n, T7f; Al-b, CN, Mg-b, Ni-b, 17-57)

158-K. Design Details of Blind Riveted Joints. Australasian Manufacturer, v. 45, Nov. 19, 1960, p. 54-55.

Diagrams and dimensional specifications for blind riveting of Al, cast iron and plastics. Methods of countersinking and sealing of rivets. (K13n; Al, CI, NM-d30, NM-d31)

159-K. New Concept in Cast Iron Welding. Australasian Manufacturer, v. 45, Nov. 19, 1960, p. 80-82.

Cast iron welds which can be immediately cooled with water or compressed air are produced by cutting antistress grooves in the weld area, sealing the surface to avoid porosity and welding by back-step stringer passes of 1-4 in. (K1; CI)

160-K. New Adhesive Films Give Optimum Glue Line in Honeycomb Structures. Materials in Design Enginnering, v. 53, Jan. 1961, p. 12-14.

Self-filleting unsupported film adhesives with high tensile and shear strengths are used to bond the skin to the core and form structural fillets between the skin surface and the inside cell walls of the honeycomb core. (K12; 7-59, NM-d34)

161-K. 45 Years of Welding. Welding Engineer, Jan. 1961, p. 31-34.

Review of the history of welding processes including development of gas and arc welding, resistance welding and newer techniques such as electroslag, electron-beam and plasma heat welding and explosive forming and cutting. (K-general, G-general, NM-k34)

162-K. American Laboratory Studies Practical Friction Welding. Welding Engineer, Jan. 1961, p. 39.

Advantages of friction welding, a process in which metal, ceramic or plastic workpieces are heated by sliding or rotating them in contact with each other. Evidence is presented to show that a layer of fluid metal is formed at the interface of the two objects and acts as a hydrodynamic thrust bearing or pressure lubricant. (K6)

163-K. Army Shipments Travel in Welded Steel Containers. Welding Engineer, Jan. 1961, p. 48.

Fabrication of corrugated steel boxes by butt, arc and resistance welding. Welds must be free from excessive porosity, overlap, entrapped slag,

undercut and burn through. (K-general; ST)

164-K. Survey of Welding Metallurgy Shows Problems and Solutions Encountered in Fabrication. W. H. Bruckner. Welding Engineer, Jan. 1961, p. 72-74.

Methods of preventing grain boundary carbide precipitation, unfavorable stress states and contamination when welding structural steels. (K9; ST, SGB-s)

165-K. Square-Butt Mig Welding Joins Aluminum Cylinders. Welding Engineer, Jan. 1961, p. 75-76.

Joining of heavy-wall Al cylinders for nuclear equipment by a new high current welding process in which arc instability is overcome by improved gas shielding and wire quality and use of a slope-controlled power supply. (K1g, K-general; Al, 4-60)

166-K. All-Welded Tank Cars Are World's Largest. Welding Engineer, Jan. 1961, p. 78.

Fabrication of railroad tank cars with 30,000 gal. capacity from structural steel sections by manual metal arc and submerged arc welding. (K1, T23p; ST, SGB-s)

167-K. Ceramic Blanket Brazing. Metalworking Production, v. 104, Dec. 28, 1960, p. 49-50.

Three brazing techniques for contoured stainless steel honeycomb panels based on replacing graphite with ceramic platens, which are resistance-heated by flat Nichrome strips. (K8j; SS, 4-57)

168-K. Magnetic Force Welding. C. A. Rowlands. Welding and Metal Fabrication, v. 28, Dec. 1960, p. 474-481.

Magnetic force welding sintered Ag to brass or Cu blanks using a welding machine which can maintain an indirect relationship between heat and electrode pressure thereby compensating for minor variations in power and workpiece contact resistance. (K3, W29, 1-52; Ag, Cu-b, 6-72)

169-K. Recent Work on Pressure Welding. R. F. Tylecote. Welding and Metal Fabrication, v. 28, Dec. 1960, p. 491-494.

Survey on the possibility of pressure welding steel tubes, foils and Zr, Ti, Cu, Zn, Mg, Fe-C and Au-Ge alloys. Methods of surface preparation and mechanisms of oxide film breakdown. Mechanical properties of pressure welds. (K5; 4-56, 4-60)

170-K. Fabricated High Duty Boilers. Welding and Metal Fabrication, v. 28, Dec. 1960, p. 503.

Boiler tubes are butt welded to short stubs which form an integral part of the boiler drums using a multirun seam welding procedure and a double U-type edge preparation. (K3p, T26q; 4-60)

171-K. Welding of Columbium and Columbium Alloys. W. J. Lepkowski, R. E. Monroe and P. J. Rieppel. Defense Metals Information Center, Battelle Memorial Institute, DMIC Memo. 69, Oct. 24, 1960, 30 p. (Available as PB 161219 from U. S. Office of Technical Services, Washington 25, D. C.)

Evaluation of Mig, Tig, ultrasonic, resistance, diffusion bond and electron beam welding techniques used on available Cb and Cb alloys to meet the requirements of oxidation resistance and high strength at elevated temperatures in weldments. Data for mechanical properties of welds. (K-general, Q-general, R1h; Cb-b)

172-K. Vapor Shield Speeds, Upgrades Welds. Steel, v. 148, Jan. 30, 1961, p. 99.

Semi-automatic joining of open web steel joists using a hollow electrode which is fed through a hand welding gun. Materials in the core volatilize to provide a vapor shield, deoxidizer and flux. (K1d; ST, 4-57)

173-K. (Swedish.) Friction Welding. Teknisk Tidskrift, v. 90, Nov. 18, 1960, p. 1169-1171.

Cylindrical parts of 10-20 mm. diameter composed of mild steel containing 0.20% carbon, carbon steel containing 0.45% C, alloy steel with 0.12-0.40% C, 0.75-13% Cr and 0.25-2% Ni, 60/40 brass and brass containing 58% Cn, 2% Mn and 40% Zn are welded. Relationship between upsetting occurred in welding and tensile, impact and bend strengths of weldments. (K6, Q27a, Q6n, Q5g; AY, CN, Cu-b)

174-K. (Russian.) Welded Structures. G. A. Nikolaev. Svarochnoe Proizvodstvo, Dec. 1960, p. 2-6.

Description of various types of modern welded structures used in ship building, metallurgical machine construction and automobile manufacture, as displayed at a welding exhibition. Application of new increased strength steels with yield point of 30 kg. per sq. mm. and resistance to brittleness at low temperatures in these structures. (K-general; SGB-a, SGB-r, ST, 4-57)

175-K. (Danish.) Welding in Atomic Power Plants. R. W. Nichols. Ingenioren, v. 69, Oct. 15, 1960, p. 592-598.

Arc welding of Monel 60, 130 and 140, vanadium, Cb and various alloy steels. Influence of relief annealing for 48-100 hr. at 600° C. and of neutron irradiation on transition temperature for the embrittlement of base and filler metal. 6 ref. (K1, Q23r, 2-64, 2-67; AY, Cb, Ni-b, V)

176-K. (Swedish.) Welding of Aluminum. Erik Karlsson. Teknisk Forum, no. 16, 1960, p. 258-260.

Survey on welding methods for Al and other light metals including soldering, gas welding, arc welding, Tig welding and Mig welding methods. Joint design. (K-general; Al)

177-K. Joining Aluminum Alloys. Metal Industry, v. 97, Dec. 30, 1960, p. 538.

Development of a paste compound that gives high strength corrosion resistant joints on Al and Al alloys and requires no finishing or after treatment. (K6; Al-b)

178-K. Diffusion Method Bonds Copper Perfectly. Steel, v. 148, Jan. 23, 1961, p. 55.

Joining of Cu-to-Cu and Cu-to-alloy bonds by a new diffusion bonding technique in which components to be joined are coated, then heated to 1700-1800° F. in a hydrogen or inert gas atmosphere. (K5k; Cu)

179-K. (French.) Welding and Brazing of Copper and Its Alloys. Cuivre-Laitons-Alliages, Sept-Oct. 1960, p. 3-11.

Methods and principles for flame and arc welding and brazing of Cu with attention to elimination of refractory oxides, metal losses, internal tensions, intergranular fissuration and other harmful effects. (K1, K2, K8; Cu-b)

180-K. (German.) Tests on Tubes With Induction Welded Longitudinal Seams. T. Furkel. Schweissen und Schneiden, v. 12, Dec. 1960, p. 517-525.

Automatic pressure welding of tubes of unkilled unalloyed 0.08-0.13% C openhearth steel. Results of chemical examination, nondestructive X-ray and ultrasonic testing, mechanical testing at 20 and 400° C., flanging, folding, busting, roll-in and bending tests, aging and microstructural investigations. (K5, S13, Q-general, N7a, M27; ST, 4-60)

181-K. (German.) Inductive Welding of Longitudinal Seams of Tubes. D. Kronauer and M. Thiele. Schweissen und Schneiden, v. 12, Dec. 1960, p. 525-530.

Mechanism of inductive fusion welding above liquidus temperature and inductive pressure welding below solidus temperature of steel tubes is discussed in terms of formation of metal bond, diffusion and recrystallization. Interpretation of reactions using the Fe-C phase diagram. Macrostructure and microstructure of seam. (K6n, K5, N1, N5f; ST, 4-60)

182-K. (German.) Welded Live Rings for Swivelling Cranes. A. Bucholz. Schweissen und Schneiden, v. 12, Dec. 1960, p. 530-532.

Production of live rings from rolled CK 45 steel (0.42% C) by welding of bearing surface with special electrodes composed of 0.15% C, 0.5% Si, 1.44% Mn, 0.14% Cu, 0.80% Cr and 0.05% Mo to obtain high strength and wear resistance. Comparison of strength and production costs of seamless forged and welded live rings. (K1, W29h; ST)

183-K. How to Weld the Cobalt Alloys. W. J. Lepkowski and R. E. Monroe. Welding Design & Fabrication, v. 34, Jan. 1961, p. 37-39.

Welding guide for Co alloys of the Fe, Ni or Co base types. Material thickness, current in amperes for various electrode diameter, arc voltage, weld speed and argon flow rate given for each major alloy type. (K-general; Co-b, Fe-b, Ni-b)

184-K. Unique Design: 39 Steel Cylinders Replace One Vessel. Welding Design & Fabrication, v. 34, Jan. 1961, p. 40.

Swaging and seal welding of one end of high strength seamless steel tubing into 39 air storage bottles to form a high pressure air storage receiver for a supersonic wind tunnel. Cylinders are stress relieved by heating to 1150° F. with oxy-acetylene flame, air cooled and tested hydrostatically at 3000-4500 psig. (K1, F25, T26q; ST, 17-57)

185-K. CO_2 Welding Saves GM $8000 a Month. Welding Design & Fabrication, v. 34, Jan. 1961, p. 49-50.

Rectangular electric motors are produced on a conveyorized welding system using automatic CO_2 welders to join the motor pole-piece to the rectangular frame, both of low carbon, electrical quality steel. (K1d, W11q; CN-g, 17-57)

186-K. Technique for Fabricating and Welding Aluminum Tank Cars. J. F. O'Connell. Welding Design & Fabrication, v. 34, Jan. 1961, p. 52-55.

Tank cars are fabricated from 5052, 5052-H-112, 6061-T-6 Al and 6063-T-42 Al alloy plate by automatic and manual inert gas-consumable electrode arc welding. Data are given for process parameters and weld quality as determined by radiographic inspection. (K1d, T23p; Al-b, 4-53)

187-K. Technique for Faster, Cheaper Welding of Heavy Al Plate. Welding Design & Fabrication, v. 34, Jan. 1961, p. 56-57.

Square-butt, or high-current, welding of 1 1/4 in. Al plate into cylinders for the nuclear industry using sigma equipment. Parameters are given for joint design, edge preparation, welding speed and wire feed notes, welding current and argon shielding flow for plate of varying thicknesses. Weld quality is examined by radiographic testing. (K1d, T11; Al-b)

188-K. Filler Wire Is Key to New CO_2 Spray Arc Welding Process. C. R. Sibley. Welding Design & Fabrication, v. 34, Jan. 1961, p. 60-63.

Semi-automatic welding of steel plates and shapes producing sound weld metal by adjusting filler wire composition for deposition by a CO_2 open spray arc. Effect of arc length, travel speed, gun angle on bead shape and penetration determined at 240-280 amp. and 18-22 volts. (K1d; ST)

189-K. Four Methods for Brazing B-70 Stainless Honeycombs. Welding Design & Fabrication, v. 34, Jan. 1961, p. 64-65.

Precipitation hardening steel, PH 15-7 Mo (containing 15% Ni, 7% Cr and some Mo), is brazed into stainless steel honeycomb panels at 1625° F. using Ag-Cu alloys in luminous wall furnace, furnaceless, salt bath and die quench brazing methods. (K8, T24a; SS-e, 7-59)

190-K. Oil Storage Tanks. A. B. Fieldhouse. Welding and Metal Fabrication, v. 29, Jan. 1961, p. 2-7.

Method for welding vertical seams on large steel storage tanks. Plate preparation, electrode consumption and welding speeds for vertical downward butt welds. Results of mechanical tests on weldments. (K-general, K1, T26q; ST)

191-K. Nuclear Fuel Handling Equipment. T. J. Palmer. Welding and Metal Fabrication, v. 29, Jan. 1961, p. 8-21.

Fabrication of welded charge face machinery for a nuclear power station using both gas and arc welding for steel sheet and structural materials. (K-general, T11q; ST)

192-K. Fusion Welding of Titanium and Its Alloys. W. G. Hull. Welding and Metal Fabrication, v. 29, Jan. 1961, p. 24-31, 36.

Review of the problems of atmospheric contamination and hydrogen embrittlement and their effect on joint properties. Prevention of contamination during welding by using vacuum purged and flow purged welding chambers and by inert gas protection in open air welding. (K1d, Q26s; Ti-b)

193-K. The Theory and Practice of Spot Welding. Douglas D. Williams. Welding Fabrication and Design, v. 4, Dec. 1960, p. 9-12.

Theory of the formation of a spot weld. Data are given for cold contact resistance between steel plates for varying electrode pressures and electrode dimensions for different plate thicknesses. Relation between current intensity, welding time and weld spot diameter. (K3n)

194-K. How to Join Beryllium. Metalworking Production, v. 105, Jan. 4, 1961, p. 19.

Fusion welding, diffusion welding, braze welding and furnace brazing techniques for Be. (K1, K5k, K8; Be)

195-K. Quality in Welding. E. Fuchs. British Welding Journal, v. 8, Jan. 1961, p. 4-9.

Review of weld quality in welded Al pressure vessels, pipe welds and welded mild steel tube. Illustrations of faulty flash, arc and oxy-acetylene welds. (K9, K1, K2h, K3r, T26q; Al, CN, 4-60)

196-K. Welding in the Production of Marine Oil Engines. J. A. Dorrat. British Welding Journal, v. 8, Jan. 1961, p. 10-17.

Materials and design consideration in planning mild steel engines to be welded by open or submerged arc process. Control of weld size, load carrying capacity, corrosion fatigue and distortion. (K1, T22h; CN, 17-57)

197-K. Welding Mission to the USSR. British Welding Journal, v. 8, Jan. 1961, p. 18-23.

Report on the following areas of Soviet welding technology: arc welding, surfacing by strip electrodes, inert-gas shielded arc welding, electro-slag welding, resistance welding, friction welding, gas welding and cutting and prefabrication of large storage tanks. (K-general)

198-K. Trolley Tools Work Honeycomb Panels. Metalworking Production, v. 104, Nov. 16, 1960, p. 67-68, 78.

Routing, welding and X-ray inspection of large stainless steel panels for aircraft and missiles, using separate trolley mounted tools for each operation. (K-general, S13e, T24; SS, 4-57)

199-K. New Welding Processes. John J. Chyle. Machine Production, v. 20, Jan. 1961, p. 19-23.

Survey of developments in and characteristics of ultrasonic, high frequency resistance, foil seam, magnetic force and percussion welding. Applications in welding refractory metals, Al, Cu, Zr and their alloys and stainless steels. (K-general, 10-54; Al-b, Cu-b, SS, EG-d)

200-K. Brazing of Sandwich Structures of Columbium Alloys. Mel M. Schwartz. American Society of Mechanical Engineers, Paper no. 60-WA-312, Dec. 16, 1960, 7 p. $1.

Brazing of refractory metals in a "cold wall" vacuum retort furnace at 3300° F. Test data show strength and ductility at 3000° F. under severe stress. (K8j, 1-73; Q27, Q23p, 1-66; Cb-b, 4-57)

201-K. Mig, Submerged-Arc Join Wind Tunnel Parts. S. J. Buell, Welding Engineer, v. 45, Dec. 1960, p. 37.

Multi-power submerged arc welding and Mig spot welding are used to fabricate steel vessels for wind tunnel sections and line them with stainless steel. (K1; SS, 4-53)

202-K. Tig Welded Insert Ring Helps Increase Pipe Quality. C. H. Voelker. Welding Engineer, v. 45, Dec. 1960, p. 46-47.

Preplaced filler metal in the form of an insert ring is used to give high quality root welds in pipes designed for severe and cyclic services. (K1d, W29h, T26r)

203-K. Controlled Angle Tig Torch Simplifies Cabinet Welding. Forde M. Simms and John V. Warinsky. Welding Engineer, v. 45, Dec. 1960, p. 50.

Fabrication of a Mg-alloy cabinet for missiles by using a flexible, telescoping welding torch to reach recessed corners through restricted openings. (K1d, W29d; Mg-b)

204-K. Brazing Used for Tube Cooling Parts. Welding Engineer, v. 45, Dec. 1960, p. 57.

Cu tubes are brazed to sheet metal fins by Ag and Au brazing alloys to form cooling radiators, devices which dissipate the heat from tubes in electronic equipment. (K8; Cu, 4-60)

205-K. Technical Control of Welding in the Steel Foundry. M. G. Hipkins. Foundry Trade Journal, v. 110, Jan. 3, 1961, p. 3-9.

Steel alloy castings are repaired and fabricated by metallic arc welding with covered electrodes, Tig and Mig welding, submerged-arc welding and electro-slag welding. Post-weld treatments include

stress relieving at 600-650 C. and normalizing at 830-880° C. (K1, K6, J1a, J24; ST, 5)

206-K. Producing Pipeline Valves by the Fabrication Method. Howard E. Jackson. Modern Machine Shop, v. 23, Feb. 1961, p. 116-123.

Channels, angles and plates are cut by multiple torches on a flame planar carriage, then beveled, vacuum blasted and submerged arc welded to form pipeline valves. (K1e, G22g, L10c, 1-73, T7b)

207-K. High Speed Welding of Center Sills. Modern Machine Shop, v. 33, Feb. 1961, p. 140-142.

Welding of 63 ft. longitudinal flat center sills by a semi-automatic arc welding process in which vapor shielding, deoxidizing and fluxing are all obtained with a tubular fabricated electrode containing filler metal. (K1d, W29h)

208-K. What's the State of Welding Behind the Iron Curtain? E. E. Claussen. Iron Age, v. 187, Feb. 2, 1961, p. 81-83.

Development and examples of application of electroslag welding in the Soviet Union. (K6)

209-K. Fastening Aluminum. Modern Metals, v. 16, Jan. 1961, p. 27-28, 30, 32, 34, 36.

Selection and heat treatment of aluminum alloy fasteners. Comparison of joining methods as to cost, equipment, speed, mechanical properties of joint and versatility. (K13, T7f; Al-b, 17-57)

210-K. Switch to Tig Welding Ends Repair Headache for Office Furniture Firm. Modern Metals, v. 16, Jan. 1961, p. 38.

Conversion to tungsten inert gas process for welding Al office chairs eliminates flux contamination and other problems associated with oxy-acetylene welding. (K1d, T10b; Al)

211-K. (German.) The Electron Beam as a Tool. Siegfried Panzer and Karl-Heinz Steigerwald. Elektrotechnische Zeitschrift, v. 81, Dec. 19, 1960, p. 925-932.

Method and apparatus for electron-beam melting, welding, cutting, soldering, milling, drilling, alloying and evaporation of metallic and nonmetallic materials. Design details of electron beam welding and milling machine. (K6, C-general, G-general)

212-K. Metal Bonding--the Better, Faster Way. Gilbert C. Close. Mill and Factory, v. 68, Feb. 1961, p. 116-117.

Production of metal bonded aircraft parts by spraying adhesive onto the sheet with an airless spray gun in a humidity and temperature controlled room. Parts are then mounted on a large pot platen and cured in an autoclave. (K12, T24; 4-53)

213-K. (German.) Repair Welding of Cast Iron. G. M. Blanc and Heinrich Edel. Schweisstechnik, v. 14, Dec. 1960, p. 133-139.

Review of autogenous and electric arc welding of gray and nodular cast iron using cast iron, steel, Cu alloyed, Ni alloyed and Ni electrodes. Soldering and brazing to repair cracks and holes in thin-walled parts. Microstructure and hardness of seam. (K1, K3, K7, K8, W29h; CI)

214-K. (German.) Processing and Machining by Electron Beams. K. H. Steigerwald. Schweisstechnik, v. 14, Dec. 1960, p. 139-141.

Electron beam milling and welding apparatus for treatment of high melting metals (Ti, Zr, W, Mo), sintered metals and nonmetallic materials including quartz. Milling of 40 micro-meter wide crossholes in steel die for spinning plastic fibers. (K6, G17b; SGA-h, Mo, Ti, W, Zr)

215-K. (German.) Tool Production and Repair by Arc Welding. Bela Zorkoczy. Industrie-Anzeiger, v. 82, Dec. 20, 1960, p. 1751.

Repair of composite steel machining tools and cracked hot forging dies by arc welding. Production of cold and hot working tools by deposit welding. Selection of electrodes. (K1, L24, T6; ST)

216-K. Welding and Heat Treating a 60 Ton Cryogenic Vessel. Warren H. Vetter. Metal Progress, v. 79, Feb. 1961, p. 88-90.

A huge storage tank for liquid oxygen was fabricated by joining 5 in. thick segments of type 321 stainless steel with 12,000 lb. of weld

metal. The entire tank was annealed after welding. (K1, J23, SS, 2-63)

217-K. Carbon Dioxide Simplifies Welding Mechanization. Mass Production, v. 36, Nov. 1960, p. 65-66.

Clean, self-disposing quality of carbon dioxide and high deposition rate of process make it suitable for mechanized welding of steel sheet. (K1d; ST, 4-53)

218-K. Welding Techniques for New Materials. L. M. Gourd and F. W. Copleston. Indian & Eastern Engineer, v. 101, July, 1959, p. 443-445.

Considerations in the inert gas shielded arc welding of Ti, Zr and Ta. Special gas shields and welding cabinets; welding conditions; physical properties of Ti, Zr and Ta. (K1d; Ta, Ti, Zr)

219-K. Welded Aluminum Suits Sonar. Welding Design and Fabrication, v. 34, Feb. 1961, p. 55-56.

Use of tungsten arc and resistance welding for the fabrication of light, strong, compact and corrosion resistant cabinets for seagoing sound system instruments. (K1, K3; Al)

220-K. Close Control of Preheating Temperatures Can Prevent Weld Failures. Helmut Thielsch. Welding Design and Fabrication, v. 34, Feb. 1961, p. 58-59, 62.

Preheating prevents cracking, provides a favorable metallurgical structure and minimizes weld shrinkage and distortion. (K9)

221-K. Developments in the Welding of Nickel and High Nickel Alloys in the Chemical Industry. J. Hinde. Australian Institute of Metals, Journal, v. 5, Nov. 1960, p. 254-263.

Preparation for welding; heat treating requirements; use of resistance, oxy-acetylene, argon and metal arc welding; weld finish and weld quality; clad steels, overlays and linings. 11 ref. (K1; Ni-b)

222-K. Two Passes Weld Heavy Plate. Iron Age, v. 187, Feb. 9, 1961, p. 120.

Mig welding of 2 in. thick Al plate in two passes by a high current density process which produces finer spray transfer from filler wire to weld pool, reduces weld contamination and permits escape of gases by maintaining a large, molten weld pool. (K1d; Al, 4-53)

223-K. Welding at Chalk River. J. V. Cornwell. Canadian Welder, v. 51, Jan. 1961, p. 12-14, 16-18.

Welding tests and specialized welding techniques used at an atomic reactor installation. Methods of remote control and induction pressure welding. Applications to stainless steel, Al alloys and carbon steels. (K-general, T11q; Al-b, CN, SS)

224-K. Welded Aluminum Watercraft. Harry Peacor. Canadian Welder, v. 52, Jan. 1961, p. 22.

Fabrication of a ferryboat from 5086 Al plate (2.5-5.5% Mg, 1% Mn) by automatic inert-gas welding using filler wire with a melt temperature of 1055° F. (K1d, T22; Al-b, 4-53)

225-K. Autos Eyed for Boost in Adhesive Joining. Steel, v. 148, Feb. 13, 1961, p. 125.

Use of adhesive bonding to join Al castings in an engine block, Mg frames and door and body sections having bonded sandwich structures. (K12, T21; Al, Mg)

226-K. (French.) Basic Principles of Electroslag Process. Goran Almqvist. Revue de la Soudure-Lastijdschrift, v. 16, Mar. 1960, p. 195-205.

Vertical welding of steel in a "sliding mold" by fusion of basic metal, deposit metal and flux to form a deep slag bath whose depth, viscosity, chemical composition, surface tension and conductivity influence the stability of the process. Description of equipment. (K6; ST)

227-K. (French.) Microfissures in Mild Steel Welds--Problem Synthesis. J. Sebille. Revue de la Soudure-Lastijdschrift, v. 16, Mar. 1960, p. 222-249.

Relation between hydrogen content in mild steel welds and formation of microfissures. Influence of electrode covers, storage, current density, atmospheric humidity, cooling speed and interpass temperature on cracking. Correlation between microfissuring and presence of inclusions. (K9, 2-60, 2-61, 9-72; CN, 7-51)

228-K. From Forging to Weldment. Production, v. 47, Feb. 1961, p. 72-73.

Production of tractor transmission cluster gears by arc welding two or three component alloy steel forgings, with most machining and tooth finishing done after welding. Use of a low hydrogen, Fe powder electrode permits faster deposition of metal. (K1, T3n; AY, 4-51)

229-K. Automatically Braze Stainless Honeycomb Panels. Production, v. 47, Feb. 1961, p. 86.

Brazing of high-strength stainless steel components for aircraft and space vehicles, using electronically controlled banks of radiant quartz lamps to heat panels to 1725° F. Process is also applicable to Cb and Mo. (K8, T24; Cb, Mo, SS, 4-57)

230-K. New Magnetic Test Includes Stainless Steels. Maxwell Pevar. Product Engineering, v. 32, Feb. 1961, p. 41-43.

Magnetic particle analysis of 301, 201, 302, PH 15-7, Mo and AM355, cold rolled stainless steel, medium carbon steel, 4130 and 4340 alloy steel used to determine spot weld and weld nugget size. Solution containing magnetic particles is sprayed onto parts held in a magnetic field. Particles migrate to outline any magnetic discontinuities. (K9r, S13j; AY, CN, SS, 7-51)

231-K. (Japanese.) Advances in the Glass Lining Techniques. Yuu Kawada. Metal Finishing Society of Japan, Journal, v. 11, Oct. 1960, p. 606-609.

Acid and mechanical shock proof glasslined steel is immersed in acid or alkaline solution to test corrosion resistance as influenced by microscopic defects and temperature. (K11a, R6, 2-61, 3-71; ST)

232-K. (Translation.) Special Features of the Use of a Polyisocyanate Adhesive for Bonding Rubber to Metal. B. G. Lipkina and M. V. Timofeeva. Soviet Rubber Technology, v. 19, Aug. 1960, p. 28-34. (A translation of Kauchuk i Rezina, Mar. 1960.)

The bond strength and adhesion of rubber bonded to steel by the adhesive leikonat (triisocyanate triphenyl methane) are measured by static direct pull tests after preheating at 80-140° C. to determine the optimum application conditions for preventing defect formation and change of properties during use. (K11c; ST)

233-K. Welding Transformer Tanks at Ferranti Ltd., Hollinwood, Lancs. Welder, v. 29, July-Sept. 1960, p. 61-63.

Mild steel plates are arc welded and fabricated into large transformer tanks weighing approximately 30 tons. Completed tanks withstand oil pressures of 12 psi. during 24 hr. test periods. (K1, T26q; CN, 4-53)

234-K. Reactor Gets Repair Free Welds. Iron Age, v. 187, Feb. 16, 1961, p. 106-107.

Production of flaw-free welds in Al-3.5% Mg alloy reactor components by Mig welding, using argon as a shielding gas. (K1d, T11; Al-b, Mg)

235-K. (German.) Autogenous Welding of Copper and Copper Alloys. G. Schreiber. Schweissen und Schneiden, v. 13, Jan. 1961, p. 7-12.

Welding of sheet, blast furnace tuyere and large machine parts composed of Cu, various bronzes, brass and "Kuprodur", a Ni-Si Cu alloy with neutral acetylene-oxygen flame or acetylene-oxygen flame with oxygen surplus. Influence of deoxidizers and residual elements in the components on weld quality. (K3, T7; Cu-b)

236-K. (German.) Selection of Current Sources for Automatic Welding. Schweisstechnik, v. 15, Jan. 1961, p. 1-5.

Matching of electrical power equipment to provide optimum current conditions for arc welding with alternating and direct current. Emphasis on argon arc and Ellira (under powder) welding. (K1, W29a)

237-K. (German.) Improvement of Welding Efficiency in Autogenous Welding of Thin Sheets. Hans H. Reinsch. Schweisstechnik, v. 15, Jan. 1961, p. 5-8.

Autogenous automatic and manual welding of 0.3-2.5 mm. thick steel sheet. Selection of gas mixture; welding techniques with and without additional wire; welding of butt, flanged, flat and fillet weld seams with efficiency being improved by use of two-flame burners. (K3; ST, 4-53)

238-K. Welding by the Mile. John Poulson and Charles L. Rundell. Metalworking, v. 17, Jan. 1961, p. 15.

Technology for metal inert gas shielded arc welding of new type Al

radar antennas by semiautomatic welding machines. Surface oxidation and contamination are checked by a surface resistance analyzer. (K1d, X15q; Al, 17-57)

239-K. (French-German.) Joining of Copper Tubes by Flanged Fittings. M. A. Moia. Pro-Metall, v. 13, Dec. 1960, p. 418-421.

Joining of Cu tubes for hot and cold water, gas and oil, pneumatic and hydraulic control lines by Cu flanged fittings. Comparison of flanged and soldered joints. (K13; Cu, 4-60)

240-K. Aluminum Windows by Mass Production. Light Metals, v. 24, Jan. 1961, p. 26-27.

Fabrication of window frames from Al extrusions and sheet metal using butyl adhesive dry glazing, flash and arc welding, P. K. self-tapping screws and mechanical joining methods. (K-general; Al, 4-53, 4-58)

241-K. Stud Welding Solves Handling Problem. Automation, v. 8, Feb. 1961, p. 85.

To prevent unrolling, ends of strip steel coils are stud welded as they come from the hot strip mill at 1000° F. An automatic positioner carrying a stud welding gun is used. (K1f; ST, 4-53)

242-K. Diffusion Bonding, Brazing Join Copper Parts. Welding Engineer, v. 46, Feb. 1961, p. 46.

Description of a new bonding technique in which a special coating on the metal surface diffuses into parts to be joined at 1700° F. in a hydrogen or inert gas atmosphere. Resulting bonds are without interface and are as strong or stronger than the base metal. (K5k, K8; Cu)

243-K. Tig Welding Cuts Costs 50% in Oxygen Line Fabrication. Welding Engineer, v. 46, Feb. 1961, p. 48.

Butt welding of 321 stainless steel by an automatic Tig process, using a torch mounted on an automatic welding machine. An automatic device built into the welding head compensates for eccentricities of alignment of the workpiece. (K1d; SS)

244-K. Fluxless Solder Cuts Aluminum Window Costs. Clyde James. Welding Engineer, v. 46, Feb. 1961, p. 53.

Cut to length Al shapes are heated to 720° F. by propane torches, soldered with fluxless, rub-on solder, then stress relieved to produce bonds up to 20,000 psi. tensile. (K7; Al)

245-K. Vapor Shielding Process Cuts Welding Time. Welding Engineer, v. 46, Feb. 1961, p. 54.

Metal-arc welding of I-beams and cover plates to form center sills by a process in which ingredients for vapor shielding, deoxidizing and fluxing are produced by a tubular, fabricated electrode containing metallic salts and oxides which vaporize in the intense heat of the arc. (K1d; 4-57)

246-K. (Pamphlet.) Submerged Arc Welds Meet Rigid Requirements for L. P. Gas Cylinders. Hobart Arc Welding News, AWN-165, Hobart Bros. Co., Troy, Ohio, p. 2-3.

Brazing and welding high-strength steel sheet to produce liquified petroleum gas cylinders. Testing of the parent metal, brazed seams and welds of cylinders for strength under pressure. (K1e, K8; ST, SGB-a, 4-53)

247-K. All Purpose Welders for Industry. Australasian Manufacturer, v. 45, Jan. 14, 1961, p. 30.

Welding of cast iron, mild steel, stainless steel, Cu, bronze and brass using specially designed arc welders with stepless current adjustment. (K1, W29; CI, CN, Cu-b, SS)

248-K. Lower Cost Sheet Metal Working. Australasian Manufacturer, v. 45, Jan. 14, 1961, p. 43.

Water tight, corrosion resistant welds are produced in 12 and 14 gage galvanized sheet metal using bronze rods and a carbon arc welding process. (K1; 4-52, 8-65)

249-K. Defects in Welding--Their Cause and Detection. L. Bracewell. Australasian Engineer, Dec. 1960, p. 87, 89.

Blow holes, porosity, penetration and undercutting in welded metal joints as related to voltage, current, welding speed, weld preparation, electrode composition and impurities. (K9)

250-K. (Spanish.) Electrodes With Iron Powder for Electric Welding. Jose Izaguirre Cobo. Ciencia y Tecnica de la Soldadura, v. 10, July-Aug. 1960, p. 1-5.

Comparison of contact welding with Fe powder electrodes and other arc welding processes. Gravimetric yield, fusion coefficient and ease of handling. (K1, W29h; Fe, 6, 17-57)

251-K. (Spanish.) Specialized Applications of the "Unionmelt" Process. Benigno Cuesta. Ciencia y Tecnica de la Soldadura, v. 10, July-Aug. 1960, p. 1-6.

Principles of the process. Application to the welding of butane bottles, thin plate and cylinder blocks. (K-general)

252-K. (Spanish.) Wear of Electrode Ends in Series Spot Welding. E. F. Nippes, W. F. Savage, S. M. Robelotto and K. E. Dorschu. Ciencia y Tecnica de la Soldadura, v. 10, July-Aug. 1960, p. 1-11.

Effect of geometric form of electrode, its material, pressure exerted on it and current intensity on resistance of the weldment, its diameter and on wear of the electrode in series spot welding of autobody steel. (K3m, T21a, Q9, W29h; ST)

253-K. (Spanish.) Spot Welding in the Construction of Metal Structures. M. de Izuzquiza. Ciencia y Tecnica de la Soldadura, v. 10, Sept-Oct. 1960, p. 1-14.

Equipment, including electronic contractors and tri-monophase transformers for spot-welding of thick steel plates. (K3n, 1-52; ST, 4-53)

254-K. (Italian.) Welding of Cast Iron. Fonderia, v. 9, Nov. 1960, p. 497-499.

Review of oxy-acetylene, arc, aluminothermal, mild, contact and bimetallic welding and brazing. (K-general; CI)

255-K. The Solderability of Some Tin, Tin Alloy and Other Metallic Coatings. C. J. Thwaites. Institute of Metal Finishing, Transactions, v. 36, 1958-1959, p. 203-219.

The solderability of various coatings of Sn, Sn alloys with Pb, Zn, Cd and of Cd and Ag is compared on brass, steel and Cu surfaces using a spread-of-drop type test. Influence of coating thickness, basis metal, undercoat layers and after-treatment. 26 ref. (K7, 17-52; Cu-b, ST, Sn-b, Ag, Cd, Pb, Zn, 8-62)

256-K. Current Trends in Resistance Welding Equipment. Ivan Reynolds. Welding Fabrication and Design, v. 44, Jan. 1961, p. 9-14.

Spot, projection, seam and flash welding and stud forming of steel, stainless steel and nonferrous alloys, including vinyl coated sheets using resistance welders with current controlled by ignition contactors. Control devices for timing, phase shift heat, slope and pressure. (K3, W29; SS, EG-a38)

257-K. Ryan Dotwelds Through Thick and Thin. Steel, v. 148, Feb. 27, 1961, p. 126.

Joining of sheets up to 0.016 in. thick to much heavier pieces of metal by a new resistance welding method in which a welding electrode is applied under pressure, a heavy current pulse is discharged and pressure is continued until the weld nugget coals. (K3; 4-53)

258-K. (German.) Development of Welding Technology in Production of Reinforced Concrete Construction Parts in the DDR (German Democratic Republic). Th. Kornosz. Schweisstechnik, v. 15, Feb. 1961, p. 13-19.

Review of resistance welding techniques used in joining reinforcing steel rods in concrete parts, including use of a single spot resistance welding machine. Cold deformation testing of spot welded reinforcing steel rod. (K3; ST, 4-55)

259-K. (German.) Deposit Welding of the Worn Clover Leaf Neck of a Nodular Cast Iron Shape Roll. Josef Totz and Wolfgang Pirker. Schweisstechnik, v. 15, Feb. 1961, p. 22-23.

Repair welding of cast iron necks by preheating to 200° C. with an acetylene flame, welding with coated electrodes and hammering to reduce shrinkage and susceptibility to crack formation. (K1a; CI)

260-K. Engineers Come to Grips With Weld Distortion. Iron Age, v. 187, Feb. 23, 1961, p. 104-106.

Methods involved in production welding of diaphragms for steam turbines and repair welding of a steam turbine spindle without distortion. (K-general, W11k)

261-K. Automatic Pipe Welding Device. Pipe Line News, v. 33, Feb. 1961, p. 20.

Grinding with an air driven abrasive cutting wheel and welding with a rotating arc welder in a continuous process to produce joints as strong as those produced manually in much less time. (K1, G18, T26r)

262-K. Fusion Welding of Titanium and Its Alloys. W. G. Hull. Welding and Metal Fabrication, v. 29, Feb. 1961, p. 72-75.

Joint design, jigging, precleaning and preparation of thin sheet for tungsten-arc welding in argon atmosphere. (K1d; Ti-b)

263-K. The Basics of Soldering. American Machinist/Metalworking Manufacturing, v. 105, Feb. 6, 1961, p. 99-106.

Soldering and tinning operations. Use and maintenance of soldering irons and cups. Relative solderability of various metals. (K7)

264-K. Precision Welding in Nuclear Reactor Construction. C. R. Allison, Jr., and J. LaForce. Machinery (London), v. 98, Jan. 4, 1961, p. 23-26.

Submerged arc and heliarc welding processes are used to join 304 and 317 stainless steel reactor core members or Zircaloy-2 components, respectively, in forming fuel rod assemblies. (K1, T11g; SS, Zr-b)

265-K. (French.) Titanium and Its Alloys. Pt. 2. Welding of Titanium and Its Alloys. R. Lachenaud. Soudage et Techniques Connexes, v. 14, Nov-Dec. 1960, p. 420-429.

Welding of Ti and its alloy TA5E under inert atmosphere with a trailer or in a chamber and of Ti and the alloy TA6V by spot welding. Mechanical and fatigue tests on welded assemblies. (K1d, K3n, Q-general; Ti-b, 7-51)

266-K. (French.) Welding of Galvanized Steel. M. Evrard. Soudage et Techniques Connexes, v. 14, Nov-Dec. 1960, p. 437-446.

Braze welding, arc welding with coated electrodes and spot welding of galvanized steel components (plates or sections), with attention to prevention of damage to the protective zinc layer. Mechanical test and corrosion data with micrographic study of weldment structures. 11 ref. (K-general, K9, R-general; ST, 8-65)

267-K. Square-Butt Welding. Canadian Welder, v. 52, Feb. 1961, p. 20.

A sigma welding process used for fabrication of heavy (1 1/2 in.) Al plate at currents above 400 amp. The process eliminates arc instability, severe oxide folds and weld porosity and the need for V-joint preparation, preheating, back-chipping and stringer-bead passes. (K1d; Al-b, 4-53)

268-K. How to Make Efficient Induction Coils. Ed Nugent. Canadian Metalworking, v. 24, Feb. 1961, p. 27-31.

Description of heating, cutting, bending and soldering operations needed for manufacture of helical, pancake or internal induction coils from Cu tubing. (K7, G6, T1m; Cu, 4-60, 17-57)

269-K. Reciprocating Burners Braze Heater Elements. Automation, v. 8, Mar. 1961, p. 81.

Mechanized brazing of Cu tubing with an Ag alloy filler to produce heating and cooling elements. (K8, T1p; Cu, 4-60)

270-K. Fastening Aluminum, Riveting Aluminum. F. L. Church. Modern Metals, v. 17, Feb. 1961, p. 28-30, 32, 34, 36, 38.

Comparisons of rivets as to head size, form, cost and composition. Recommendations for edge distance, rivet spacing and size of rivet hole. (K13n; Al)

271-K. Stitching Aluminum. K. B. Rhodie. Modern Metals, v. 17, Feb. 1961, p. 40, 42, 44, 46.

Determination of maximum thickness of materials which can be stitched as related to hardness, machine size and wire hardness and gage. Factors in selection of stitch types, stitching systems and wire. (K13; Al)

272-K. Diffusion-Bonding of Copper and Its Alloys. Assembly & Fastener Engineering, v. 4, Feb. 1961, p. 34.

Diffusion bonding is achieved by heating coated parts at 1700-1800° F. in a hydrogen or inert atmosphere so that the carrier volatilizes. Resulting bonds are homogeneous, as strong as the base metal and equal in electrical properties to Cu base metal. (K5k; Cu-b)

273-K. Butt Welding of Gold Rings. American Jewelry Manufacturer, v. 6, Feb. 1961, p. 12-13.

Water cooled semi-automatic butt welding by the resistance process to connect shank ends of high-quality gold rings. Method prevents color shading. (K3; Au)

274-K. Electron Beam Welds Pay Off for Bellowsmaker. Steel, v. 148, Mar. 6, 1961, p. 78-79.

Electron beam welding of delicate pressure sensing devices made of stainless steel to achieve porosity free welds and assure a vacuum tight seal. (K6; SS)

275-K. Hot-Cracking in Mild and Alloy Steels. Commonwealth Engineer, v. 48, Nov. 4, 1960, p. 52.

Review on the problem of hot cracking in weld metals as a function of solidification and transformation phenomena, stress forming elements and composition. (K9, N-general, 2-60, 3-66; AY, CN, 7-51, 9-72, 10-54)

276-K. (Japanese.) Ultrasonic Welding. Fukusaburoh Tokoroyama. Ohm, v. 47, Nov. 1960, p. 48-51.

Seam welding of homometallic or heterometallic sheets of Al, Cu, Ge, Au, Kovar, Mo, Ni, Pt, Si, Zr or steel using ultrasonic welding machine. (K3p, 1-74; Al, Au, Cu, Ge, Mo, Ni, Pt, Si, Zr)

277-K. (Japanese.) Ultrasonic Soldering. Kenjiroh Azumi. Ohm, v. 47, Nov. 1960, p. 58-60.

Al is soldered by ultrasonic heating with solder containing Zn, Sn and Cd. Electrolytic corrosion resistance of joint is tested by salt water immersion. (K7, 1-74, R4b; Al)

278-K. The Metal-Arc Welding of Stainless Steels. M. C. T. Bystram. Edgar Allen News, v. 40, Jan. 1961, p. 6-8.

Solution composition, time and temperature conditions for chemical surface treatment of stainless steels to be used in chemical processing equipment. Heat treatment, surface conditions and design as they affect the finished weld. (K1g, 2-64, L12, T29; SS, 17-57)

279-K. Rotating Unit Welds Pipeline. Iron Age, v. 187, Mar. 9, 1961, p. 95.

Outline of a new arc welding process for steel pipelines, in which an air-driven abrasive wheel slices a small sliver from each pipe end and an arc welder follows the cutter's track and performs the weld. (K1, T26r; ST)

280-K. Brazing Missile and Electronic Components in Dry Hydrogen. Pt. 1. H. E. Lewis. Metal Progress, v. 79, Mar. 1961, p. 93-97.

Because dry hydrogen is highly reducing to most oxides at high temperature, it makes an excellent brazing atmosphere. But successful brazing in dry hydrogen requires careful consideration of many factors. (K8; SS, SGA-h)

281-K. Brazing Shortcuts for the B-58. D. R. Torgeson and J. J. Kenna. Metal Progress, v. 79, Mar. 1961, p. 121-125.

Several devices and methods have been developed to lower brazing costs and shorten brazing time of honeycomb panels. (K8; SS, Al)

282-K. Brazing Ceramics to Metals. Leon Lerman. Metal Progress, v. 79, Mar. 1961, p. 126-129.

Two methods, the Mo-Mn and the active alloy, have been devised for joining ceramics to metals. (K11b, K8)

283-K. Welding Bases for Steel Mill Tension Drives. S. A. Wilson. Machine Production, v. 20, Feb. 1961, p. 43-44.

Sections fabricated from hot rolled openhearth steel plate are arc welded to support a drag generator payoff drive. High deposition rates are achieved with Fe powder electrodes. (K1, ST, 4-53)

284-K. Friction Welding Study Completed by U. S. Research Laboratory. Machine Production, v. 20, Feb. 1961, p. 45, 62-63.

Investigation of basic parameters under which mechanical energy of two metals, plastics or ceramics is converted into thermal energy, resulting in a weld at the place of contact. (K6)

285-K. Weld Studs Picked for Double-Duty. Metalworking, v. 17, Mar. 1961, p. 17.

Drilling, end welding of studs with hand gun and puddle welding of final joint to produce steel steam pressure vessel. (K1f, T26q; ST)

286-K. Weldability of Mild Carbon Steel. H. F. F. Koch. Indian and Eastern Engineer, v. 102, Dec. 1960, p. 685-691.

Effects of microstructure, hardening, residual stress and martensite content on welding susceptibility, welding safety and brittle fracture resistance. (K9s, 3-66, 3-71; CN)

287-K. The Mechanics of Adhesive Bonding. N. K. Benson. Applied Mechanics Review, v. 14, Feb. 1961, p. 83-86.

Review of adhesive joint stress analysis literature. Composition and mechanical properties of various types of adhesives used for structural bonding. Methods of testing and analyzing results to determine stress distribution and resistance to peeling. Aircraft and rocket applications. 44 ref. (K12)

288-K. Welding of Conducting Electrodes to Thin Metallic Films. St. Dembicka-Jellonkowa. Journal of Scientific Instruments, v. 38, Feb. 1961, p. 62.

An accurate potentiometric measurement of the electrical resistance of thin Ag and Cr films is made feasible by welding the electrode to the film with a suitable current pulse to insure contact between them. 3 ref. (K1; Ag, Cr, 14-62)

289-K. (German.) Brazing With Silver Solder. G. Schneider. Mitteilungen der BEFA, Nov. 1960, p. 2-5.

Test soldering of brass rods with Ag solder at 610° C. to determine optimum conditions for use in electric motor manufacturing. Design of a soldering device for joining steel screws to brass sheet. (K7, W11q; Cu-n, ST, SGA-f)

290-K. (German.) Soldering of Copper Current Junctions to Rails. F. Fries. Mitteilungen der BEFA, Nov. 1960, p. 1-2.

Soldering of Cu junctions to steel rails with Ag solder having a 600-620° C. melting temperature and a composition of 44-46% Ag, 18-22% Cd, 19% Cu, rest Zn. (K7; Cu, ST)

291-K. (Russian.) Kinetics of Interaction of Molten Metal With Gases and Slag During Arc Welding. A. A. Erokhin. Svarochnoe Proizvodstvo, Nov. 1960, p. 4-8.

Composition changes in welded metals as affected by the rate and duration of the metal gas-slag reaction. Oxidation of small amounts of Si and Mn contained in melt is studied during welding in CO_2 or air, using SV-08 or SV10GS electrode wire. 26 ref. (K1, N16m)

292-K. (Russian.) Welding by Twin Independent Arcs. Yu. L. Krasulin. Svarochnoe Proizvodstvo, Nov. 1960, p. 29-30.

New welding method permits regulation of the arc heat, thus preventing formation of microcracks and porosity in metal. Twin arc welding is recommended in hard facing and welding of alloy steel and copper coated titanium. (K1; AY, Ti, 8)

293-K. (Russian.) Welding of 27KHGSNL Cast Steel With Low Alloyed Structural Steels. F. E. Tret'yakov and E. Yu. Freidlina. Svarochnoe Proizvodstvo, Nov. 1960, p. 30-32.

Method of automatic or manual submerged arc welding under CO_2 shield. Selection of electrodes which provide minimum welding defects, good mechanical properties and easy slag separation from the seam. Product welds exhibit high tensile strength at room and elevated temperatures. (K13; AY, SGB-s, ST)

294-K. (Russian.) A Simple Method of Ultrasonic Cold Welding. L. O. Makarov. Akusticheskii Zhurnal, v. 6, Apr. 1960, p. 507.

Cold welding of 0.07 mm. Al foil using V-block to angle foil in reference to vibrator. Welding dependent on block angle, force and time of vibration. (K6r; Al, 4-56)

295-K. The Arc Welding of Galvanized Steels. M. Puech. Acier-Stahl-Steel, v. 25, Dec. 1960, p. 503-508.

33-50 basic Bessemer mild steel is Zn galvanized by hot dipping and then arc welded to form butt, lap and internal corner welds. Tests are made to study the soundness of the joints as a function of the type of electrode coating and to determine the mechanical properties of the joint and the corrosion resistance after different reconditioning treatments. (K1; CN, 8-65)

296-K. Electron Beam Weld Shows Light Touch. Steel, v. 148, Mar. 13, 1961, p. 135.

Electron beam welding of vacuum feed through nipples to form vacuum tight joints which stand bake-out temperatures over 500° F. (K6)

297-K. Welded Surface Plates. A. K. Kleinsorge. Mechanical Engineering, v. 83, Mar. 1961, p. 52-54.

Fabrication of deflection resistant surface plates by welding T-1 construction steel to form a box whose cross section is symmetrical about the neutral axis. (K-general; ST, SGB-s)

298-K. (French.) Welding of Very Thin and Thick Metal Foil. Machine Moderne, v. 55, Jan. 1961, p. 39-40.

Method developed for welding very thin metal foil on thicker foil by applying strong unilateral pressure through an electrode on the point to be welded, sending strong pulsating current through the electrode and maintaining the pressure until the weldment is sufficiently cooled. Application to welding of stainless steels. (K6, 3-73; SS, 4-56)

299-K. Weldable As-Cast Nickel Aluminum Bronze Composition and Microstructure. M. L. Foster and S. Goldspiel. Modern Castings, v. 39, Feb. 1961, p. 72-92.

Determination of composition and structure of NiAl bronze to produce consistently weldable as-cast material with improved mechanical properties and cavitation resistance suitable for propellar castings. The relationship between Al content, mechanical characteristics, microstructure and weldability is analyzed and data presented for optimum application. Optimum as-cast structure is obtained with 9.5% Al, 5% Ni, 4% Fe and 0.5% Mn. 13 ref. (K9s, Q-general, M27, 2-60; Cu-s, Al, Ni, 5)

300-K. New Methods Set Pace of Progress for Sandwich Production. Space/Aeronautics, v. 35, Mar. 1961, p. 50-55.

Brazing of A286 alloy and PH 15-7 Mo alloy sandwiches by blanket, furnace and banks of radiant quartz lamps. Core fabrication and grinding processes. (K8, G18; SS, SGA-h)

301-K. (French.) Argon Shielded Arc Welding. A. Moreau. Revue de la Soudure--Lastijdschrift, v. 16, Apr. 1960, p. 265-275.

Arc voltage as a function of amperage. Melting velocities for individual voltages and amperages. Welding equipment. 3 ref. (K1d)

302-K. (French.) Electron Bombardment Welding. J. van Audenhove, M. Meulemans, D. Tytgat and E. Jonckheere. Revue de la Soudure--Lastijdschrift, v. 16, Apr. 1960, p. 276-289.

Welding of reactor fuel element sheaths. Testing by pressurizing with He. Welding temperature as a function of electron emission intensity. Effect of voltage on penetration depth. 10 ref. (K6, T11g)

303-K. Cheaper Way to Weld Tubes. Helmut Thielsch. Product Engineering, Design Work Sheets, 14th Series, 1961, p. 74-75.

Consumable insert rings containing deoxidizer eliminate porosity in tungsten inert gas welds in carbon steel tubes. Costs. (K1d; CN, 4-60)

304-K. Why Not Weld it Chemically? A Review of Structural Adhesives. A. F. Martin. Product Engineering, Design Work Sheets, 14th Series, 1961, p. 76-78.

Factors affecting joint strength. Types of adhesives. Fabricating techniques for Al and Mg alloys and stainless steels. (K12; Al-b, Mg-b, SS)

305-K. High Frequency--What it Means to Welding Design. Richard J. Allen. Product Engineering, Design Work Sheets, 14th Series, 1961, p. 79-80.

High-frequency resistance welding for production of continuous weld seams in carbon and alloy steel and Cu, Ni and Zr alloys. (K3; AY, CN, Cu-b, Ni-b, Zr-b)

306-K. High Resistance Slag Speeds Welds. Product Engineering, Design Work Sheets, 14th Series, 1961, p. 82-83.

Electroslag welding requires less filler material and only one path to join steel forgings and plate up to 10 in. thick. (K6; ST, 4-51, 4-53)

307-K. What the Tests Show About Soldered Aluminum Joints. W. McQuillan. Product Engineering, Design Work Sheets, 14th Series, 1961, p. 84-85.

Relative strength and life of joints soldered with various alloys. Mechanical method of removing oxide coating. Fluxes for soldering. (K7; Al)

308-K. Fabrication of Nuclear Piping Demands Revised Welding Procedures. R. H. Hoefler. Welding Engineer, v. 46, Mar. 1961, p. 25-26.

Arc welding of stainless steel piping for nuclear applications. (K1, T11q; SS, 4-60, 17-57)

309-K. Fiber Metallurgy Promises Greater Efficiency in Resistance Welding. Harry Schwartzbart. Welding Engineer, v. 46, Mar. 1961, p. 27-29.

Techniques and advantages of fiber metal resistance welding and shim brazing. Fiber metal mats placed between surfaces to be welded increase contact resistance so that there is a steeper thermal gradient away from the joint interface. (K3)

310-K. Proper Welding Saves Thousands of Dollars for Ford Motor. F. T. Tancula. Welding Engineer, v. 46, Mar. 1961, p. 34-36.

Arc welding techniques for repair of entry rolls, shear blade holders, slag car frames, back-up chucks, collar rolls and drive pinions. (K1, W25)

311-K. Production Line Practices Speed Heavy Equipment Fabrication. Welding Engineer, v. 46, Mar. 1961, p. 38, 40.

CO_2 shielded, self-fluxing welding process is used in conjunction with welding positioners to produce gas drums. (K1d)

312-K. (Italian.) Welding of Stainless Steel. Acciaio Inossidabile, v. 27, Nov-Dec. 1960, p. 542-549.

Various steels containing 0.03-0.40% C, 17-25% Cr, 4.5-36% Ni, 0-4.5% Mo, 0-8.5% Mn, 0-0.35% Ti, 0-0.63% Cb and 0-2% Cu are Argon arc, Sigma or submerged-arc welded or welded with a coated electrode. Corrosion resistance of the seam in boiling 10% H_2SO_4. Bend testing of weldments. (K1, R6g, Q5; SS)

313-K. Repair Welding of Cast Iron. G. M. Blanc, E. Hindson and H. E. Z. Gordon. Welding and Metal Fabrication, v. 29, Mar. 1961, p. 104-110.

Repair of cast iron structures by oxy-acetylene welding, bronze welding, silver brazing, soft soldering and arc welding. Effect of Si, Ni, Mn, C and P content upon weldability and mechanical properties of cast iron. 5 ref. (K-general; CI)

314-K. Fusion Welding of Titanium and Its Alloys. Pt. 3. W. G. Hull. Welding and Metal Fabrication, v. 29, Mar. 1961, p. 111-113.

Tungsten arc and self-adjusting arc welding of commercially pure Ti, 6Al4VTi alloy and 5Al2.5SnTi alloy. Welds are stress relieved at 425-650° C. to minimize risk of delayed cracking. (K1, J1a; Ti-b)

315-K. Shrink Till it Screams. Harry J. Kent. American Machinist/Metalworking Manufacturing, v. 105, Feb. 20, 1961, p. 98-99.

A hollow 4340 steel shaft is shrink fitted into a disk of the same material by heating the disk to 900° F. and cooling the shaft to -60° F. Components are assembled and returned to room temperature to form an extremely heavy shrink fit. (K13r; ST)

316-K. A New Way to Make Stainless Honeycomb. G. Jewitt Crites. American Machinist/Metalworking Manufacturing, v. 105, Feb. 20, 1961, p. 100-101.

Resistance welding of stainless steel foil strips to form stainless honeycomb core using electrodes inserted between the steel strips to insure the progressive joining of cells at the nodes. Applications in aircraft and missile industry. (K3; SS, 4-53)

317-K. Properties of Mild Steel Weld Metal Not Revealed by the All-Weld Metal Tensile Test. K. Winterton. Welding Journal, v. 40, Mar. 1961, p. 106s-109s.

Comparative tensile testing of mild steel weldments produced from four electrode classifications to determine ductility and hydrogen content as affected by aging and electrode type. Results show that the mechanical properties are favorably affected by subsequent heat treatment so that values obtained are misleading. (K9r; CN)

318-K. Evaluating Crack-Resistant Electrodes for Welding HY80. S. I. Roberts. Welding Journal, v. 40, Mar. 1961, p. 110s-112s.

Controlled testing, utilizing comparative electrode bend tests, of coated E-9018 electrodes (iron-powder, 80,000 psi.) to determine their sensitivity to cracking when used in the welding of HY80 steel. (K9r, 9-72, W29h; AY)

319-K. Notched Longitudinal Bend Specimens for Evaluating Armor Weldments. S. M. Silverstein, R. P. Sopher and P. J. Rieppel. Welding Journal, v. 40, Mar. 1961, p. 113s-117s.

Specimens are used to evaluate the toughness performance of high-strength armor steel weldments prepared with austenitic and ferritic Grades 180 and 230 coated electrodes. Results show that notched bend testing may be used as a partial substitute for the more expensive H-plate test. (K9r, Q5h; ST)

320-K. Brazing of Beryllium for High Temperature Service. S. R. Maloof and J. B. Cohen. Welding Journal, v. 40, Mar. 1961, p. 118s-122s.

Procedure for Ag brazing of Be to produce strong joints for use up to 1450° F. Data are given for design and preparation of braze materials and results of wettability tests. Effect of brazing time and joint structure on the strength of butt-brazed joints. (K8; Be)

321-K. Today's Industrial Role of Magnetic-Flux Gas-Shielded Arc Welding. R. T. Telford. Welding Journal, v. 40, Mar. 1961, p. 237-243.

Characteristics and application of the magnetic-flux-gas-shielded arc welding process for mild steel fabrication. Use of continuous wire feeder achieves increased welding speeds, penetration and lower costs. 4 ref. (K6, K1d; CN)

322-K. Tungsten Arc-Welding Saves Trucking Firm $3000. Welding Journal, v. 40, Mar. 1961, p. 249.

Salvage of damaged Al truck parts through tungsten arc welding results in reduction of repair costs. (K1g, T21e; Al)

323-K. An Aluminum Back-Up Bar for Automatic Metal-Arc Gas-Shielded Welding. C. M. Jenkins. Welding Journal, v. 40, Mar. 1961, p. 250-251.

A change over from stainless steel to Al back-up bars with steel inserts for automatic metal-arc gas-shielded welding of missile parts results in increase in weld quality and decrease in parts cost. (K1d, W29)

324-K. Automatic Welding for the Right of Way. Melvin A. Judah. Pipe Line Industry, v. 14, Mar. 1961, p. 26-29.

Automatic welding of square cut pipe by a new circumferential process which does not require pipe rotation. Process utilizes a CO_2 shield in place of flux and a reverse polarity arc welder. (K1d, T26r)

325-K. Electron Beam Welds Molybdenum Sheets. Steel, v. 148, Mar. 27, 1961, p. 166-167.

Short time tensile tests at 80-3000° F. of Mo base sheet materials welded by electron beam methods show that these materials can be successfully welded by this method. Welds are also checked by dye penetrant and radiographic methods. (K6; Mo, 4-53)

326-K. Square-Butt Welding: Time and Money Saver. Western Metalworking, v. 19, Mar. 1961, p. 43-44.

Sigma welding of heavy wall Al cylinders for use in the nuclear industry to eliminate V-joint preparation, preheating, back-chipping and stringer-bead passes. (K1d, T11; Al, 4-60)

327-K. Determination of the Causes of Weld Metal Cracking in High-Strength Steels and the Development of Heat Treatable Low Alloy Steel Filler Wires for Use With the Inert Gas Shielded Arc Welding Process. H. W. Mishler. Battelle Memorial Institute (Wright Air Development Division). U. S. Office of Technical Services, PB 161981, May 1960, 60 p. $1.50.

The first test described is similar to the standard Lehigh test, except that the degree of restraint on the weld metal increases from low to high as the test weld is deposited. Thus, only one specimen is needed to test a particular filler wire. The second test employs apparatus that applies an adjustable restraining force to the test weld. The force is applied to test specimens prior to deposition of the test weld through an air cylinder. A separate specimen is needed for each pressure used. (K9r, K1d; ST, SGB-a)

328-K. Simplest Joint Preparation With Square-Butt Welding. Canadian Machinery and Metalworking, v. 72, Mar. 1961, p. 112, 114.

Sigma welding of heavy-wall 6061 Al cylinders for nuclear applications. Joint preparation. Welding speeds, current densities, voltages and wire feed speeds for various plate thicknesses. (K1d, T11; Al-b, 4-60)

329-K. New Welding Processes. John J. Chyle. Machine Production, v. 20, Mar. 1961, p. 28-35.

Joining of low and medium carbon steels, stainless and free machining steels, cast iron, brass, Al, Ti, Cu, Monel and beryllium copper by friction, diffusion bond, fusion electroslag, electron beam and arc plasma welding processes. Stainless steel, Ti alloy and high-temperature alloys are brazed to form honeycomb sandwich panels. Applications. 13 ref. (K-general)

330-K. (French.) Welding of Chromium Steel. Pt. 1. H. Gerbeaux. Metallurgie et la Construction Mecanique, v. 93, Jan. 1961, p. 19-27.

Phase transformations elastic limit at low and room temperatures, heat and corrosion resistances and weldability of Cr steels such as 25CD4S, 15CDV6, 35CD4 and others with 1-6% Cr and 0.5-1% Mo and austenitic stainless steels. (K9s, N-general, R-general, Q21; SS)

331-K. Welding of Medium-Carbon Low-Alloy Steels. F. Watkinson. British Welding Journal, v. 8, Mar. 1961, p. 93-103.

Influence of diffused hydrogen in the weld metal on the critical cracking of medium carbon low-alloy steel arc welded joints. Martensite formation is influenced by the Ni, Cr, Mn, Mo and Cr content of the various steels and as it affects critical cooling rate. 6 ref. (K1, N8p; CN)

332-K. (German.) Aluminothermic Welding in Production of Continuous Railway Tracks. J. Wodara and W. Novak. Deutsche Eisenbahn-Technik, v. 9, Jan. 1961, p. 23-26.

Aluminothermic test welding of railway tracks with molds of various ingates for evaluation of optimum ingate design and preheating temperature. Microstructure and hardness investigation of welds. (K6, K9r, T23q)

333-K. Brazing for High-Temperature Service. H. E. Pattee and R. M. Evans. Defense Metals Information Center, Battelle Memorial Institute, DMIC Memo. 149, Feb. 21, 1961, 32 p. (Available as PB 151108 from U. S. Office of Technical Services, Washington 25, D. C.)

Brazing processes and atmosphere control, filler metals and heating methods involved in joining stainless steels, super alloys, refractory metals and nonmetallics for 300-2000° F. service in sandwich structures, rockets, aircraft, missiles, gas turbines and nuclear reactors. 118 ref. (K8, T-general; SGA-h, SS, EG-d37, SGA-f, 7-59, 17-57)

334-K. Designing for Chemical Welding. Pt. 2. Joint Design. H. J. Jankowski. Design Engineering, v. 7, Mar. 1961, p. 41-43.

High-strength phenolic elastomers and epoxy resin adhesives are used for the structural joining of Al, brass, Mg, steel, Ti, Cu and stainless steel. Service temperature range for the adhesives is -65 to 500° F.; 180° F. is a common limit. (K12; Al, Cu-b, Mg, Ti, ST, NM-d34, 17-57)

335-K. Joining Copper Parts. Electromechanical Design, v. 5, Mar. 1961, p. 41.

Two or more Cu components are joined with a homogeneous bond by a special coating on the metal surface which diffuses into the parts to be joined and produces a bond without an interface. Joints retain the high electrical and thermal conductivity of Cu with superiority to soft soldered joints in respect to tensile, shear and fatigue properties. (K5k; Cu)

336-K. Tig Welding Joins Copper to Stainless. J. M. Gerken and D. B. Kittle. Metalworking Production, v. 105, Mar. 1, 1961, p. 53.

Inert gas shielded tungsten arc welding of Cu to stainless steel by concentrating most of the heat into the Cu and fusing the Cu to the steel, rather than both metals melting and fusing together. (K1d; Cu, SS)

337-K. Welding Aluminum. Pt. 2. Mechanical Properties of Welds. Modern Metals, v. 17, Mar. 1961, p. 32-34.

Mig welding of heat treatable and nonheat-treatable Al alloys with Al alloy fillers. Data for shear strength, tensile strength, yield strength and elongation for resulting weldments. (K1d, K9r, Q-general; Al-b, 7-51)

338-K. Extrusions Plus Adhesives Equals Versatile Light Poles. J. P. Brush and J. A. Scott. Modern Metals, v. 17, Mar. 1961, p. 46-48.

Bonding of solid Al extrusions with an epoxy resin to produce 17.5 ft. circular, tapered poles. Physical testing of strength with bending and torsional loads. (K12; Al, 4-58)

339-K. Projection Welding. Douglas D. Williams. Welding Fabrication and Design, v. 4, Feb. 1961, p. 9-13.

Projection welding methods used on carbon, stainless, alloyed and galvanized or tinned steels and under certain conditions on Al and its alloys. Use in joining dissimilar metals, such as steel and brass, steel and Al or two steels with different properties. (K3q; ST, Al-b, Cu-n, 8-65)

340-K. Portable Shielded Arc Welding. Production, v. 47, Apr. 1961, p. 83.

A semi-automatic shielded arc welding process using a mild steel electrode filled with metallic oxides and salts which vaporize when heated and form a shielding, deoxidizing and fluxing atmosphere around the weld. (K1d)

341-K. Production Procedures at the Beacon Works of John Thompson Motor Pressing, Ltd. Sheet Metal Industries, v. 38, Mar. 1961, p. 162-170, 222.

Arc, spot and projection welding assembly of automobile underbodies. (K1, K3, T21a)

342-K. Welding Meets Challenge of Space Age Metals. R. R. Irving. Iron Age, v. 187, Apr. 6, 1961, p. 99-106.

Electron-beam, inert-gas shielded and vacuum chamber techniques for welding W, Ta, Mo, Cb, Zr, Ti and Be with attention to effects of purity of base metal and welding environment on weld strength and ductility. (K-general; SGA-h, EG-d37, W, Ta, Mo, Cb, Zr, Ti, Be)

343-K. Are You in Step With Welding Progress? Steel, v. 148, Apr. 10, 1961, p. 90-94.

Survey of semi-automatic welding processes such as electron beam, arc and CO_2 welding and evaluation in terms of lower costs for joining steels and alloys. Use of low temperature, small wire methods to join light metals such as 5083 and 5086 Al alloys. (K-general; ST, Al-b)

344-K. Automatic Welder Insures Annealing Line Continuity. Steel, v. 148, Apr. 10, 1961, p. 96.

Automatic resistance seam welding of the ends of coiled strip tin plate producing lap welds having tensile strength greater than that of the parent metal. (K3p; ST, 4-53, 8-62)

345-K. Roll Welding Opens Way to Honeycomb Forming. Steel, v. 148, Apr. 10, 1961, p. 98.

Fabrication of corrugated honeycomb sandwich structures by hot rolling 2014 Al alloy, Ti, Mo, steel and Inconel to form pressure welds. (K5, F23; Al-b, Ni-b, Mo, Ti, ST, 7-59)

346-K. Electron Beam Welding Breaks the Size Barrier. Steel, v. 148, Apr. 10, 1961, p. 100-102.

Electron beam welding of Mo, Ta and W in a 40 ft. vacuum chamber to form weldments of high-tensile strength in 20 ft. long sections for advanced aircraft and missiles. (K6, T24e; Mo, Ta, W)

347-K. CO_2 Welding Speeds Can Exceed 300 Ipm. Steel, v. 148, Apr. 1961, p. 99.

High speed CO_2 welding of 1010 steel and 1015 steel producing clean and spatterfree weldments in automobile frames. (K1d, T21a; ST)

348-K. Are You Buying Too Much Weld Metal? Welding Design & Fabrication, v. 34, Mar. 1961, p. 33-34.

Methods of reducing weld size during arc welding of mild steel. (K1; CN)

349-K. Graphite Cloth Speeds Honeycomb Brazing. Welding Design & Fabrication, v. 34, Mar. 1961, p. 40, 48.

Blanket or furnace brazing of stainless steel honeycomb panels using a graphite heating element cloth in a protective argon atmosphere to reduce brazing time. (K8; SS, 4-57)

350-K. New Process for Welding Mild Steel Combines Features of CO_2 and Shielded Arc Welding. Western Machinery and Steel World, v. 52, Mar. 1961, p. 44.

Development of a gas shielded metal-arc welding process using a specially treated low-alloy steel welding wire to produce a spatter-free arc. Process can be applied to tubing, landing mats,

die posts, car frames, compressor castings, pressure vessels and machine mountings. (K1d; CN)

351-K. Square-Butt Welding of Heavy Aluminum Plate. Western Machinery and Steel World, v. 52, Mar. 1961, p. 51.

Al cylinders of 1 1/4 in. thickness are square-butt welded by a process incorporating gas shielding and wire quality and slope-controlled power supply improvements to overcome arc instability. Current of up to 600 amp. increases heat input at the weld zone and eliminates porosity. (K1d; Al, 4-53)

352-K. Uses of Precious Metal Alloys in Brazing. Engineering, v. 191, Feb. 10, 1961, p. 210-211.

High temperature brazing of Nimonic alloys, W, Mo, Zr, Be and ceramic materials using Ag, Au and Pd brazing alloys. (K8; Be, Mo, Ni-b, W, Zr)

353-K. Resistance Welding Sets New Trend in Module Production. R. A. Wray and H. G. Stech. Space Aeronautics, v. 35, Apr. 1961, p. 93, 96, 98-99.

Resistance welding of Ni and Cu strip and wire to produce joints which retain high strength at high temperatures and when exposed to shock and vibration. Applications in fabrication of electronic modules used in pocket instrumentation with resultant higher packaging density and quicker assembly. (K3, T1; Ni, Cu, 4-53, 4-61, 17-57)

354-K. (Spanish.) Theory and Practice of Spot Welding. Douglas D. Williams. Ingenieria Industria, v. 27, Oct. 1960, p. 131-134, 136, 138.

Electrode composition and type, welding resistance, dimensions of the plate and intensity and rate of welding as they affect spot diameter. (K3n)

355-K. Tests Demonstrate Payoff of New Brazing Alloy. R. C. Kapituk. Iron Age, v. 187, Apr. 13, 1961, p. 90-91.

Data are given for strength, ductility, tendency toward undercutting, grain growth and age hardening of a newly developed Mn-base alloy used to braze 347 stainless steel thin-wall tubing. (K8, Q27, Q23p; SS, 4-60, SGA-f, Mn-b)

356-K. Tooling Up a Stainless Balloon. H. M. Edwards and W. P. McGregor. American Machinist/Metalworking Manufacturing, v. 105, Jan. 9, 1961, p. 63-65.

Fabrication of thin stainless steel sheet to form 10 ft. diameter tanks for the Atlas missile. Methods of forming, abrasive trimming, cutting-off and precision spot, seam and Tig welding of the skin to internal and external backup rings. (K-general, G-general, T21e; SS, 4-53, 17-57)

357-K. (German.) Welding Problems in the Construction of Nuclear Reactors. A. Schiller. Schweissen und Schneiden, v. 13, Feb. 1961, p. 39-43.

Elimination of welding defects such as tungsten inclusions and oxide films in welding of alloyed steel tubes (18-8 CrNi steel). Deposit welding of heat and corrosion resistant surface areas using age-hardenable electrode materials (Inconel alloys). Welding of thick clad plates and clad or austenitic fittings. (K-general, T11)

358-K. (German.) Welding Problems in the Construction of Nuclear Reactors. H. Oehme. Schweissen und Schneiden, v. 13, Feb. 1961, p. 43-48.

Special welding techniques such as motor-arc-welding of 0.5 mm. thick Al coatings for cylindrical uranium fuel elements, welding of fuel element plates by an automatic spot-welding machine under protective atmosphere, welding of pressure vessels under high-purity Ar or He and welding of Zircaloy, Hastelloy, Inconel and alloyed steel. (K-general, T11)

359-K. (German.) Welding Techniques Employed in Constructing the Condensate Subcooler for the RWE Nuclear Power Station at Kahl. H. Henseler. Schweissen und Schneiden, v. 13, Feb. 1961, p. 49-56.

Techniques in welding of various parts of alloy steel (15Mo3, 20Mo3, 19Mn5, 24CrMoV55, 24CrMo5 and X10CrNiNb 18/9 steel) with particular reference to plating by deposit welding, welding of austenitic tubes and welding of a 180° bend. Comparison of microstructure of matrix and weld. (K-general, T11; ST)

360-K. (German.) Manual Arc Test Welding of Thick Unalloyed Steel Plates. Th. Schlieper and M. Deeskow. Schweissen und Schneiden, v. 13, Feb. 1961, p. 56-60.

Welding of preheated 100 mm. thick MRSt 37 steel plates under varying

mounting and welding conditions using high-tensile strength electrodes. Subsequent ultrasonic testing of welds, hardness measurements and macrostructure examination. (K1; ST, 4-53)

361-K. (German.) Welding Conditions During Resistance Spot Welding of Stainless 18/8 Chromium Nickel Steels. R. Oppenheim and W. D. Brand. Schweissen und Schneiden, v. 13, Feb. 1961, p. 61-70.

Test welding using low current and high-electrode pressure of 1 and 1.5 mm. thick X5CrNi 18 9 steel sheets to sheets of same material and to 3 mm. thick St 37.12 steel sheets. Spot welding of stabilized X10CrNiNb 18 9 steel and X10CrNiTi 18 9 steel. Macrostructure investigation of inclusions and holes. Shear testing of welded joints. (K3n; SS, 4-53)

362-K. Chrysler Automatic Plant for Resistance Welding Motor-Car Floor Pan Assemblies. Machinery (London), v. 98, Mar. 22, 1961, p. 649-653.

Two 685 ft. long resistance welding and assembly lines incorporating welding presses controlled by an electronic scanner produce floor pan assemblies for cars with different wheel bases at the rate of 2000 per 8 hr. shift. (K3, T21b, W29)

363-K. Martin Successfully Joins Columbium Alloys. C. Burrows, L. J. Gagola and M. M. Schwartz. Fansteel Metallurgy, Feb. 1961, p. 1-3.

Fansteel 82, an alloy of Cb, Ta and Zr, is resistance and fusion welded with or without filler metal and brazed using Ti braze alloy at 3300° F. in vacuum. (K-general, K8, K9s; Cb-b, Ta, Zr)

364-K. (German.) Resistance Butt Welding of Steel Wire of High Carbon Contents. Herman Josef Bockenhoff. Stahl und Eisen, v. 81, Mar. 16, 1961, p. 337-349.

Pressure butt test welding of open-hearth steel wire (0.06-0.87% C) of given mechanical properties by a conventional welding machine for evaluation of best welding conditions. Influence of heat treating and deformation on properties of weld. Comparison with flash welding. (K3; ST, 4-61)

365-K. Radiographs Show Quality of Panel Brazing. B. H. Faulkenberry, R. H. Johnson and C. E. Cole. Nucleonics, v. 19, Apr. 1961, p. 126-130.

Inspecting stainless steel honeycomb sandwich is made possible by including radioactive tracer elements in the brazing foil. Sensitized film indicates presence of brazing fillets. (K9r, 1-59; SS, 7-52)

366-K. Oxy-Propane Brazing With Flux Injection. Sid Smith. Canadian Welder, v. 52, Mar. 1961, p. 10-12.

Joining of steel parts using a propane with oxygen and in-flame fluxing to prevent discoloration of base metal and brazing material in the surrounding area. Fuel costs are substantially reduced. (K8; ST)

367-K. (French.) Weldability of Coatings of Tin, Tin Alloys and Other Metals. C. J. Thwaites. Galvano, v. 30, Jan. 1961, p. 24-25.

Weldability of coatings of Sn, of Sn-Pb and Sn-Zn alloys and of Cd and Ag determined by adherence tests. Effect of the thickness of the deposit, the subcoat and the base metal. (K9s; Sn-b, Pb, Zn, Cd, Ag, 8-62)

368-K. Submerged Arc Welding of Stainless Steel. Machinery, v. 67, Apr. 1961, p. 107-113.

Limitations of submerged arc process. Selection of filler metals and fluxes for welding stainless steels. Mechanical properties of submerged arc welded stainless steel. (K1e; SS)

369-K. Open Air Tig Welding Fabricates Complex Underwater Pipeline. T. Anderson and E. L. Trimble. Machinery, v. 67, Apr. 1961, p. 147.

Tig and conventional arc welding of a steel pipeline consisting of three concentric pipes and two "piggyback" lines. (K1d, T26r; ST)

370-K. (Slovak.) Use of Radioisotopes in the Investigation of Welding Processes. Bohumil Zitnansky. Zvaranie, v. 9, Dec. 1960, p. 350-353.

Use of the isotopes in studying the transition of alloying elements from the coating and core of an electrode into the weld metal at the beginning of melting, the passing through the arc and the penetration into the bath at the interface slag-metal. Investigation of carburization, decarburization and segregation process

and of the mechanism of intercrystalline corrosion. 29 ref. (K-general, 1-59)

371-K. (Czech.) Furnace Soldering in an Exothermic Atmosphere. Otakar Moravek. Zvaranie, v. 9, Dec. 1960, p. 357-362.

After cleaning by compressed air and addition of the solder--mostly in the form of a wire--the parts are soldered while passing through a furnace in an atmosphere obtained by the partial combustion of a city gas-air mixture, purified from SO_2 and H_2S. 10 ref. (K7g)

372-K. (Czech.) Hot Straightening. Boleslav Vrana. Zvaranie, v. 9, Dec. 1960, p. 362-364.

Deformation of welded parts can be avoided by a design providing for a symmetric distribution of weldments about the neutral axis, or symmetric heating and cooling; prestressing before welding; fastening of the parts to be welded in water cooled fixtures; design of rims and supporting ribs; hot straightening. (K9, F29r)

373-K. Assembling Circuitry Board for Airborne Computers. P. E. Boron. Assembly & Fastener Engineering, v. 4, Apr. 1961, p. 31-36.

Dip soldering, microwelding and adhesive bonding in assembly of airborne computer components. Design features. (K7d, K12, T1)

374-K. RCA Welds Transistor Parts in Controlled Atmosphere. Assembly & Fastener Engineering, v. 4, Apr. 1961, p. 43-44.

Transistor cover joined to base by electric resistance welding. (K3, T1)

375-K. Find New Adhesive Uses in Typewriters. Assembly & Fasteners Engineering, v. 4, Apr. 1961, p. 48.

Adhesive bonding of vinyl plastic to other plastic materials and to Al and steel. Joining anodized Al to enameled Al. (K12; Al, ST)

376-K. (French.) Electron Bombardment in Metallurgy. P. Thome and C. Bridoux. Societe Francaise des Electriciens, Bulletin, v. 2, Jan. 1961, p. 24-34.

Design of bombs for electronic bombardment. Application to welding and fusion under high vacuum. 11 ref. (K6, 1-73)

377-K. Spotlight on Arc Welding. Welder, v. 29, Oct-Dec. 1960, p. 77-80.

Applications of arc welding to production of components ranging from light gage metal to massive plate constructions including a brake press base, automatic strapping machine and gas scrubbing plant. (K1)

378-K. Welding in the Production of Hydraulic Jacks and Similar Equipment. Welder, v. 29, Oct-Dec. 1960, p. 81-85.

Metal arc welding is used in manufacture of hydraulic jacks, rams, presses and various tools. A lighter, stronger jack is produced by replacing castings for the handle, frames and hydraulic oil box with welded components. (K1g, T6)

379-K. (German.) Weld Cracking of Aluminum Alloys. Z. Buray. Acta Technica Academiae Scientiarum Hungaricae, v. 32, Jan-Feb. 1961, p. 93-118.

Various binary and complex alloys containing Mg, Zn, Si, Cu, Fe, Ti and B and filler metals used in their welding are tested by oxy-acetylene welding or argon arc welding in a water cooled fixture or by the casting of ring-shaped test pieces. Suppression of cracking by the use of filler metals containing increased amounts of Mg, Si, Cu or Ti. 23 ref. (K1d, K2h, 9-72; Al-b)

380-K. Experiences in Welding of Cold Rolled Steel. D. B. Tolly and J. A. Schiefferle. Paper from "Porcelain Enamel Institute Forum, Proceedings". v. 1. Porcelain Enamel Institute, Inc., Washington, D. C., 1959, p. 64-66.

Review of observations made in welding refrigerator liners fabricated wholly or in part from low-carbon cold rolled steel. Influence of weld caused defects in the porcelain enamel finish. Measurement of surface resistance. Effect of welding current. Influence of surface roughness and hardness on weldability. (K-general; CN-g, 8-71)

381-K. Pipeline Welding Goes Automatic. Steel, v. 148, Apr. 24, 1961, p. 136, 141.

Girthwelding of steel pipelines at welding speeds up to 55 ipm. using CO_2 shielding and a rotary carriage device which prepares the pipe ends and welds them in two 360° rotations. (K1d, T26r; ST)

382-K. Brazing Missile and Electronic Components in Dry Hydrogen. Pt. 2. H. E. Lewis. Metal Progress, v. 79, Apr. 1961, p. 94.

Purity of the atmosphere and control of temperature will determine the results obtained in brazing in dry hydrogen. Pointers on minimizing contamination and regulating heating and cooling. (K8, T24e, T1)

383-K. In Solder, Flux Makes the Difference. Joseph D. Keller. Metal Progress, v. 79, Apr. 1961, p. 111.

A simple test enables engineers at Martin-Orlando to select one particular solder from a group, all of which had previously met government specifications for metallic content. (K7; SGA-f)

384-K. Welding Engineers Meet. Metal Progress, v. 79, Apr. 1961, p. 124-126, 128, 130, 132, 134, 136, 138, 142.

Welding of stainless steel; hot cracking; use of filler metals; data on precipitation hardening stainless steels. (K1; SS)

385-K. Hydrogen in Arc Welding With Coated Electrodes. N. Christensen. Welding Journal, v. 40, Apr. 1961, p. 145s-154s.

Sources of hydrogen in metal arc welding. Determination of hydrogen in mild and low alloy steel weld metals and effect of hydrogen on mechanical properties and structures. 39 ref. (K1a, K9, Q26s, Q-general; ST, 7-51)

386-K. Effects of Repeated Repair Welding of Two Aluminum Alloys. F. G. Nelson. Welding Journal, v. 40, Apr. 1961, p. 166s-168s.

Hardness and tensile tests used to study effects of repeated arc welding on the width of the heat affected zone on either side of groove welds in 6061-T6 and 5456-H321 Al alloy plates. (K9, K1, Q-general; Al-b, 4-53, 7-51)

387-K. Some Metallurgical Aspects of CO_2-Shielded Arc Welding. M. D. Randall, P. J. Rieppel, S. L. Hoyt and A. F. Chouinard. Welding Journal, v. 40, Apr. 1961, p. 169s-174s.

Gaseous end products and oxidation losses in carbon dioxide shielded welding; mechanical properties of carbon and alloy steel welds deposited by CO_2 shielded consumable electrode process; and resistance of welds to hot and cold cracking. 27 ref. (K1d, Q-general; ST, 7-51)

388-K. Quenched and Tempered Steels in Ship Structure. Thomas J. Dawson. Welding Journal, v. 40, Apr. 1961, p. 173s-181s.

Composition and tensile and impact properties of HY-80 steels. Investigation of pre-heat and electrode moisture control problems, electrode coatings, weld design and quality control into ship hulls and superstructures. (K-general, K9, T22; AY, 17-57)

389-K. Ferritic Welding of Steel Armor. Z. J. Fabrykowski. Welding Journal, v. 40, Apr. 1961, p. 339-342.

Development of ferritic electrodes and welding procedures for high-strength steels. Principles of "H" plate test and its significance in welding quality control. (K1, K9r, T2g, W29h; ST, 4-53)

390-K. Ultrasonic Welding Engineering, Manufacturing and Quality Control Problems. Welding Journal, v. 40, Apr. 1961, p. 349-358.

Principles of ultrasonic welding and applications in joining dissimiliar metals, alloys and other materials. Data are given for cooling, clamping force and welding tip requirements, vibration problems and their control and ultrasonic welding schedules. 9 ref. (K6r)

391-K. Welding of Massive Manganese-Vanadium Steel Assemblies for Varrazano-Narrows Bridge Tower Piers. Irving Diamond. Welding Journal, v. 40, Apr. 1961, p. 359-362.

Submerged arc and covered arc-welding of ASTM 242 low-alloy high-strength Mn-V steel plate. (K1a, K1e; AY, 4-53)

392-K. Projection Welding Low-Carbon Steel Using Embossed Projects. J. F. Harris and J. J. Riley. Welding Journal, v. 40, Apr. 1961, p. 363-376.

Method and equipment for welding low-carbon steel sheets with embossed projections. Influence of electrode and projection design, sheet thickness, electrode force, welding current and welding time on formation of projection welds. 5 ref. (K3q; CN-g)

393-K. Brazing of Sandwich Structures of Columbium Alloys. M. M. Schwartz.

Welding Journal, v. 40, Apr. 1961, p. 377-382.

Survey of metallurgical aspects of brazing refractory metals. Procedure for brazing Cb and Cb alloys in cold wall, high-temperature vacuum resistance furnace, using Ti as brazing alloy. Shear strength of brazed 33% Ta-0.7% Zr-Cb alloy joints at 70-3000° F. (K8, Q2; Cb-b, EG-d37, 7-52)

394-K. Role of the Engineer in Designing for Carbon-Steel Structures. J. F. Lincoln. Welding Journal, v. 40, Apr. 1960, p. 383-384.

Design consideration of stresses in welded structures with attention to adverse effects of over welding. A limited degree of porosity in weldments is suggested as insurance against cracking. (K-general, 3-66, 9-68; CN, SGB-s)

395-K. (German.) Current State of Metal Bonding by Adhesives. H. Winter and H. Meckelburg. Metall, v. 15, Mar. 1961, p. 187-198.

General review of metal bonding in terms of classification and technological properties of adhesives; bonding techniques; mechanical, fatigue, chemical and weater resistance of bonds; destructive and nondestructive testing of bonds; construction techniques for bonded parts; and application of metal bonding in aircraft and vehicle construction. (K12)

396-K. Fastening Aluminum. Pt. 4. Special Rivets, Screws and Bolts. F. L. Church. Modern Metals, v. 17, Apr. 1961, p. 68, 72, 74, 76, 78, 80, 82, 84.

Design and use of special fasteners for the Al industry. Various types of tools and methods of installation with blind rivets, pop rivets and self-sealing fasteners. (K13; Al)

397-K. Factors in Resistance Welding. D. Endquist. Canadian Welder, v. 52, Apr. 1961, p. 20, 22.

Weldability of steels, alloys and light metals as affected by resistivity, thermal conductivity, hot working temperature and prior surface preparation. Welding heat required determined by physical properties of metal. (K9s, K3)

398-K. (Russian.) Fluxless Welding of Aluminum and Its Alloys by Soft Solders. Ya. M. Kanevskiy. Izvestiya Akademii Nauk SSSR, May 1960, p. 146-149.

Simultaneous removal of oxide film, tinning and soldering of Al specimens using a portable electrofurnace and an abrasive wheel consisting of compressed solder chips and asbestos. (K7, 1-52; Al)

399-K. Resistance Welding Characteristics of Sheet Steels. G. E. Grotke and W. D. Doty. Paper from "Porcelain Enamel Institute Forum, Transactions". v. 20, Porcelain Enamel Institute, Inc., Washington, D. C., 1958, p. 13-23.

Review of the basic principles of resistance welding processes to show why incompatibility of different types of low-carbon steel sheet is to be expected. Spot welding, projection welding, seam welding, upset-butt welding and flash welding. Influence of carbon content, electrical resistivity, microstructure, grain size and surface condition on resistance welding characteristics. (K3; ST, 4-53)

400-K. New Welding Laboratory. Inco, v. 28, no. 1, p. 28-29.

Submerged-arc welding and automatic gas-shielded consumable electrode welding of Ni alloys, cast iron and dissimilar metals. Welds are inspected by X-rays. (K1e, K1d; CI, Ni-b)

401-K. Long-Armed Welder Reaches the Inaccessible. Metalworking Production, v. 105, Mar. 29, 1961, p. 62-63.

Blind spot welding of stainless steel corrugated parts inside airplane wings using a machine that applies 2500 lb. electrode pressure. (K3n, T24a; SS)

402-K. Arc Welding Rear Axle Housings and Related Assemblies. W. F. Williams and S. M. Spice. SAE Preprint 329A, 1961, 8 p.

Automatic submerged arc welding, using bare or copper-coated steel wire and externally added granular flux and "Inner shield", a process using a flux cored steel wire without externally applied flux or gas shield, are used with seam and Mig welding techniques to fabricate automobile axle assemblies. (K1, K3, T21c; ST)

403-K. Gas Shielded Fusion Welding in Automotive Production. R. E. Brooks. SAE Preprint 329B, 1961, 9 p.

Development of CO_2 shielded welding and inert gas-shielded consumable electrode welding processes and equipment. Application in the fabrication of automobile parts. (K1d, T21)

404-K. (French.) Welding and Brazing of Copper and Its Alloys. Pt. 6. Silver Brazing. Cuivre Laitons Alliages, Jan-Feb. 1961, p. 3-9.

Torch brazing of steel and Cu using Ag containing Cu, Zn and Cd as filler metal. Characteristics of the filler metal and of the surfaces to be joined. (K8g; Cu, Ag-b, SGA-f, 17-57)

405-K. When a Clean Weld Is Needed. Charles E. Reeb. Metalworking Production, v. 105, Apr. 5, 1961, p. 57, 59.

Production of a tractor track-roller by submerged arc welding of steel forgings using a mild steel electrode. (K1e, T3n; ST, 4-51)

406-K. (French.) Calculation of the Thermal Processes of Welding. N. N. Rykaline. Soudage et Techniques Connexes, v. 15, Jan-Feb. 1961, p. 5-38.

Calculation of heat distribution on the surface or in the interior of parts during arc, oxy-acetylene and resistance butt welding. 6 ref. (K-general)

407-K. (Italian.) Formation of Hydrogen Bubbles Under the Action of Static Loads. V. O. Valanti. Rivista Italiana Della Saldatura, v. 12, Nov-Dec. 1960, p. 269-281.

Ultrasonic investigation of the formation of hydrogen bubbles (fish eyes) in weld metal under static load during application of basic, acid and rutile electrodes. (K1, S13g, 3-68; 7-51, 9-68, H)

408-K. Gas Pressure Bonding Ready for Production Role. Steel, v. 148, May 1, 1961, p. 56-58.

Diffusion bonding, a technique employing high pressures and temperatures to join refractory metals, is applied to bonding of fuel element components, Cb, Mo and other metal alloys. (K5k; EG-d37)

409-K. New Techniques, Alloys Widen Brazing Horizon. Steel, v. 148, May 1, 1961, p. 70-72.

Review of recent advances in brazing technology including wide gap brazing, fiber metal shim method and plasma spray application of braze materials. (K8)

410-K. Argon Flush: Key to Fabrication of Titanium Clad Steel. C. L. Kobrin. Iron Age, v. 187, Apr. 27, 1961, p. 110-111.

Stainless steel sheets are roll bonded to Ti strip in an argon atmosphere at less than 1750° F. to produce four deck sandwiches with strong, ductile bonds. (K5j; SS, Ti)

411-K. Roll Weld Method Bonds Panels. Iron Age, v. 187, Apr. 27, 1961, p. 114.

Roll welding produces sound core-to-cover bonds in corrugated-core Ti and Al alloy panels without jigging. Materials are hot rolled to pressure weld the peaks of the corrugated metal core to the cover sheets. (K5j; Al-b, Ti-b, 4-57)

412-K. Arc Spot Welding in Automotive Production. B. L. Kosink. SAE Preprint 329C, 1961, 9 p.

Principles of nonconsumable and consumable arc spot welding processes with design considerations for selection in welding automobile components of various steels of different configurations and heat treated hardnesses. (K3n, T21)

413-K. Adhesives for Ordnance. M. J. Bodnar. Ordnance, May-June 1960, p. 954-955.

Epoxies, epoxy-phenolics, nitrite-phenolics and vinyl-phenolics are used to obtain high-strength bonding of missile components. Bonding tests are performed on steel, Al, Cu, Cd, Zn, Be, Nb, Ag, Mo, Re, Ta, W, U238 and Zr. Data are given on adhesive bonding of high explosives to themselves and to other adherents. (K12, T2p)

414-K. Designing Ferrous Parts for Furnace Brazing With Copper. E. C. Buckingham. Machinery (London), v. 98, Apr. 12, 1961, p. 816-825.

Data given for the effect of brazing temperature on the tensile strength of the joint and on the degradation of the joint through progressive oxidation. (K8j, Q27a; Fe-b)

415-K. How Explosives Weld Metals. Iron Age, v. 187, May 4, 1961, p. 83-85.

Advantages of explosive welding of Al to Al, stainless steel to Ni alloys,

stainless steel to stainless steel and Cu to Cu systems. Effect of plate thickness, explosive thickness, length and width of the system and other parameters. (K6, NM-k34; Al, Cu, Ni, SS)

416-K. (Swedish.) Adhesive Bonding of Aluminum. S. Backman. Industriell Teknik, v. 88, Nov. 30, 1960, p. 867-872.

Evaluation of strength of various joint designs with emphasis on tensile strength of overlap joints as functions of the length of overlap and the material thickness. Deformation of base material and adhesive is observed under tensile stress. 5 ref. (K12, Q24, Q27; Al, 7-58)

417-K. Production Equipment and Methods for Cross Wire Welding. Wire Industry, v. 28, Apr. 1961, p. 363-364.

Production of mild steel wire mesh by spot welding of a parallel system. (K3n, 1-52; CN, 4-61)

418-K. Dip Brazing Aluminum Assemblies in Large Facility at Meridian Metalcraft, Inc. Industrial Heating, v. 28, Mar. 1961, p. 468-470, 472, 480.

New process permits fabrication of assemblies from stock or machine formed shapes and of brazing parts into an integral unit in production quantities without warpage or high scrap loss. (K8n; Al)

419-K. Honeycomb Structure Output Speeded. Missiles and Rockets, v. 8, May 1961, p. 42-43.

Brazing of stainless steel and A-286 high-temperature steel in a vacuum furnace at 1640° F. using a brazing foil containing 93% Ag, 7% Cu and 0.2% Li. Ultimate tensile strength, yield strength and elongation given for resulting structures. (K8j, 1-73; SS, SGA-h, 4-57)

420-K. Tools From Honeycomb Scrap. Waldo C. Voth. Metalworking Production, v. 105, Apr. 19, 1961, p. 76-78.

Al honeycomb scraps from production runs on aircraft components are joined together by simple presswork then covered with glass cloth and epoxy resin to stiffen the mass and provide smooth outside surfaces. Application of the laminate panels in assembly jigs, fixtures and inspection tools. (K13r; Al, 4-57)

421-K. Plasma Torch Learns to Weld. American Machinist/Metalworking Manufacturing, v. 105, Apr. 17, 1961, p. 115.

Description of an advanced form of Tig welding in which the arc and the inert gas pass through a constricted orifice designed to turn the gas into a plasma at 10,000° F. and up. (K6)

422-K. Now It's Explosive Welding. American Machinist/Metalworking Manufacturing, v. 105, Apr. 17, 1961, p. 119.

A jetting effect is produced when two metal plates come together with a high relative velocity at some angle to each other; material at interface plastically deforms into ripples. Interaction between the two surface jet elements and a rapid release of the load permanently welds parts. (K6)

423-K. Joining Refractory Metals Is Tricky Business. G. M. Slaughter. SAE Journal, v. 69, May 1961, p. 52-55.

Welding and brazing of Be to refractory metals W, Ta, Mo, Cb, Fe and Ni. A study is made on the influence of impurities on transition temperature for recrystallized metals. Intermetallic formation, weld porosity and thermal expansion behavior are discussed. (K-general; Be, Cb, Fe, Mo, Ni, Ta, W)

424-K. Adhesive Takes High Heat and Shock. Missiles and Rockets, v. 8, Apr. 24, 1961, p. 40.

Development of an adhesive with low expansion coefficient, "Astroceram", for bonding ceramics, refractories, quartz and metals which withstands continuous service temperatures of over 4000° F. Data are given for mechanical properties including 8-9 Moh hardness, 10,000-15,000 psi. tensile strength and compressive strength of 80,000-150,000 psi.; physical properties and chemical composition with suggested missile-space applications. (K12, 2-62; SGA-h, NM-d34, 17-57)

425-K. Roll Wobbler Reconditioning. Welding Fabrication and Design, v. 4, Mar. 1961, p. 17-18.

Rebuilding of worn roll wobblers by metal arc welding with a low hydrogen, mild steel electrode and hard facing using a Cr, Mo, medium carbon steel alloy in submerged arc welding process. (K1e, K1g, W23p)

426-K. (German.) Welding of Large Tubes by the Under-Powder Method. Schweisstechnik, v. 15, Apr. 1961, p. 43-46.

Welding operations (seam preparation, adjustment of welding heads, pouring of powder) and welding conditions (purity and grain size of powder, amperage and voltage ranges) in under-powder welding of large-diameter steel tubes. Welding defects including cracking of Ellira seam, incomplete welds, necking and notch formation. (K6; ST, 4-60)

427-K. Design for Faster Spotwelding. Walter Blumenstein. Product Engineering, v. 32, Apr. 24, 1961, p. 76-80.

Design considerations for welds and weld spacing for producing stronger welds at faster production rates. Recommended practices for spotwelding austenitic stainless, hardenable and low, medium and high-carbon steels; Cu and Be-Cu alloys; and Al, Mg, Ni and their alloys. Materials are rated in terms of weldability and minimum shear strength per spot. (K3n, K9; ST, Cu-b, Al-b, Mg-b, Ni-b)

428-K. New Techniques in Bonding Solid Fuel Rocket Motor Cases. Philip Rosenberg and Samuel J. Dastin. SAE Preprint 330C, 1961, 5 p.

Evaluation of various structural adhesives and techniques for fabrication of high-strength steel bonded cases based on metal design allowables up to 350,000 psi. Materials considered include polyamide epoxy, vinyl-phenolic, rubber phenolic-epoxy, epoxy, rubber-phenolic, epoxy-phenolic and epoxy-silicone-phenolic. Tests failed on motor cases at 250,000 psi. 5 ref. (K12, Q10c, T2p; AY, NM-d34, 17-57)

429-K. Vanadium at the Keystone. Union Carbide Metals Review, v. 4, Winter-Spring, 1961, p. 26-27.

Vanadium is used for arc and resistance welding of Ti to steel, forming corrosion resistant, strong and nonbrittle joints. Data are given for tensile and shear tests on weldments. (K1, K3; ST, Ti, V)

430-K. (Dutch.) Oxy-Acetylene Welding of Aluminum. Lastechniek, v. 27, Feb. 1961, p. 27-29, 32-33.

Choice of welding wire composition and diameter for pure and alloyed Al sheet of 1-10 mm. thickness. Use of hygroscopic and nonhygroscopic fluxes. Joint design, cleaning of parts to be welded, fixtures used for keeping the parts in place. Protection of still hot weldments against air drafts. Removal of hygroscopic flux residues. (K2h; Al, 4-53)

431-K. (Dutch.) Argon-Arc Welding of Small Pressure Vessels From Alloy Steel for Use in Airplanes and Rockets. Lastechniek, v. 27, Feb. 1961, p. 36-38.

Welding of spherical and cylindrical containers of 0.16-32 l. capacity from SAE 4130 steel sheet using a filler wire of Mn steel with a low carbon content and no more than 0.010% S and 0.015% P. Previous cleaning with trichloroethylene and shot blasting. X-ray testing. Heat treatment of welded containers at 900° C., oil quenching, tempering at 480° C. Pressurizing and fall testing. (K1d, T26q, T24; AY, 4-53)

432-K. (Dutch.) Welding of Cupronickel Tubing to a Steel Plate for Use in High-Pressure Pre-Heaters. G. E. Tummers. Lastechniek, v. 27, Jan. 1961, p. 1-3.

Tubing is arc welded to a ST 50 steel plate using an Incoweld A electrode containing 13-17% Cr, 1-3% Cb, maximum 0.5% Cu, maximum 0.75% Si, 6-12% Fe, 0.5-2% Mo, 1-3.5% Mn, maximum 0.15% C, remainder Ni or a Monel 140 electrode. To avoid absorption of S, P, C, H or O, cleanness of the joint from oil or fat and working with a dry electrode are essential. 14 ref. (K1; Cu-b, Ni, ST, 4-60)

433-K. (Dutch.) New Publications in the Field of Welding. G. van Schaick Zillesen. Lastechniek, v. 27, Jan. 1961, p. 3-10.

Literature review on welding equipment, materials, welding processes, design of welded structures, nondestructive testing and examples for welding operations performed. 99 ref. (K-general)

434-K. Developments in Stud Welding. D. J. N. Lauri. British Welding Journal, v. 8, Apr. 1961, p. 113-121.

Stud welding processes adapted to the welding of shear connectors utilized in bridge fabrication. Developments in Al alloy and steel stud welding are noted in terms of research designed to eliminate erratic welding results. (K1f; Al-b, ST)

435-K. Foil Seam Welding. F. Busse. British Welding Journal, v. 8, Apr. 1961, p. 123-129.

Working principles for the foil seam welding of butt joints in sheet metal panels. Practical results are given including guidance on sheet preparation techniques, choice of foil and selection of welding machine variables. (K3p; 4-53)

436-K. Automatic Tungsten-Arc Welding of Heat Exchangers. N. T. Burgess. British Welding Journal, v. 8, Apr. 1961, p. 141-150.

Development of procedures and inspection methods for welding power-station feedwater heaters and, in particular, the fabrication of precision points in tubular heat exchangers. 8 ref. (K1g, W13b)

437-K. Mild Steel Welding With Argon/CO_2 Mixtures. B. H. Baker, N. Crevis, J. A. Lucey and F. W. Lunau. British Welding Journal, v. 8, Apr. 1961, p. 151-161.

Report on argon/CO_2 mixture (20-25% CO) utilized in the bare wire, gas-shielded welding of mild steel indicates superior results over those obtained with argon/O_2 or CO_2 including better weld bead shape and lower voltage in deep transfer welding. 9 ref. (K1d, K1g; CN)

438-K. Some Recent Developments in Brazing. G. R. Bell. British Welding Journal, v. 8, Apr. 1961, p. 166-171.

History and application of brazing techniques including use of nickel-base brazing alloys with high alloy materials. Choice of flux is considered and need for joint clearance design stressed. 20 ref. (K8)

439-K. Ultrasonic Welding. S. W. Meville. British Welding Journal, v. 8, Apr. 1961, p. 177-187.

Report on welding by ultrasonic vibrations without the use of external heat. Investigations conducted utilize a rig applying axial pressure between two rotating disks, a rig using a vibrating reed principle and an ultrasonic cleaning set using piezo-electric barium titanate crystal blocks. 50 ref. (K6, 1-74)

440-K. Adhesives Open New Design Potential. H. J. Jankowski. Design Engineering, v. 7, May 1961, p. 48-50.

Data given for methods of surface cleaning, adhesive application and bonding cycle for bonding Al and Mg foils to form honeycomb structures. (K12; Al, Mg, 4-56)

441-K. Tests Prove 9% Nickel Steel Meets Requirements for Cryogenic Service. Pt. 1. Welding Engineer, v. 46, Apr. 1961, p. 46-47.

Tensile and bend test data for arc weldments in pressure vessels and plate specimens of a low-carbon, high-Ni steel developed for pressure vessel use at -100 to -320° F. Tensile and yield strength, elongation, ductility and notch toughness are compared to A-353 steel. (K9r, Q-general, 2-63; SS, 7-51)

442-K. Thin-Metals Percussive Welded Without Marring or Distortion. Charles A. Gunn. Welding Engineer, v. 46, Apr. 1961, p. 48-49.

Stud welding process uses electrical stored energy for simultaneous fusion of the abutting surfaces of the stud and workpiece. Applications include welding of similar and dissimilar metals such as Al, Zn, Cu, brass and stainless and plated steels. (K3a; Al-b, Cu-b, Zn-b, ST)

443-K. How to Evaluate Shrink and Draw Strains. Nicholas S. Hodska. Welding Engineer, v. 46, Apr. 1961, p. 50-54.

Design considerations for welding techniques and stress relief for minimizing shrink and draw strain variations in weldments involving study of grain growth, recrystallization and heat reactions of metals to be used. (K-general, J1, N-general, Q25; 7-51)

444-K. Reactive Metal Tubing is Tig Welded on a Production Basis. Welding Engineer, v. 46, Apr. 1961, p. 60, 62.

Welding of Ta, Cb, Zr and Hf tubes of 3 1/2-48 in. diameter using a-c. and d-c. Tig welders. (K1d; Cb, Hf, Ta, Zr, 4-60)

445-K. Automatic Mig Unit Slashes Field Pipe Welding Time. Welding Engineer, v. 46, Apr. 1961, p. 66.

Steel pipe of 4, 6 and 8 in. diameter is welded in situ with 0.040 in. wire at 45 in. per min. using Ar, He or CO_2 shielding by automatic equipment which does not require rotation of the pipe. (K1d, T26r, 1-52; ST)

446-K. Survey of Notch Tough Steels Shows Fabrication Problems. Thomas J. Dawson. Welding Engineer, v. 46, Apr. 1961, p. 75-76, 78.

Welding and heat treatment parameters for maintaining optimum ductility in quenched and tempered, notch tough, high-strength steels with emphasis on HY-80 low alloy steel. Mechanical properties, nature of the heat affected zone and weldability are given with some attention to development of notch toughness by alloying with Ni, Cr and Mo. (K-general, K9s, J-general, Q26s, Q-general, 2-60; AY, SG-a)

447-K. Nickel-Silver Brazing Solves Stapling Machine Production Problems. Jack Poulson. Welding Engineer, v. 46, Apr. 1961, p. 88, 90.

Fabrication of intricate stapling machine subassemblies from cold rolled L-5-C steel strip by brazing with a Ni-Ag alloy and using an automatic fluxing system. (K8; ST)

448-K. Flux-Cored Process Makes 5 Ft. Pass in 80 Sec. Welding Engineer, v. 46, Apr. 1961, p. 96.

Flux-cored CO_2 welding of rubber or neoprene covered 1020 steel rolls, the electrode wire being fed continuously from coils. (K1d; ST, 8-70)

449-K. Weld and Drag Pipelaying. Light Metal Age, v. 19, Apr. 1961, p. 4-5.

Seamless 6061 T6 Al alloy pipes, having regular wall thickness at the ends and thin walls along the length, are joined by stationary welding machines and then dragged or pulled across rough terrain to form a permanent pipeline. The uncoated and unwrapped buried pipeline is protected by Mg anodes. (K-general, T26r; Al-b)

450-K. World's Tallest Structure...Design Said "Weld It". Elda Jones and K. H. Zeigler. Welding Engineer, v. 46, May 1961, p. 46-47.

Structural componenents of Man-Ten and A-7 steel are manual metal-arc welded to form a 1676 ft. television transmitting tower. (K1g; ST, 4-57)

451-K. 1280 Tons of Blast-Proof Doors for Missile Site. Howard E. Jackson. Welding Engineer, v. 46, May 1961, p. 48-49.

Submerged-arc and metal-arc welding are used to join steel beams to form a blast proof door. (K1e, K1g; ST, 4-57)

452-K. Old Standby A-7 Steel Used in All-Welded Building Frame. E. E. Hanks. Welding Engineer, v. 46, May 1961, p. 50-51.

Beams of A-7 steel are submerged-arc and metal-arc welded to form a 120 by 208 ft. building. (K1e, K1g; ST, 4-57)

453-K. Automatic Welder Joins Aluminum Gas Line. Welding Engineer, v. 46, May 1961, p. 54.

Mig welding and drag pipelaying operations are combined to produce a permanent Al pipeline. (K1d, T26r; Al)

454-K. Low Cost Sandwich Panels. Welding Engineer, v. 46, May 1961, p. 63.

Development of a new roll-welding process for production of corrugated-core sandwich panels which may be extensively formed after assembly. (K5j; 4-57)

455-K. Speed Auto-Body Production by 40%. Welding Engineer, v. 46, May 1961, p. 64.

Mig spot welding has replaced manual metal arc welding in a Detroit automotive body plant. Welds are made 3-20 times faster, weld characteristics being controlled by the arc duration time and electrode feed rate. (K1d, T21a)

456-K. Integral Pressure-Vessel Welding Techniques. Leo E. Gatzek and Ivan Rattinger. American Society of Mechanical Engineers, Paper no. 61-AV-14, 1961, 8 p.

Fusion and resistance welding techniques for welding Al alloys, stainless steels and other materials found in pressure vessels. Inspection and nondestructive test methods. (K1, K3, T26q; Al-b, SS, 17-57)

457-K. New Joining Processes for Uncommon Materials. R. E. Monroe. American Society of Mechanical Engineers, 61-AV-61, 1961, 7 p.

Review of electron beam, ultrasonic, plasmajet and explosive welding, inert gas-shielded electrode welding, diffusion bonding and brazing techniques for uncommon materials such as Cb, W, Ti and Zr. (K-general; Cb, Ti, W, Zr)

458-K. Bonding of Structural Adhesives. E. J. Sydor. SAE Preprint 330B, 1961, 5 p.

Review of developments in structural adhesives, in particular thermosetting compounds, and bonding methods. Evaluation of bonding strength of adhesives containing cyanoacrolates and modified epoxies by lap-joint bonding of coupons of Alclad Al 24ST3 under varying conditions with subsequent determination of room temperature tensile shear strength. (K12; Al-b, NM-d34)

459-K. Fusion Welding of the Less Common Metals. J. M. Newburn. Paper from "Australian Atomic Energy Symposium". Melbourne University Press, Melbourne, Australia, 1958, p. 216-220.

Review of the literature on the fusion welding of Be, Hf, Cb, Ta, Th, Ti, U, V and Zr. Direct current inert gas-shielded arc process is the preferred welding procedure. 65 ref. (K1; Be, Cb, Hf, Ta, Th, Ti, U, V, Zr)

460-K. (German.) Maximum Tensile Shear Strength in Spot-Welding of Carbon Steel Sheet With Up to 6 Mm. Thickness. O. Becken and K. Havers. Schweissen und Schneiden, v. 13, Apr. 1961, p. 127-135.

Test spot-welding of 0.88-6.2 mm. thick steel sheet (0.03-0.09% C) of given tensile strength using spot-welding machines of 0.5-3 tons electrode force. Subsequent tension-shear testing to evaluate strength as influenced by sheet thickness and spot diameter. (K3n; ST, 4-53)

461-K. (German.) Influencing Factors, Quality and Strength in Resistance Spot Welding. W. Glage. Schweissen und Schneiden, v. 13, Apr. 1961, p. 135-140.

Criteria for assessment of spot quality. Representation of quality (in terms of tensile shear strength) of spot-welding junctions of 1 mm. thick steel sheet as a function of welding variables such as welding current, welding time, electrode force, spot diameter and electrode diameter in terms of a nomogram. (K3n, Q2g; ST, 4-53)

462-K. (German.) Projection Welding Reduces Production Time. E. A. Otto. Schweissen und Schneiden, v. 13, Apr. 1961, p. 146-151.

Projection welding of sheet and tube material is discussed in terms of electrical features including current distribution, geometrical shape and size of projections and welding tools, welding machines and economics. (K3q; 4-53, 4-60)

463-K. (German.) Root Welding of High-Stress Tubes of Low and High-Alloy Steels. R. Faulstich. Schweissen und Schneiden, v. 13, Apr. 1961, p. 160-165.

Root welding of 13CrMo44 and X10 CrNiMoTi1810 steel tubes of varying diameter and wall thickness using quartz ring with hard glass fiber texture and steel rings for root support. Reaction mechanism. Quality of weld. (K-general; AY, SS, 4-60)

464-K. (French.) Welding of Chromium Steel. H. Gerbeaux. Metallurgie et la Construction Mecanique, v. 93, Feb. 1961, p. 111, 113-114, 117.

Fusion welding of steel with varying Cr content. Composition of welding metal. Treatment of welded seam. (K1; ST, Cr)

465-K. Furnace Brazing of Stainless Steel Assemblies. H. M. Webber. Metal Progress, v. 79, May 1961, p. 108-111, 118, 120, 122, 124, 126, 128.

Furnace brazing, employing a variety of protective atmospheres, furnaces and filler metals, offers a number of advantages. Many flux-free nonporous joints can be brazed simultaneously and economically, dissimilar metals with wide thickness variations can be joined and close tolerances can be held. (K8j; SS)

466-K. Welding Engineers Meet in California. R. C. Bertossa. Metal Progress, v. 79, May 1961, p. 136, 138, 140, 142, 144, 150.

Short summaries of papers on the welding of Al and high-temperature alloys. (K-general)

467-K. The Role of Joint Design in Furnace Brazing. Ray N. Omans. Assembly & Fastener Engineering, v. 4, May 1961, p. 25-28.

Forming of lap joints, butt joints and scarf joints by Cu furnace brazing. Brazed joints show uniform strength, have low residual stress and minimal heat distortion. (K8j)

468-K. (German.) Estimation of Strength and Dimensions of Single Overlapped Metal

Bonds. Heinz Muller. Fertigungstechnik und Betrieb, v. 11, Feb. 1961, p. 131-135.

Calculation of bonding strength depending upon dimensions of overlap. Tensile-shear tests for varying lapping lengths and thickness of adhesive of polyurethane bonded AlMg3 sheets. (K12; Al-b)

469-K. (Dutch.) Carbon Steel Tubing Butt Weldments With and Without Backing. Lastechniek, v. 27, Mar. 1961, p. 64-67.

Butt joints produced by oxy-acetylene welding or manual arc welding are exposed to an internal pressure causing a static tangential stress of 10 kg. per sq. mm. and an axial stress of 5 kg. per sq. mm. and simultaneously to tensile cycling at loads ranging from 12-26 kg. per sq. mm. and a frequency between 10^5 and 10^7 to determine fatigue strength. (K1, K2h, Q7a; CN, 4-60, 7-51)

470-K. (Slovak.) Welding of Thick Steel Parts. Josef Cabelka. Zvaracsky Sbornik, v. 10, Jan. 1961, p. 3-20.

Carbon steel is tested for its weldability by the VUS2S method. Effect of oxygen and nitrogen on aging notch impact strength and weldability. Use of vacuum melted steels or steels that were refined under special slags and preheating up to 250° C. prior to manual arc or electroslag welding are suggested. (K1, K6, K9s; CN)

471-K. (Slovak.) Spot Welding of Low and High-Alloy Steels Combined With a Heat Treatment Carried Out by Means of Plier Electrodes. G. A. Maslov. Zvaracsky Sbornik, v. 10, Jan. 1961, p. 21-33.

Sheets of 30KhGSA, 12G2A and EI659 steels of 0.8-3.5 mm. thickness are spot welded by a process allowing regulation of heating and cooling velocities. Embrittlement of the center of weld and the heat exposed zone is avoided and increased strength of the weldment achieved. 5 ref. (K3n; AY, SS, 4-53)

472-K. (Slovak.) Welding of Thin Sheet in a CO_2 Atmosphere. I. I. Zaruba. Zvaracsky Sbornik, v. 10, Jan. 1961, p. 34-40.

Automatic and semi-automatic welding by carbon or very thin consumable electrodes of 0.5-1.2 mm. diameter. Mixed Ar/CO_2 atmospheres can be used. Materials include 1-3 mm. thick sheets of NL2, SKhL1, SKhL4, 14KhGS, MSg4, 15KhM, 20KhM, 20KhMF, 2Kh13, Kh17N2 or 1Kh18N9T steel. (K1; ST, 4-53)

473-K. (Slovak.) Automatic Flash Welding. Viorel Miclosi. Zvaracsky Sbornik, v. 10, Jan. 1961, p. 51-64.

Description of equipment used in the welding of tracks. Wiring diagrams and diagrams showing phases of the welding current. Relationship between current and the velocity at which the portions to be welded are brought together. (K3r, 1-53)

474-K. Beryllium Joining RAD Sponsored Program. J. B. Cohen. Avco Corp. (Wright Air Development Division). U. S. Office of Technical Services, PB 161830, Apr. 1960, 45 p. $1.25.

New brazing techniques for joining Be to itself. A Be 20 at.% Ag brazing alloy yields joint strengths at room temperature of 60% (30,000 psi.) of that of the base metal. In temperature ranging from 700-1450° F. the joint strength is 80% that of the base metal. (K8; Be)

475-K. Beryllium Joining WADS Sponsored Program. E. M. Passmore. Avco Corp. (Wright Air Development Division). U. S. Office of Technical Services, PB 161831, Apr. 1960, 127 p. $2.75.

Joining of Be plates and rods by braze welding, fusion welding and pressure welding investigated to develop improved methods for applications at both room and elevated temperatures. Braze welding with Ag filler metal and pressure welding without filler are the most promising techniques for joining Be. (K-general; Be)

476-K. Some Design Considerations for Welded Aluminium. S. R. Banks and R. E. Smith. British Welding Journal, v. 8, May 1961, p. 199-206.

Paper outlining factors relevant to the design of welded Al structures. Characteristics of various Al alloys are described and comparisons are made with structural steel. Typical applications. Static and fatigue strength of welded Al joints. 19 ref. (K-general; Al, 4-57)

477-K. Development of Mig Welding Techniques for Aluminium. J. E. Tomlinson and D. Slater. British Welding Journal, v. 8, May 1961, p. 216-226.

Development of inert-gas metal arc welding equipment, practice and standards as applied to Al. Material preparation, joint configurations, welding procedure and standards of weld quality. 10 ref. (K1d; Al)

478-K. Factors Influencing the Properties of Welds in Aluminium. J. C. Bailey and G. W. Eldridge. British Welding Journal, v. 8, May 1961, p. 227-236.

Review of the currently established procedures for Tig and Mig welding of Al and its alloys and the methods developed for testing the welds. Factors underlying the occurrence of defects such as weld cracking, porosity and oxide inclusions. Other factors influencing properties such as filler rod composition, extent of the heat affected zone and welding variables of speed and current. 16 ref. (K1d, K1g; Al-b)

479-K. Aluminum Welding Practice. L. Capel. British Welding Journal, v. 8, May, 1961, p. 245-257.

Factors that affect quality of welds in Al made by Mig and Tig welding processes. Illustrated formulae for calculation of distortion. Nondestructive methods for examination of welds. Detailed recommendations for radiographic methods. (K1d, K1g; Al)

480-K. Welding Progress: Has it Levelled Out? Harry Thomasson. Canadian Metalworking, v. 24, May 1961, p. 41-45.

Evaluation of the state of research and development in automatic arc welding, arc grouping, oxy-fuel gas cutting and resistance welding and brazing with emphasis on techniques for joining steel, cast iron and exotic metals. (K-general, 10-54; ST, CI, EG)

481-K. The Soldering of Magnesium. Tin and Its Uses, no. 51, 1961, p. 13-14.

Deposition of Ni or Cu on Zn coated Mg prior to electroplating with Sn and subsequently "flow melting" with tinning oil to form an easily solderable layer. (K7; Mg)

482-K. Now... Pre-Shaped Epoxy Adhesives. Vincent Sussman. Product Engineering, v. 32, May 22, 1961, p. 43-45.

Applications of preshaped epoxy adhesive pellets in metal-plastics and metal-metal bonding of Al, Cu, brass, plated Cd, stainless and alloy steels, Ta and other metals. Data are given for curing temperatures and times, surface preparation of the metals and bond properties. (K11, K12; Al, Cu-b, Cd, ST, Ta, NM-d34, 17-57)

483-K. Metal Honeycomb Costs Cut. Materials in Design Engineering, v. 53, May 1961, p. 19, 203.

Development of a roll welding process in which plates of corrugated metal cores are hot rolled and pressure welded simultaneously to cover sheets. (K5, F23, 1-66; 4-53)

484-K. Ultrasonic Welding Joins Stainless to Aluminum in Nuclear Power Plant. J. Koziarski and P. Dick. Materials in Design Engineering, v. 53, May 1961, p. 146-147.

Ultrasonic welding is used to produce joints which withstand 30-40 psi. gage air pressure and 1 atm. He pressure without leaking in a double shell having the inner skin composed of 321 stainless and the outer of 6061-T6 Al alloy. (K-general, 1-74; Al, SS)

485-K. Welding and Brazing of Refractory Metals. G. M. Slaughter. Society of Automotive Engineers, Paper no. 340E, 1961, 5 p.

Procedures for welding and brazing refractory metals and Be taking into account problems of transition temperature, reactivity with impurities, recrystallization of parent material, porosity in welds and intermetallic formation and thermal expansion differences in brazing. 20 ref. (K-general; Be, EG-d37)

486-K. The Fabrication of High Thrust Lightweight Jet Engines. S. Weiss and D. E. Hacker. Society of Automotive Engineers, Paper no. 340F, 1961, 7 p.

Tig welding procedures for 17-7 PH and 410 stainless steels, Inconel W, A 286 alloy and other materials for use in lightweight jet engines. Data are given for stress endurance, tensile strength, yield strength and elongation. (K1d, T24b; Ni-b, SS, SGA-h)

487-K. (German.) Automatic Welding of Large-Size Tanks. Technica, v. 10, Mar. 31, 1961, p. 388.

Automatic welding of up to 22 mm. thick tank steel walls in a single operation by the "circomatic" welding process, combined inert-gas-slag welding at high speed, using two welding heads, with

CO_2 as the protective gas. (K1d, K6, T26q; ST, 17-57)

488-K. (German.) New Welding Processes. J. J. Chyle. Technica, v. 10, Mar. 31, 1961, p. 401-406.

Review of special welding techniques such as thermocompression welding (wires to semiconductors), diffusion welding (Au-plated Be-Cu alloy to Cu-plated Monel), electroslag welding of very thick steel and iron plates, electron welding of high melting metals (W, Mo, Be, Ta, Zr, Hf), welding by ionized gases at 2800-16500° C. and soldering of sandwich constructions. (K-general, K6, K7, 10-54; W, Mo, Be, Ta, Zr, Hf, Fe-b, ST, Ni-b, Cu-b, 8-62)

489-K. (French-German.) Welding of Aluminum. Fritz Meier. Aluminium Suisse, v. 11, Mar. 1961, p. 70-75.

Review of modern Al arc welding methods using nonmelting (tungsten inert gas welding, argon arc) and flash-off electrodes (metal inert gas welding) and Ar as protective gas. Design of welding equipment; mechanical properties of welds. (K1d, W29, 1-52, 10-54; Al)

490-K. (German.) Autogenous and Electric Fusion Welding. Technik und Betrieb, v. 13, Feb. 1961, Insert.

Review of fusion welding principles in terms of pressure welding where metals are heated to the plastic state and joined under pressure (e.g., hammer welding, spot welding, thermit pressure welding, resistance pressure welding) and autogenous and electrical fusion welding where metals are heated to the liquid state. (K-general, 10-54)

491-K. (German.) Novel Development in Ultrasonic Technology. Technik und Betrieb, v. 13, Mar. 1961, p. 41.

Use of ultrasonic spot, seam and butt welding in joining metal foils to plates, welding of thin sheets and bonding of metals of different melting points. Discussion of reaction mechanisms, applicability of the process and welding equipment design. (K6r, 10-64; 4-53, 4-56)

492-K. Development of an All-Welded Tubular Truss Core Sandwich. Bertram Klein. Aerospace Engineering, v. 20, May 1961, p. 22-23, 54-55.

Step by step fabrication of a structural stainless steel sandwich consisting of a tubular truss core and two chemical-milled skins, one of which is perforated to facilitate spot welding. (K3n; SS, 4-57)

493-K. Effect of Surface Resistance on Seam Welding Cold-Rolled Steel. J. A. Schiefferle and D. B. Tolly. Paper from "Porcelain Enamel Institute Forum, Proceedings". v. 22. Porcelain Enamel Institute, Inc., Washington 6, D. C., 1960, p. 41-42.

Mechanical sanding and light pickling are used to decrease the surface resistance of cold rolled steel in preparation for resistance welding. (K3p; ST)

494-K. (Czech.) Welding of Steel Castings. Jan Plachy. Slevarenstvi, v. 9, Feb. 1961, p. 56-57.

Survey on weldability, correct choice of electrodes, directions for preheating and heat treatment of weldments. Materials considered are a number of steels of the CSN4226, 4227, 4228, 4229 groups and CSNN2713 steel. (K9s; ST, 5)

495-K. How Planemakers Weld Thin, Curved Pieces. Steel, v. 148, May 22, 1961, p. 116-117.

Argon arc welding of stainless foil, Ti, Rene 41 and Armco PH 15-7 Mo. (K1d; Ni-b, SS, Ti, 4-56)

496-K. Rubber to Metal Bonding Needs No Primer, Adhesive. Steel, v. 148, May 22, 1961, p. 118.

New compound is applied to the metal surface under pressure to improve surface contact and to force out trapped air and volatiles which may degrade the rubber structure and bonding capacity. The rubber can be used for both ferrous metals and for nonferrous metals such as Al. (K11c; Al, Fe-b)

497-K. Inert-Gas Tungsten-Arc Spot-Welding for Missile Assemblies. W. P. McGregor. Machinery (London), v. 98, Apr. 19, 1961, p. 886-888.

Tig spot-welding of Atlas missile components composed of 301 and 321 stainless steels, Cu, Al, K-Monel, brass, Ti and Al alloys. Inert shielding gases are He and A. The weld quality is influenced by current density, arc length, number of cycles, gas coverage and flow, type of electrode and

its preparation, base metal preparation, back-up material and contact of mating surfaces. (K1d, T24e; Al-b, Cu-n, Ni-b, SS, Ti)

498-K. Fundamental Study of Weld Joint Behavior (Experimental Submarine Structural Materials: Evaluation of Cast HY-80). A. J. Babecki and P. P. Puzak. Report of NRL (Naval Research Laboratory), Apr. 1961, p. 39-41.

Comparison between wrought and cast HY-80 Ni-Cr-Mo alloy steel for optimum weldability and weldment strength properties by Charpy V-notch, Navy drop-weight and tensile tests at low temperature. Data are given for mechanical properties after various heat treatments. (K9s, Q-general, 2-63, 2-64; AY, 7-51)

499-K. Development of D-6-A Steel Rocket Motor Cases. George R. Sippel, George L. Vonnegut and Dean K. Hanink. Paper from "Symposium on the Testing and Evaluation of Materials for Solid Propellant Rocket Motor Casings". Report no. MAB-156-M. National Academy of Sciences, Washington 25, D. C., 1959, p. 273-304.

Tig welding, heat treatment, inspection and pressure testing of high-strength D-6-A alloy steel rocket motor cases. Development of instrumented bend test and correlation of bend test parameters with hoop burst strength of 24 in. diameter cases. Effect of tempering temperature. (K1d, J-general, Q-general, T2p, 2-64; SGB-a, TS, 17-57)

500-K. Switch to Semiautomatic Welder Speeds Railcar Assembly Work. M. H. Waggener. Iron Age, v. 187, May 25, 1961, p. 113-114.

Fabrication of railcar by arc welding steel structural shapes with inner shield semi-automatic squirt welder that has an 80% operating factor and can deposit a 1/4 in. fillet at up to 50 ipm. (K1, T23p; ST, 4-57)

501-K. Producing Brazed Honeycomb Panels for the B-70 Bomber. C. L. Pelton. Assembly & Fastener Engineering, v. 4, June 1961, p. 37-40.

Brazing PH-15-7 Mo stainless steel in an inert atmosphere to form honeycomb panels for aircraft structures. (K8, T24a; SS-e)

502-K. Seam Welder Joins Strip Quickly. Iron Age, v. 187, June 1, 1961, p. 78.

Resistance welding machine used together with a continuous annealing line. It moves in automatically joining the stainless steel strip for its trip through the furnace. (K3, J23; SS, 4-53)

503-K. Adhesive Bonding of Metals for Advanced Ordnance Applications. John J. Veliky. Feltman Research Laboratories. U. S. Office of Technical Services, PB 161863, Sept. 1960, 21 p. $. 75.

The practicability of bonding unusual metals such as Be, Cr, Au, Ag and U^{238} with two thermosetting adhesives, a polyester and a polysulphide-modified epoxy are explored. Two additional adhesives, a polyurethane and an epoxy polyamide are used with the uranium because of difficulties encountered in bonding to this material. (K12; Be, Cr, Au, Ag, U)

504-K. Adhesive-Bonded Rocket Cases. Samuel J. Dastin and Philip Rosenberg. SAE (Society of Automotive Engineers) Journal, v. 69, June 1961, p. 90-91.

Fabrication of rocket motor cases with higher resistance to internal pressure using overlapping rings of high-strength, H11 hot work die steel with bonding by a "composite" epoxy resin structural adhesive. Data are given for shear stress distribution as a function of load and flexibility. (K12, T2p, 3-66; TS-k, 17-57)

505-K. How They Made the Space Capsule. William Dubusker. American Machinist/Metalworking Manufacturing, v. 105, May 15, 1961, p. 130-132.

Fabrication of Project Mercury capsule from Ti sheets and Rene 41 alloy by resistance-welding, arc-welding and hot forming at 1000^{o} F. Fiberglass is used as thermal and electrical insulation. (K-general, G-general, T24e; SGA-h, Ti, NM-f, 17-57)

506-K. Mig Welder Boosts Arc Time. Frank Kopczyk. American Machinist/Metalworking Manufacturing, v. 105, May 15, 1961, p. 138.

Semi-automatic welding of Fe tractor radiator guards using the Dual Shield process which employs a flux-cored electrode wire and an arc shielded with CO_2. Both the electrode and the CO_2

are fed through a water-cooled welding gun at present rates governed by an electrical control unit. (K1d, 1-52, T3n; Fe-b)

507-K. New Brazing Method Cuts Honeycomb Production Time 80%. J. F. Cochran. Metalworking, v. 17, May 1961, p. 18-19.

Honeycomb sandwich steel panels are brazed in an electrical resistance-heated fixture equipped with a bottom platen, a pressure box acting as the upper platen and an atmosphere barrier that protects the work from contamination. The fixture is also used for aging operations. (K8, 1-52; ST, 7-59)

508-K. Arcspots Speed Auto Body Production. Steel, v. 148, May 15, 1961, p. 149.

Consumable electrode spot welding of auto bodies by a process using a burnback control unit to eliminate problems of the electrode freezing in the molten pool and electrode burnback into the gun. (K3n, T21a)

509-K. Welding Plastic-Coated Steel Sheet. Sheet Metal Industries, v. 38, May 1961, p. 330, 358.

Steel sheet covered with polyvinyl chloride is projection-welded using a high-current short-duration pulse to form the weld without disturbing the plastic coating. (K3q; ST, 4-53, 8-70)

510-K. Automatic Large-Diameter Pipeline Welding. Canadian Welder, v. 52, May 1961, p. 28, 30.

CO_2 shielded arc welding of large diameter transmission pipe line in a fixed position in the field using a welding machine with a rotating head. No grinding or cleaning is required for the joints after welding. (K1d, T26r)

511-K. Plasma Arcs Set for Full Production Role. Steel, v. 148, May 29, 1961, p. 70-72.

Description of plasma arc torches. Application in cutting 4 or 5 in. ferrous and nonferrous metals at speeds up to 300 ipm., plating missile and rocket parts, surfacing and welding all metals at speeds comparable to those of standard Mig and Tig arc welding processes. (K6)

512-K. Automatic Arc Welding. J. R. Morgan. New Zealand Engineering, v. 16, Apr. 15, 1961, p. 142-146.

Advantages of automatic welding, especially submerged arc and open arc processes. Applications of automatic arc welding in constructional steelworking, sheet metal fabrication, hardfacing and welding of pressure vessels. Use of manipulators and positioners. (K1, T29n; ST, 4-57)

513-K. Friction Welding Behind the Iron Curtain. Machinery, v. 67, May 1961, p. 108-113.

Characteristics and technology of the friction-welding process. Influence of speed of rotation, preheating pressure and upsetting time on welding operations. Relationship between mechanical properties of weld and amount of upset. Design and automation of friction-welding machines for processing alloy and carbon steels, Al, Cu, bronze, brass and Ti. (K6; ST, Al, Cu-b, Ti)

514-K. Thin Gage Butt Welding "Grows Up". Gilbert C. Close. Mill & Factory, v. 68, June 1961, p. 89-90.

Thin gage butt welding and weld seam roll planishing of stainless steel sheet and screen to produce tubing, honeycomb and centrifuge screens with seam tolerances to 0.002 in. (K-general, K5j; SS, 4-53)

515-K. Review of Recent Developments in Metals Joining. J. J. Vagi, H. E. Pattee, H. W. Mishler, R. E. Monroe and R. M. Evans. Defense Metals Information Center, Battelle Memorial Institute, DMIC Memo. 109, May 25, 1961, 5 p. (Available as PB 171628 from U. S. Office of Technical Services, Washington 25, D. C.)

Flash welding, electron beam welding, inert gas shielded welding with tungsten arc, resistance spot welding, brazing and adhesive bonding of Mo-0.5 Ti alloy, F-48 Cb alloy, FS-82 Cb alloy, Cb-33 Ta-0.7 Zr alloy, Ta alloy, Ta, Mo and W. Testing at temperatures to 3200° F. to determine bend ductility and shear strength. 9 ref. (K-general; Cb-b, Mo, Ta, W)

516-K. Mechanical Properties of Molybdenum Welds Below 700° F. R. E. Pavlak, M. Christensen and A. L. Lowe, Jr. Welding Journal, v. 40, May 1961, p. 197s-201s.

Inert-gas-shielded tungsten arc welding of Mo and Mo alloyed with 0.5% Ti

to Mo and to low-alloy steels. Tensile strength and ductility of butt and lap joints in the temperature range 70-700° F. Microstructure of joints. 16 ref. (K1g, Q27, Q23p, M27; Mo, AY, 7-51)

517-K. A Solution Adopted in Some Difficult Applications of Flash Welding. Evert Bylin. Welding Journal, v. 40, May 1961, p. 229s-240s.

Investigation of flash welding with automatically controlled motor-operated upsetting as employed for joining flanges to centrifugally cast iron pipes and creep and heat resisting Ni alloys with the basic analysis of 50-70% Ni, 20% Cr, 0-20% Co, 5% Fe and 5% Al + Ti + Si. Influence of welding conditions on structure and UTS of the welds. 3 ref. (K3r, 1-52, M26, Q27; CI, 4-60, Ni-b, Cr, Co)

518-K. Pittsburgh Public Auditorium--Retractable Roof. E. Cohen and R. H. Goldsmith. Welding Journal, v. 40, May 1961, p. 501-516.

Design of cantilever space frame, movable leaves and rain-girder of dome-like auditorium roof with special attention to utilization of welded components and connections. Visual, radiographic and ultrasonic inspection of semi-automatic submerged arc and manual arc welded components. (K1, T26n, 17-51, S13; ST. 7-51)

519-K. Resistance Autobrazing of Wires to Intermetallic Thermoelectric Materials. W. A. Owczarski. Welding Journal, v. 40, May 1961, p. 517-521.

Process permits joining of metallic probes to compound thermoelectric materials and is characterized by self-melting of one base metal and wetting of second base metal to complete joint. Fe, chromel, alumel and Pt probes are joined to PbTe, Bi_2Te_3 and ZnSb. (K6q; Fe, Pt, Ni-b, Cr, Al, 4-61, 14-68)

520-K. A Welded Tubular-Bucketed Turbine Wheel. E. J. Clark. Welding Journal, v. 40, May 1961, p. 522-528.

New concept in turbine wheel design incorporates buckets formed from 0.01 in. thin-walled, age hardenable Ni alloy tubing which are welded to the wheel using the tungsten arc process. Development of welding procedures. Performance tests. (K1g, T7h; Ni-b, 4-60, 17-57)

521-K. Welded Steel Office Buildings. John F. Gulley. Welding Journal, v. 40, May 1961, p. 529-530.

Arc welding of steel structures. Emphasis on beam-to-column welded connections. (K1, T26n)

522-K. Stainless Steel Coil Permits Internal Cooling of Unique Welder Ignitron With Help of Tungsten-Arc Welding. Welding Journal, v. 40, May 1961, p. 530-531.

Forming of 304L stainless steel tubing into coils for water-cooled, Hg-pool vacuum tubes designed especially for welder control and similar a-c. control operations. Tungsten-arc welding is used to close one end of coils after winding and to join coil to cold rolled steel plates on the ends of the ignitron tube. (K1g, G6, W29c; SS, 4-60, 17-57)

523-K. Savings Made in CO_2-Shielded Welding. Foundry, v. 89, June 1961, p. 189-190.

Substitution of CO_2 for argon as a shielding agent in semi-automatic repair welding of steel castings. Analysis of welding quality and process cost. (K1d; ST, 5)

524-K. Factors in Joint Design Using Adhesives for Metal Bonding. H. R. Butzlaff and K. F. Charter. American Society of Mechanical Engineers, Paper no. 61-MD-14, 1961, 9 p. $1.

Effect of metal thickness, overlap and impact resistance on the ability of bonded lap joints to carry a load. Temperature, bond film thickness, joint geometry, time and loading, as they affect adhesive shear strength of mild steel, Al, Alclad and Dural test specimens. 19 ref. (K12; Al, CN)

525-K. Impact of Recent Developments in High-Strength Steels on Structural Design and Fabrication. Pt. 2. Design and Fabrication. R. H. Marvin. American Society of Mechanical Engineers, Paper no. 61-MD-8, 1961, 12 p. $1.

Evaluation of strain hardening and precipitation hardenable steels in practical structural designs. Determination of the uniaxial tensile strength-to-density ratio and elastic stability of

sandwich specimens of 301 stainless steel, 17-7 PH, PH 15-7 Mo and AM-355 steels fabricated by resistance and fusion welding. (K3; ST, SGB-a)

526-K. Stud Welding by Capacity Discharge. Light Metals, v. 24, May 1961, p. 143-144.

Ferrous and nonferrous small diameter studs are welded to plates by a capacity discharge. Process advantages and applications are noted. (K1f)

527-K. Seam-Welding Stainless-Steel Foil. W. A. Owczarski and R. E. Beach. Machinery, v. 67, June 1961, p. 106-109.

304 stainless steel foil, carbon steel, brass and Pt in thicknesses ranging from 0.002-0.006 in. are seam welded by using the proper current control and a modified bench-model spot welder. (K3p; SS, 4-56)

528-K. You Can--Flash-Weld Aluminum to Copper If You Have the Proper Tools. C. Dana Moore. Machinery, v. 67, June 1961, p. 144-147.

Al is flash welded to Cu using a welding machine which synchronizes the heat and force cycles and equates the differences in the conductivity of the two metals. The electric current produced is intense and synchronized with extreme accuracy. (K3r; Al, Cu)

529-K. (Italian.) Welding of Stainless Steel. Pt. 2. l'Acciaio Inossidabile, v. 28, Jan-Feb. 1961, p. 9-17.

Arc welding of 393 M and 249 M steels containing 13-17% Cr and 453 E, 832 MV and 254 E austenitic steels containing 18-26% Cr and 5-20% Ni. Thermal expansion, thermal conductivity and electrical resistivity as a function of composition. Effect of Ti addition on carbide precipitation. Directions for welding and subsequent descaling, mechanical polishing and sand blasting. (K1, P11, P15g, N7b, 2-60; SS)

530-K. Adhesives for Fabricating Speed Capsules. Harold H. Rosenbaum. Metal Progress, v. 79, June 1961, p. 80-85.

Adhesives are used extensively during construction of the capsules for the Convair 990 to bond components to the honeycomb floor panel and to seal all joints, thus forming a leak-proof tank for fuel. Added bonus is greater strength than obtained by using riveted construction alone. (K12, T24)

531-K. Testing Ceramic-Metal Brazes. J. Patrick Sterry. Metal Progress, v. 79, June 1961, p. 109-111.

The results of preliminary tensile and shear tests of ceramic-metal brazes show that the technique has a good potential for critical missile structures such as radomes. However, much work remains to be done before the method can achieve status as a standard practice. (K11b, K8, Q27, Q2)

532-K. Corrugated-Core Sandwich Construction. Metal Industry, v. 98, May 26, 1961, p. 413.

Production of corrugated-core sandwich construction from 2014 Al alloy, B 120 VCA Ti alloy, A-55 Ti, steel, Mo and Inconel sheet by roll welding, a process utilizing hot rolling to pressure weld the peaks of the corrugated metal core to the cover sheets. (K5j; Al-b, Mo, Ni-b, ST, Ti-b, 4-57)

533-K. Large Aluminum Heat Exchangers for Cryogenics Field Dip Brazed in Huge Salt Bath Furnace. Industrial Heating, v. 28, May 1961, p. 884-886, 888.

Dip brazing of Al heat exchanger cores with 22,000 sq.ft. of heat transfer surface. Equipment and procedure. (K8n, W13b, 17-57; Al)

534-K. Now. . . It's Explosive Welding. Metalworking Production, v. 105, May 24, 1961, p. 75.

Description and mechanisms of explosive welding. Present application for Al and steel plates. Effect of explosive welding on hardness values. Possible application in cladding of chemical vessels and piping. (K6, NM-k34; Al, ST, 4-53)

535-K. Stainless Welds Simplified. Steel, v. 148, June 5, 1961, p. 98-99.

Production of tough, ductile joints in austenitic stainless steels using arc and resistance welding and brazing techniques. (K1, K3, K8; SS-e)

536-K. Welding Zircalloy Tubing, Fin at Hanford Employs High Frequency Resistance Method. Western Metalworking, v. 19, May 1961, p. 28-29.

Process for welding Zr alloy tubing utilized in the fabrication of nuclear reactors by a resistance weld technique in which current reverses at 450,000 cps. and follows a low inductance path. Tubing, strip, channels, fins or ribs and T sections can be welded. (K3; Zr-b, 4-60)

537-K. Vacuum Process Solves Nuclear Weld Problem. Western Metalworking, v. 19, May 1961, p. 31.

Electron beam vacuum welding of nuclear fuel elements. Heated tungsten filaments (to 4150° F.) emit electrons which are then focused as a beam on the metal. Electron kinetic energy converts to heat resulting in melting and fusing. (K6, 1-73, T11g)

538-K. Roll Welding Method for Corrugated Core Panels. Western Metalworking, v. 19, May 1961, p. 45-48.

Roll welding process for producing metal corrugated-core sandwich panels. Hot rolling pressure welds the peaks of the core to cover sheets. (K5j; 4-57)

539-K. (Dutch.) Electron Beam Drilling and Welding. H. Huizing. Metaalbewerking, v. 26, Nov. 24, 1960, p. 208-210.

Electron drilling and welding of W, Mo, Ta and high-alloy steel sheet. Energy supplied per surface unit. Smallest surface to which the electron beam can be limited is 0.01 sq. mm. Apparatus. Structure of weldments. (K6, G24; Mo, SS, Ta, W)

540-K. Fundamentals of Resistance Welding. F. A. Bodenheim. Porcelain Enamel Institute Forum, Proceedings, v. 22, 1960, p. 34-40.

Review of process variables including current and resistance parameters and design of transformers and timers. Application of equipment in spot, projection, seam and butt and flash-butt welding. (K3, 1-52, 10-54)

541-K. Bi-Metallic Pipe. Dan Christopher. Mechanical Engineering, v. 83, June 1961, p. 68-71.

Electric arc and inert gas welding of bimetallic tubing consisting of carbon steel base material with thin Al, Zr, Ti, Cu, Monel, Ta, Ni, Inconel or 304, 316, 321, 347 stainless steel liners. Evaluation of corrosion resistance, stress-strain relationships, tensile modulus of elasticity, yield point, heat transfer, coefficient of thermal expansion and effects of applied pressure. 7 ref. (K1, P-general, Q-general; CN, Al, Zr, Ti, Cu, Ta, Ni-b, SS, 4-60, 8-62, 17-57)

542-K. Inclusions Are Eliminated in Upside-Down Welding. Steel, v. 148, June 19, 1961, p. 94.

Inclusions are eliminated during production of stainless steel, Ti and Zr tubing for reactor use by an upside-down welding process in which the contaminating tungsten flows downward because the electrode is under the work. (K1d; SS, Ti, Zr, 4-60)

543-K. (Spanish.) Flash Welding of Light Alloys. Jose Manuel and Gomez Martinez. Ciencia y Tecnica de la Soldadura, v. 10, Nov-Dec. 1960, p. 5-511, 1-15.

Experimental determination of the constants of Al-Mg alloys. Influence of butt welding on mechanical properties of Al and Al-Mg alloys. Welding equipment and applications. 9 ref. (K3r, Q-general, W29, 17-57; Al, Mg)

544-K. Friction Welding. Australasian Manufacturer, v. 46, May 13, 1961, p. 44-47.

Method and technology of friction welding for high-speed and carbon steels, 18-8 steel, Al, Cu, bronze, brass and Ti. Power consumption, friction moment, speed, pressure and volume of upsetting during a welding cycle. Relationship between amount of upsetting and tensile strength for friction welded high-speed and carbon steel. (K6; Al, CN, Cu-b, SS, TS-m, Ti)

545-K. Welding Is Adaptable. Engineering Materials and Design, v. 4, June 1961, p. 346.

Welding of ferrous metals, Al, Mg, and Cu by various techniques including argon arc. Applications in design and engineering, maintenance and repair. Mechanical repair of castings by stitching of metal. (K-general, K1d, 18-72; Fe-b, Al, Mg, Cu)

546-K. Stud Welding to Thin Sheet. Engineering Materials and Design, v. 4, June 1961, p. 370.

Capacity discharge stud welding utilizing a large bank of capacitors

and a power pack to recharge them. The advantage claimed is the use of single-phase current where three-phase is not available or convenient. Application to welding studs or attachments to thinner plate than is feasible by conventional arc stud welding. (K1f)

547-K. Adhesive Bonding of Metals--What Are Design Factors. Iron Age, v. 187, June 15, 1961, p. 110-112.

Lap, bevel and bonded joints of phenolic and epoxy adhesives to Al and mild steel. Overlap, thickness and joint design affect lap joint strength. Peeling stresses combined with effects of differential straining reduce strength of lap joints. (K12; Al, CN)

548-K. (French.) Soldering and Brazing of Copper and Its Alloys. Pt. 4. Cuivre, Laitons, Alliages, no. 60, Mar-Apr. 1961, p. 3-10.

Furnace induction, resistance, dip and fused bath brazing of carbon and alloy steel and Cu and brass. Use of solders containing Cu, Ag or P and methods of application. (K7, K8; Cu-b, ST, SGA-f, 17-57)

549-K. (Book-French.) Metallurgy of Steel Welding. D. Seferian and P. Chevenard. 1959. 393 p. Dunod, 92, Rue Bonaparte, Paris 6e, France.

Review of principles and technological parameters of gas, arc, resistance and other welding processes. Transformations, phase constitution and microstructures observed in weldments; gas absorption and causes for cracking. Weldability tests and factors influencing the weldability of carbon, austenitic, low-alloy and chromium-molybdenum steels. (K-general, 10-54; ST)

550-K. Wanted: Welds With 100,000-PSI Yield Strength. Welding Design and Fabrication, v. 34, May 1961, p. 48-49.

Techniques and materials employed in the welding of high strength, heat treated structural alloy steel. Use of low-hydrogen electrodes for manual butt welding as well as automatic welding using a mild steel flux. Inspection by magnetic particle and radiography methods. (K1; AY, SGB-s)

551-K. Automatic Welding Solves 5 Problems. Welding Design and Fabrication, v. 34, May 1961, p. 56.

Automatic butt welding of duct work of galvanized and hot rolled steel, stainless, Cu, Al and Monel eliminates tacking and distortion, improves weld quality and increases welding speed. (K-general; Al, Cu, Ni-b, ST)

552-K. CO_2 Plug Welding Is 95% Faster. Michael Bender. Welding Design and Fabrication, v. 34, May 1961, p. 58.

Decrease in welding time and improvement of weld quality in semi-automatic CO_2 plug welding of steel using flux-cored electrodes. Smaller holes may be punched rather than drilled. (K1d; ST)

553-K. One Hundred Fixtures Speed Welding of Aluminum Trailers. Welding Design & Fabrication, v. 34, June 1961, p. 36-37.

Welding of 6061, 2024 and 17 MT5 Al alloys fixtures to trailers using water or air cooled semi-automatic welding guns. Weld penetration and porosity are improved by the 25/75 helium-argon mixture used to shield the weld. Finished weldments are inspected using a dye penetrant. (K1d; Al-b)

554-K. Is There a Future for Friction Welding. Welding Design & Fabrication, v. 34, June 1961, p. 42.

Friction welding of a variety of materials including carbon, alloy and stainless steels, brass, Al, Cu, Zr and plastics. Friction welds are formed by revolving or oscillating two metal, ceramic or plastic objects against each other under pressure until the rubbing surfaces become fluid. The objects are then held rigidly under pressure and bond on cooling. (K6; Al, AY, CN, Cu-b, SS, Zr)

555-K. Load Design Means Faster Low Cost Resistance Welding. Simon Fisher. Welding Design & Fabrication, v. 34, June 1961, p. 47-49.

Resistance welding with emphasis on design in seam welding. Design is of particular importance since a poorly designed form can shunt the current necessary to form the weld away from the area to be welded. (K3, 17-51)

556-K. Automatic Welder Makes Stainless Honeycomb. G. Jewett Crites. Metalworking Production, v. 105, May 31, 1961, p. 57, 59.

Production of stainless steel core up to 6 in. thick and within ±0.001 in. tolerance

by process involving insertion of Cu electrodes between strips of stainless steel fail for progressively joining cells at nodes. (K1; SS, 4-57)

557-K. (German.) The Electro Slag Welding Process. W. Krieweth. Elektor-Anzeiger, v. 14, Apr. 26, 1961, p. 113-120.

Review of electro slag welding in terms of reaction mechanism. Welding technology such as materials used, characteristic electrical data and welding efficiency. Applications including welding of a turbine shaft and of a thick-walled (100 mm.) steel drum. Mechanical strength of welds. (K6, T7h; ST)

558-K. Percussive Welding Does the Finest Work. W. A. Owczarski and A. J. Palmer. American Machinist/Metalworking Manufacturing, v. 105, June 12, 1961, p. 114-116.

Two dissimilar metals are brought together rapidly; before meeting the approaching surfaces are melted by an arc powered by a capacitor bank, then the molten surfaces are squeezed by collision and metal is forced to sides of joint. Description of a shop-made percussive welder. Tests conducted on chromel-alumel, Cu-Nichrome, Cu-Type 304 plate, Th-Th and Th-Zircaloy-2. (K3a; Al-b, Cr-b, Cu-b, Ni-b, Th, Zr-b)

559-K. A Coated Electrode for Fusion Welding AISI 4340 Steel for Ultra High Strength Applications. E. F. Deesing. Welding Research Council, Bulletin Series, no. 68, Apr. 1961, p. 1-7.

Evaluation of four welding electrodes with core wires of rimmed steel or 4340 steel and coatings of TiO_2 or lime base. Compatibility of weldmetal deposited by these electrodes and AISI 4340 steel heat treated to ultra-high strength levels. Base metal-weldmetal compatibility is based on chemical composition, hardenability, response to heat treatment, microstructure and tensile, impact and fatigue properties. (K1, W29h; ST)

560-K. (German.) Temperature, Material Transfer and Physical Properties of Slags of Unalloyed Electrodes. W. Hummitzsch. Schweissen und Schneiden, v. 13, May 1961, p. 187-195.

Study of physical parameters of welding with unalloyed electrodes including measurement and estimation of arc temperature and heat balance for electrodes, mechanism of material transfer from electrode to weld and physical properties of slags including specific weight, viscosity, surface tension, thermal expansion, thermal conductivity, specific heat, microstructure and hardness. (K1g, W29h)

561-K. (German.) Material Transfer and Shape of Liquid Welding Drop in the Welding Arc. R. Faulstich. Schweissen und Schneiden, v. 13, May 1961, p. 201-204.

Cinematographic investigation at 6500 exposures per sec. frequency of material transfer and shape of welding drop in welding operations including manual open-arc welding, overhead with lime basic electrode, Mig welding with Ar as protective gas using austenitic and ferritic feed wire, shielded arc welding using CO_2 as inert gas and ferritic uncoated, folded and grooved wire. (K1, K9n; ST)

562-K. Projection Welding Best for Spot Work. Harry Thomasson. Canadian Metalworking, v. 24, June 1961, p. 38-41.

Comparison of projection with spot welding in terms of production cost, dimensional accuracy, uniformity of weld and electrode life. Application in joining stamped, drawn or pressed steel parts. (K3m, K3q; ST)

563-K. What's Happening at Mines Branch Will Benefit All Welding Shops. W. P. Campbell. Canadian Metalworking, v. 24, June 1961, p. 41-43.

Review of welding research projects including induction welding of piping, butt welding of reinforcing bars and tin-bronze castings, properties of mild steel weld metal, weldability testing of high-strength alloy steels and steels containing uranium. Weldability production from steel composition, behavior of the cruciform test for weldability and influence of arc strikes in initiating brittle fractures in steel. 4 ref. (K-general, 10-54; Cu-b, ST)

564-K. Enterprise in South Wales. Welding and Metal Fabrication, v. 29, June 1961, p. 236-246.

Operation and equipment for welding fabrication of metal furnaces, flame deflectors, ingot casting machines, ingot pushers, skips, hydraulic presses, grinding machines, tube stills, coolers and structural work composed of steel. (K-general, W-general; ST)

565-K. Low Alloy Steel Welding. E. Freeth. Welding and Metal Fabrication, v. 29, June 1961, p. 252-255.

Preheating, welding and heat treating of low-alloy steel plate. Control of cracks due to laminations and segregates, brittle phases produced during the welding cycle and diffusion of hydrogen. (To be continued.) (K-general, K9, 9-69, 9-72; AY)

566-K. Explosive Welding. Welding and Metal Fabrication, v. 29, June 1961, p. 259-261.

Bonding of similar and dissimilar materials including Al, steel, Inconel, stainless steel, Cu, Ti, Zr, ceramics, cermets and plastics by high energy techniques. Other applications of the process include forming of brazed laminates and work hardening by using the blast. (K6; NM-k34, 17-57, Al, ST, Ni-b, Cu, Ti, Zr, 6-70, NM-f)

567-K. Fusion Welding of Titanium and Its Alloys. Pt. 4. W. G. Hull. Welding and Metal Fabrication, v. 29, June 1961, p. 262-266.

Weldability and mechanical properties of alpha and beta phase Ti sheets. Effects of various alloying elements on quality of welds produced by arc, gas and resistance welding. 45 ref. (K-general, K9; Ti-b)

568-K. CO_2 Welding Gets Quality Tag. Steel, v. 148, July 3, 1961, p. 58-59.

Results of research on the CO_2 weldability of stainless, alloy and mild steels and other materials, behavior of alloying elements during welding, ways of avoiding severe oxidation and effect of CO_2 on the mechanical properties of the weld. (K1d; ST)

569-K. Progress in Brazing. Digest of "Report on Several Papers on Brazing Presented at the 42nd Annual Meeting of the American Welding Society, Apr. 1960, New York, N. Y.". Metal Progress, v. 80, July 1961, p. 132, 134, 136.

Covers exothermic brazing, joining of refractory metals and ultrahigh-strength steels, techniques for using inert gases and studies of penetration and base metal erosion during brazing. (K8; ST, SGB-a, EG-d37)

570-K. CO_2 Welding Triggers Output. Iron Age, v. 187, July 6, 1961, p. 80-81.

Applications of CO_2 process in welding control arms for wheel suspension systems in passenger cars, storage tanks, truck frames and machine parts. (K1d)

571-K. The Role of Stud Welding in Product Design. Frank Wille. Assembly & Fastener Engineering, v. 4, July 1961, p. 24-27.

Stored energy percussive stud welding of carbon steels, stainless steels, leaded free brass, electrolytic Cu and Al alloys. Application in attaching threaded studs to panels. (K1f; Al-b, Cu-b, CN, SS)

572-K. Flame Soldering Technique for Multi-Row Aluminum Coils. Assembly & Fastener Engineering, v. 4, July 1961, p. 37.

Joining of return bends of Al tube in multi-row coils using an automatic Zn soldering technique. (K7; Al, 4-60)

573-K. Factors in Joint Design for Adhesive Bonding. Kenneth F. Charter and Harry R. Butzlaff. Assembly & Fastener Engineering, v. 4, July 1961, p. 28-32.

Shear strength, stress-rupture strength, impact resistance, load-carrying ability and corrosion resistance of adhesive bonds used for joining steel and Al. Effect of adhesive composition, bond film thickness, overlap and other joint design variables. (K12; Al, ST)

574-K. Positioning--Better Welds in Less Time. Welding Design and Fabrication, v. 33, Dec. 1960, p. 33-34.

Examples of positioners for manual and automatic welding to improve speed, quality and uniformity of welds. (K9)

575-K. How to Design a Welded Roll. Welding Design & Fabrication, v. 33, Dec. 1960, p. 47-49.

Determination of hub weld size by using standard bending and tension formulas. Examples and illustrations. (K9n)

576-K. Automatic Line Combines Resistance Welding With Forming and Piercing. Thomas C. Falter. Welding Design & Fabrication, v. 33, Dec. 1960, p. 62-64.

Assembly line schematic and tooling for fabrication of refrigerator condenser assemblies in one continuous automatic operation. (K3, G17, F26q, 1-52, T10c)

577-K. Northrop Brazes Honeycomb Panels in 15 Min. Welding Design & Fabrication, v. 33, Dec. 1960, p. 66-67.

New process which uses heat from banks of radiant quartz lamps replaces furnace brazing methods of fabricating panels from stainless steel, Ti, Cb and Mo. (K8; SS, Ti, Cb, Mo, 7-59)

578-K. Should You Switch to Automatic Arc Welding? Welding Engineer, v. 46, June 1961, p. 41-43.

Advantages, limitations and applications of automatic submerged arc, Mig, Tig, electroslag and electrogas welding. (K1, K6, 18-74)

579-K. Space Age Requirements Spur Resistance Welding Innovation. Welding Engineer, v. 46, June 1961, p. 54-55.

Joining of stainless steel strips up to 0.016 in. diameter to stainless sheet of thickness up to 4:1 ratio. Process includes applying welding electrode under heavy pressure at spot to be joined and continuing electrode contact pressure until weld nugget is sufficiently cooled. (K3; SS, 4-53)

580-K. Welding Will Replace Mechanical Fasteners in the Aerospace Industries. Welding Design & Fabrication, v. 34, Apr. 1961, p. 47, 89.

Trends and requirements of the aerospace industries. Automation and built-in sensing devices. Brazing. (K-general, 18-74, T24; SGA-h, SGB-a)

581-K. The Right Way to Join Dissimilar Metals. Jay Bland. Welding Design & Fabrication, v. 34, Apr. 1961, p. 56-58.

Welding, brazing and braze welding pressure-tight joints in dissimilar metals. Techniques for avoiding failure in dissimilar-metal welds. (K-general, K8)

582-K. MIG Spot Welding of Aluminum Is In: Riveting Is Out! Welding Design & Fabrication, v. 34, Apr. 1961, p. 64, 66, 68.

Elimination of layout, drilling, punching and bolting by Mig spot welding of nonstructural Al products. (K1d; Al)

583-K. Will Your Next Car Have a One-Piece Brazed Stainless Steel Block? Scholer Bangs. Welding Design & Fabrication, v. 34, Apr. 1961, p. 70, 75.

Stainless steel stampings are furnace brazed to make a single-unit block including cylinders and head for a 175 hp. water-cooled 4-cylinder engine. (K8j, T21b; SS, 4-59, 17-57)

584-K. The Plasma Arc Can Now Be Used for Welding and Weld Surfacing. R. M. Gage. Welding Design & Fabrication, v. 34, Apr. 1961, p. 76-78, 80.

Principles of plasma arc welding, heat transfer, transferred and nontransferred arc torches. Plating, cutting, welding and weld surfacing operations with high-strength materials and refractory metals. (K1, L24; SGB-a, EG-d37)

585-K. Electronic Brain Controls Welding of Unitized Bodies. Welding Design & Fabrication, v. 34, Apr. 1961, p. 82-83.

Electronic scanner controls 24 welding machines in the spot welding of automobile rail and floor pan assemblies. Scanner permits only one machine to operate at a time and assures each machine the same amount of current when it welds. (K3n, T21a, X14)

586-K. Designers! Don't Overlook On-The-Job Stress Relieving. Otto Kreisel. Welding Design & Fabrication, v. 34, Apr. 1961, p. 85-87.

Electrical resistance and induction heating elements are used in preheating and stress relieving high carbon and alloy steel thick wall weldments for high temperature and pressure applications. (K9q, J1a; CN, AY, 7-51, 17-57)

587-K. CO_2 Welding: A Stronger, Lighter Building. Welding Design & Fabrication, v. 34, Apr. 1961, p. 88.

Deep penetration by this process requires fewer passes and less weld metal. Process produces joints that resist dead, live and wind-loading, reduces or eliminates edge separation and permits use of small joint openings. (K1d, T26n)

588-K. (Italian.) Electroslag Welding. Macchine, v. 16, May 1961, p. 517-525.

Steel sheets and plates of 50-350 mm. thickness are welded using 1-3 electrodes at a velocity of 0.87-1.21 meters/

hr. Composition of fluxes used to prepare the slag bath. Design of joints. (K6; ST, 4-53)

589-K. Is Habit Needlessly Increasing the Cost of Out-of-Position Welding? J. E. Hinkel. Welding Journal, v. 40, June 1961, p. 605-609.

Welding techniques, process parameters and weld quality are evaluated for using E-XX 18 powdered, low-hydrogen electrodes in arc welding steel plate in horizontal, vertical and overhead positions. Effects of joint level, plate thickness and preheating conditions. Cost comparison with use of E-XX 10 electrodes. (K1, W29h; ST, 4-53)

590-K. "Wide Gap" Brazing for High-Temperature Service. P. R. Mobley and G. S. Hoppin. Welding Journal, v. 40, June 1961, p. 610-617.

Development of Cu and Ni alloys capable of brazing joint with gaps up to 0.06 in. Application with furnace brazing techniques in fabrication of 321 stainless steel, Inconel X and L 605 Co base alloy jet engine components suitable for operation in the 1500-1800° F. range. Microstructure and elevated temperature shear strength of brazed joints. (K8j, K9, T24b; SS-e, Ni-b, Co-b, SGA-h, Cu-b, SGA-f, 17-57)

591-K. Enclosed Welding Technique Applied to Welding of Reinforcing Bars. W. P. Campbell. Welding Journal, v. 40, June 1961, p. 629-633.

Evaluation of the technique by visual, radiographic and metallographic examinations and by bend and tensile tests of weldments. Effect of hydrogen producing potential of the electrodes on weld quality. (K1, K9; ST, 4-55)

592-K. Metalworking Progress Report: Square-Butt Welding of Aluminum. Welding Journal, v. 40, June 1961, p. 634-635.

Square butt or high current welding by an inert gas arc shielded process of edges of 1 1/4 in. thick 6061 Al alloy cylinders at less total heat input, fewer passes and increased speeds. (K1d; Al-b, 4-53)

593-K. Welding of an Ultra-High Strength Steel for Missile Motor Cases. J. F. Rudy, J. I. Fisher, J. P. Sheehan, F. Suyama and H. Schartzbart. Welding Journal, v. 40, June 1961, p. 241s-252s.

Behavior of Tig welded joint in 0.08 in. thick 300 M alloy steel under uni-axial loading, transverse and parallel to direction of welding and under bi-axial loading. Tensile properties after various heat treatments, surface decarburization and cold rolling. (K1d, K9, Q27, T24e, 2-64, 3-68; AY, SGB-a)

594-K. Weldability Prediction From Steel Composition to Avoid Heat-Affected Zone Cracking. K. Winterton. Welding Journal, v. 40, June 1961, p. 253s-258s.

Review of formulas available for prediction of the weldability in terms of composition with derivation of new formula, based on the end of transformation temperature in the austenite-martensite transformation, for the calculation of equivalent carbon content. Correlation of carbon equivalent with heat affected zone cracking and with weldability data for high-strength steels. 24 ref. (K9s, N8, 2-60, 9-72; AY, SGB-a)

595-K. Welding Techniques Boost Shipbuilding at Whyalla. Australian Mechanical Engineering, v. 48, May 5, 1961, p. 37-41.

Development of techniques for fully welded ship construction. Submerged and visible arc welding methods, plate preparation, prefabrication, handling and radiography. (K1, K9p, S13e, T22)

596-K. (German.) Welding of Austenitic Steels. Herbert Krainer. Schweisstechnik, v. 15, May 1961, p. 54-59.

Review of welding processes including autogenous, arc, Tig, Sigma, Mig and resistance welding and welding defect occurrence with emphasis on intercrystalline corrosion, stress cracking and hot tearing in joining conventional austenitic steel types. (K1, 9-71, 9-72, SS-e)

597-K. Welding and Joining--New Applications of Explosives. L. Zernow, I. Lieberman and W. L. Kincheloe. Tool and Manufacturing Engineer, v. 47, July 1961, p. 75-78.

Theory and use of explosives and tooling required in welding and joining of Al, Al alloy and low-carbon steel. (K-general, NM-k34; Al, CN)

598-K. The Welded Maidenhead Bridge. Gilbert Roberts. British Welding Journal, v. 8, June 1961, p. 291-309.

Design, fabrication, erection and welding details. Bridge is made of reinforced concrete and high-tensile steel. (K-general, T26p, 17-51; ST)

599-K. Weldability of Aluminum. G. Westendorp. British Welding Journal, v. 8, June 1961, p. 310-315.

Weld porosity and reduction in strength caused by welding heat. Use of dry argon atmosphere for reducing porosity. (K9s; Al)

600-K. Temperatures in Spot Welding. J. A. Greenwood. British Welding Journal, v. 8, June 1961, p. 316-322.

Calculation of temperature distribution and temperature cycle of a particular point after various welding times, assuming no contact resistance, constant material properties and no surface loss of heat. 4 ref. (K3n, K9n)

601-K. Simple Jointing Methods for Aluminium Busbar. F. G. McDonald. Light Metals, v. 24, June 1961, p. 170-172.

Welding, bolting, clamping, insulating and screening operations on D50S Al alloy in fabrication of conductors of various shapes and sizes for use in a large power station. (K1d, K13, T1; Al-b)

602-K. The Reclamation of Diesel Locomotive and Rolling Stock Wheels by Welding. R. G. Kirk. Australasian Engineer, v. 52, Apr. 1961, p. 46-49.

Submerged-arc welding of preheated worn solid-disk wheels and tire wheels of Class "E" steel with an automatic welder using mild steel electrode wire. (K1e, T23s, 18-72; ST)

603-K. Workpiece Becomes Part of Welding Machine. Western Metalworking, v. 19, June 1961, p. 38-39.

An extended-reach resistance welder is used to spot weld critical stainless steel joints that require reaching long distances into small openings like wing assemblies. Reference guides are assembled in the structure before welding. Welding of a corrugated shear web to channel shaped web caps within two sandwich sections. (K3n, 1-52; SS, 7-59)

604-K. Brazing Refractory Metals. Mel M. Schwartz. Mechanical Engineering, v. 83, July 1961, p. 30-33.

High temperature vacuum brazing of Cb alloys, Ta, Mo and W using 70 Pd-30 Cu, 70 Pd-30 Ni, 84 Ni-16 Ti, 52 Cb-48 Ni, 90 Pt-10 Ir and 90 Pt-10 Rh alloys and Ti and Pt as filler materials. Limitations caused by recrystallization, ductile-brittle transition temperatures, formation of intermetallics and weakness of the filler material. (K8j, 1-73; Cb-b, Ta, Mo, W, SGA-f)

605-K. Welded Joints Increase Life of Commutator Connections. Harry Thomasson. Canadian Metalworking, v. 24, July 1961, p. 34-36.

Tungsten inert gas shielded process using argon protective atmosphere is used to replace Pb-Sn soldered connections for elimination of hot spots and temperature limitations. (K1d, T1)

606-K. Cast Iron Welded in 1/10th the Time. Metalworking Production, v. 105, June 28, 1961, p. 63.

Quenchweld, a 3-rod welding process with quenching of the weld after each pass by a damp cloth or air blast, is used for repairing thin sections or heavy castings and joining of cast iron to steel. Three electrodes are used with either a-c. or d-c. arc. (K1a, 1-52, 18-72; ST, CI, 5)

607-K. Welding in Engineering. Australasian Manufacturer, v. 46, June 3, 1961, p. 44-50.

Welding processes available to engineers are classified and discussed in two groups, fusion processes and resistance processes. Brazing and gas cutting and cutting machines. Quality control. (K-general, K8, G22g, 1-52, S13)

608-K. How Arc Spotwelding Simplifies Terminal Joining. Steel, v. 149, July 10, 1961, p. 85.

Arc spot welding is used to join electrical stainless steel pins to Al alloy caps in the production of automatic Al frying pans. Terminal joint is made in 6 sec. Process reliability depends upon accurate positioning, pushbutton control of the cycle and a pilot starting device. (K1, T10c; Al-b, SS)

609-K. The Characteristics and Fabrication of Plastic-Metal Laminates. E. J. Williams. Australian Institute of Metals, Journal, v. 6, May 1961, p. 83-89.

Characteristics of metal-plastic laminates including bond strength, chemical and wear resistance and electrical properties. Fabrication methods including deep drawing, fastening, bonding or welding. (K11d)

610-K. Arc Welding of Thin Materials (MIG Process). G. A. Scott. Australian Institute of Metals, Journal, v. 6, May 1961, p. 90-98.

Welding equipment for short-arc techniques and suitable power sources used in welding Al and its alloys, mild steel, stainless steel, Cu and aluminum bronze. Details of wire and methods of wire feeding. 6 ref. (K1d, 1-52; Al, CN, SS, Cu, Cu-s)

611-K. The Fabrication and Use of Some Nickel Alloys. K. H. Belcher. Australian Institute of Metals, Journal, v. 6, May 1961, p. 150-159.

Classification of Ni-containing materials including Ni-Cu, Ni-Cr-Fe and Ni-Mo-Cr-Fe alloys, Nimonic 75, 80A, 90, 105 and 115, 'O' Ni, H.P.A. and H.P.W. Ni, Duranickel and various alloys possessing special electrical resistance, controlled expansion and magnetic properties. Methods of welding and extrusion. Application of powder metallurgical techniques to production of high-purity magnetic materials. 17 ref. (K-general, F24, H-general, P15g, P16; Ni-b)

612-K. Argon-Nitrogen Mixtures for the Self-Adjusting Arc Welding of Copper. J. G. Young. British Welding Journal, v. 8, July 1961, p. 349-353.

Influence of gas composition on metal transfer and penetration in the Cu self-adjusting arc is examined for Ar, N and mixtures of the two gases. For currents below the threshold value in Ar (310 amp.), the metal transfer rate in mixtures containing from 5-33% N is higher than the transfer rate in Ar. (K1, K9n; Cu)

613-K. Inert Gas Shielded Metal Arc Welding of Thick Copper Without Preheat. K. J. Clews. British Welding Journal, v. 8, July 1961, p. 353-359.

Tests are carried out on 1/2 in. thick phosphorus-deoxidized Cu plate using Ar, N and mixtures of the two gases. Current, wire feed speed and travel speed are varied and the dependent arc voltage is measured. Results show the influence of gas composition on required preheating temperatures and welding speed. 5 ref. (K1d; Cu, 4-53)

614-K. Filament-Wound Pressure Vessels. Richard Gorcey. American Society of Mechanical Engineers, Paper no. 61-MD-17, 1961, 12 p. $1.

Fabrication of compressed gas bottles, liquid propellant tanks, rocket engine thrust chambers and nozzles and solid-propellant cases by filament winding which consists of wrapping a reinforcing material such as Fe, Ti or steel and a resinous binder around a mandrel to form a part. The technical advantages are analyzed with discussion of the winding equipment, techniques, materials and designs. (K11, G-general, T26q; Fe, Ti, ST, 4-61, NM, 17-57)

615-K. Design for Welding. T. B. Jefferson. Welding Engineer, v. 46, Mid-June 1961, p. 5-17.

Comparison of welding with other fabrication processes. Design information for joining methods and types of weld loading. Calculation of weight of weldmetal and formulas for computing stresses on butt, lap and fillet welds. Description of structural carbon steels, high-strength steels and heat treated alloy steels for welded construction. (K-general; CN, AY, SGB-a)

616-K. Molten Salt Process Picked to Break Brazing Bottleneck. Metalworking, v. 17, July 1961, p. 11.

Dip brazing 6061 and 6062 Al alloy sheet, plate, forgings and extrusions with BAlSi-4 alloy in a molten bath of fluorides and chlorides at 1100° F. to produce jet engine compressor parts with good joint strength and quality. (K8n, T24b; Al-b, 4-53, 4-51, 4-58)

617-K. Statistical Variations in the Lap-Joint Strength of Metal Bonding Adhesives at Elevated Temperatures. H. W. Eickner and W. Z. Olson. ANC-23 Panel on Composite Construction for Flight Vehicles, Report no. 1880, Feb. 1961, 22 p.

Sources and degree of variability in strength obtained in elevated temperature tests of adhesive-bonded, lap joint specimens of 301 corrosion resisting steel using four representative adhesives.

Fixed effects evaluated include operators, presses and press-by-operator interaction. Random effects include time, bonding runs and cleaning runs. (K12; SS)

618-K. Welding Keeps Up With Uncommon Metals. Steel, v. 149, July 17, 1961, p. 121-122.

Electron beam, ultrasonic and arc welding; diffusion bonding and brazing as methods for joining W, Cb, Mo, Ti, Zr and Be. (K-general, 10-54; Be, W, Cb, Mo, Ti, Zr)

619-K. High Speed Welder Tames Production Problems. Iron Age, v. 188, July 20, 1961, p. 100-102.

Applications of high frequency resistance welding to high speed joining of various structural shapes composed of steel, Cu, Zr, heat resistant alloys and other materials. (K3; SGA-h, ST, Cu, Zr)

620-K. Designing and Fabricating the Air Force Space Test Capsule. Western Machinery and Steel World, v. 52, July 1961, p. 34-35.

Cylindrical shell is fabricated from 6061-T6 Al alloy using an all-welded construction. Closures are made by spinning with hydraulic spinning lathes. (K-general, G13, T24e; Al-b, 17-57)

621-K. New Ablative Skirt for Titan Second-Stage Engines. Western Machinery and Steel World, v. 52, July 1961, p. 38-39.

Fabrication of ablative skirt from asbestos tape, preimpregnated with phenolic resin, and cellular figerglass, which permits a "dry jacket" engine start at altitude. The skirt is bonded by liquid adhesive to the combustion chamber by a segmented flange of Al alloy 6061-T6. (K11, K12, T24e; Al-b, NM, 17-57)

622-K. Cusilman Bronze and Carbon Arc Help Cut Fabrication Costs. Welding Fabrication and Design, v. 4, May 1961, p. 17.

Light sheet metal bent with a 3/4 in. flange, is welded in vertical up, side horizontal and overhead positions using filler rod and carbon electrodes. (K1d; Cu-s, 4-53)

623-K. Developments and Techniques in Resistance Welding. R. W. Ayers. Welding Fabrication and Design, v. 4, May 1961, p. 5-8.

Review of resistance welding techniques and applications particularly in the sheet metal industry. Advantages of three phase processes in seam and projection welding. (K3, 10-54; 4-53)

624-K. Ottawa Firm's Big Assembly Breakthrough. Melba B. Woelfle. Canadian Machinery and Metalworking, v. 72, July 1961, p. 48-49.

Connecting hub assembly system, called Triodetic assembly, is used to join Al, Mg or plastic structural members in the construction of space frames and towers, boat docks, antennas and other structures. (K13q, T26, T24d, T22k; Al, Mg, 4-57)

625-K. Two-Pass Machine Butt-Weld in Aluminum Tank Cars. Canadian Machinery and Metalworking, v. 72, July 1961, p. 94-96.

Two-pass butt welding of ALCAN B53S plate cylindrical courses and ALCAN C54S heads with ALCAN 6209 filler wire. Preliminary machining is almost eliminated and arc time is reduced to nearly 1/3. (K1, T23p; Al-b, 4-53)

626-K. Low Alloy Steel Welding. E. Freeth. Welding and Metal Fabrication, v. 29, July 1961, p. 283-290.

Investigation of weldmetal porosity, cracking, fissuring, creep resistance and stress rupture properties and impact resistance in manual, Tig, Fusarc, Fusarc/CO_2 and submerged arc welding. Selection of filler rod to suit applications. 18 ref. (K-general, K1, Q3, Q7, W29h; AY, 9-68, 9-72)

627-K. Design and Strength of Brazed Joints. M. H. Sloboda. Welding and Metal Fabrication, v. 29, July 1961, p. 291-296.

Effect of joint design on flow of brazing alloy, deformation, fracture and soundness of Cu and Cu alloy, carbon steel, stainless steel, Al and Al alloy, Nimonic and Ti brazed assemblies. 5 ref. (K9, Q24, Q26; Cu, CN, SS, Al, Ni-b, Ti, 7-52, 17-51)

628-K. Orbital Welding of Stainless Steel Tube. L. Keble Hill. Welding and Metal Fabrication, v. 29, July 1961, p. 301-307.

Use of an Ar-H shrouding in arc welding of aircraft tubing. Equipment and sequence of operations. (K1d, 1-52, T24; SS, 4-60)

629-K. A Displacement Copper System for the Soldering of "Pure" Aluminum. Sheldon L. Matlow. Electrochemical Society, Journal, v. 108, July 1961, p. 709-710.

Cu deposited from ammoniacal $CuCl_2$ is used to provide an adherent base for soldering Al. (K7, L17; Al, Cu)

630-K. (German.) Technology and Machinery of Electroslag Welding. G. Almquist. Schweisstechnik, v. 15, July 1961, p. 73-75.

Mechanism of electroslag welding and technological features such as physical properties of welding additions, influence of electrical factors on welding and preparation of parts for butt welding and welding of "T" and corner joints. (K6)

631-K. (German.) Welding Under Protective Inert Gas, Powder and Slag. W. Hummitzsch. Schweisstechnik, v. 15, July 1961, p. 75-81.

Study of welding mechanisms including material transfer in the drop, with emphasis on Tig (tungsten inert gas) and Mig (metal inert gas) welding, using Ar and CO_2 as inert gas. Survey of welding machinery, welding efficiency and quality of welds. (K1d, K4, K6, 1-52)

632-K. (German.) High-Strength Steels and Their Welds in the Case of Large Sheet Thickness. Werner Hummitzsch. Schweisstechnik, v. 15, June 1961, p. 61-67.

Welding technology of high-strength, fine-grain steels is discussed in terms of transition behavior of steel, weldability, welding by manual electrodes, inert gas shielded welding, thermit powder welding and electroslag welding. 5 ref. (K-general, K9, 2-59, 3-73; SGB-a, ST)

633-K. How to Fasten Carbide to Steel. Pt. 2. Grant A. Morrison. Machine and Tool Blue Book, v. 56, Aug. 1961, p. 118-124.

Mechanical mounting overcomes some of the limitations of brazing and cementing carbides. A mechanically attached bond is stronger than an adhesive bond and is not limited to a narrow operating range. Use of threaded bolts, brazed plugs and wedges. (K11b; ST)

634-K. Automatic Welding Is Volkswagen's Secret. Chuck Berka. Welding Design & Fabrication, v. 34, July 1961, p. 27-28.

Automatic resistance welding and arc welding of subassemblies (doors and roofs), front and rear end assemblies and wheels. (K1, K3, 18-74, T21)

635-K. Automatic Resistance Welding: The Only Way to Make Telephone Relay Contacts at a One-Second Clip. Welding Design & Fabrication, v. 34, July 1961, p. 30-31.

Automatic relay spring processing machines are used to weld Ag contacts to flat Ni-Ag springs, coin the contacts, tin the other end for connecting wires and form the spring to the right tension. (K3, 1-52, X15r; Ag, Ni-b, Ag)

636-K. Portable Induction Brazing Makes Better Hydraulic Joints. C. G. Brock. Welding Design & Fabrication, v. 34, July 1961, p. 32-34.

Comparison of brazed joints to threaded steel fittings in high-pressure aircraft hydraulic systems. Brazing of AM 350, AM 355, A 286, Inconel X and 321 stainless steel alloys with Ag-Cu-Li alloys. Fatigue curves are plotted from vibration, pressure-impulse tests. (K8k, Q7k, T24; SS, 4-60)

637-K. Projection Welded Part Absorbs Shocks Better, Longer. Welding Design & Fabrication, v. 34, July 1961, p. 41.

Locknut-bolt joint is replaced by a projection welded stud in an automobile shock-absorber stud-spring-plate assembly. Fatigue tests. (K3q, Q7, T21c)

638-K. Welded Girders Solve Design Dilemma. Welding Design & Fabrication, v. 34, July 1961, p. 42-43.

Cable-suspended, double-cantilever roof of an airport hanger consists of 16 welded box girders. Design provides open areas without columns or cantilever trusses. Fillet welding of girder webs and cross frames. Assembly details. (K-general, T26n; 4-57)

639-K. Phenomenological Considerations in Ultrasonic Welding. J. B. Jones, N.

Maropis, J. G. Thomas and D. Bancroft. Welding Journal, v. 40, July 1961, p. 289s-305s.

Survey of research and instrumentation for observing stress, energy and temperature relations in the weld zone and interpreting factors relevant to the ultrasonic welding process. Comparison of weldability of various materials on the basis of net energy required to generate a weld with data given for Al and Al alloys, Cu, Armco iron and 302 stainless steel. (K6r, K9, 1-54, S13; Al-b, Cu-b, Fe, SS, 4-53, 7-51)

640-K. Experimental Determination of Dimensional Heat Flow in Weldments. S. S. White. Welding Journal, v. 40, July 1961, p. 317s-319s.

Technique utilizing temperature-sensitive lacquers to determine heat flow transient temperature--the temperature above which heat flow is more three than two- dimensional--of various Ti alloy sheets of constant thickness. Measurement of peak temperature locations and fusion zone geometries. 3 ref. (K9n, 2-62; Ti-b)

641-K. Weldability of a Modified Hot-Work Die Steel. W. A. Sipes and E. J. Fogarty. Welding Journal, v. 40, July 1961, p. 320s-323s.

Study of the weldability of a modified hot work die steel of the AISI H-11 type. Satisfactory joints are produced using an experimental coated low hydrogen electrode. After suitable heat treatment, joints achieve strength levels in the 300,000 psi. range with efficiencies approximating 100%. 30 ref. (K9s, K1a, Q27, 2-64; TS-k)

642-K. Welding PH 15-7 Mo Precipitation Hardening Stainless Steel. H. Smallen. Welding Journal, v. 40, July 1961, p. 324s-329s.

Microstructure, tensile properties and hardness values of PH 15-7 Mo stainless steel after inert gas shielded tungsten arc and spot welding and various heat treating sequences. UTS values approximating 100% of parent metal strength are obtainable for fusion weldments when austenite conditioning and transformation treatments are performed after welding. Highest lap shear values for resistance weldments are obtained by welding after transformation and before final hardening treatment. (K1d, K3n, K9, M27, Q-general, 2-64; SS-e)

643-K. CO_2 Shielded Welding of Horizontal Joints in Oil Storage Tanks. Paul W. Turner. Welding Journal, v. 40, July 1961, p. 707-713.

Horizontal seams in 1/4-1 1/2 in. thick steel plates of tanks for crude oil storage are welded by CO_2-shielded metal arc process. Radiographic tests disclose that key junctions are more susceptible to defects than the remainder of the seam. 6 ref. (K1d, T29n, 9-69; ST, 4-53)

644-K. Consumable Electrode Spot Welding. J. A. Howery and G. F. Mack. Welding Journal, v. 40, July 1961, p. 714-722.

Basic equipment for consumable spot welding--a gas shielded arc process using solid wire or flux cored electrodes. Application in the assembly of automobile bodies. Survey of process variables for fillet, lap, through and butt welds in mild steel sheet; tensile strength of test welds and cost comparison with other methods. (K3n, K1d, K9r, T21a; CN, 17-57)

645-K. Series Spot Welding of Missile Fins. D. W. Herold. Welding Journal, v. 40, July 1961, p. 723-725.

Direct and indirect series spot welding of 1018 steel in the production of a dorsal fin for a missile. Survey of weld requirements and operating problems. (K3n, T24e; ST, 17-57)

646-K. Use of Inconel Deposited Weld Metal for Nuclear Component Parts. R. W. Minga and W. H. Richardson. Welding Journal, v. 40, July 1961, p. 726-735.

Welding and weld overlaying with Inconel using inert gas shielded tungsten arc and metal arc processes. Survey of problems in meeting nuclear quality requirements; weld defects and their control; and identification grain boundry constituents causing fissuring and hot cracking. (K1d, K9, L24, T11; Ni-b, 17-57)

647-K. Highway Tunnel Has Welded Tube. J. F. Gulley. Welding Journal, v. 40, July 1961, p. 736-737.

Arc welding of a 33 ft. ID steel plate structure for use as a vehicular river tunnel. (K1d, T26; ST, 4-53, 17-57)

648-K. Self-Contained Mobile Rigs for Flux-Cored Welding Process Speed Fabrication at Naval Weapons Plant. Welding Journal, v. 40, July 1961, p. 738.

Carbon dioxide shielded flux-cored electrode process and equipment used for welding steel plates. (K1d, 1-52, T2; ST, 4-53, 17-57)

649-K. Geared for Production. R. E. McLane and P. T. Sessions, Jr. Welding Journal, v. 40, July 1961, p. 739-740.

Magnetic flux shielded arc process used to weld cast steel half gear to 1 in. thick frame in the fabrication of large gears for gate hoists for river dams. (K1d, K6, T7a; ST, 5)

650-K. Arteries of a Stratofort. G. R. Clay and J. C. Rodgers. Welding Journal, v. 40, July 1961, p. 747-748.

Argon shielded tungsten arc welding used to produce Al alloy and stainless steel tubing assemblies and 6061 Al alloy fuel tanks for aircraft. (K1d, T24a; Al-b, 17-57)

651-K. Into the Winner's Circle. R. M. Stuchell and J. R. Flynn. Welding Journal, v. 40, July 1961, p. 749.

Carbon dioxide shielded magnetic flux consumable-electrode welding used for welding carbon steel plate in the fabrication of 5-million gal. water tank. (K1d, K6, T26q; CN, 4-53)

652-K. Researches on the Welding of Galvanized Steel Sheets. G. Odone, G. Milanese and A. Porta. Acier-Stahl-Steel, v. 26, June 1961, p. 283-292.

Evaluation of bronze and electric arc welding of rectangular specimens. Macroscopic and microscopic examinations of the end-to-end joints. Welding parameters and efficiency of joints as determined by mechanical tests. Salt spray, salt solution immersion and marine atmosphere corrosion tests before and after weld reconditioning. 9 ref. (K8, K1, K9r, M27, M28, R3p, R11; ST, 4-53)

653-K. Bonding Irregular Shapes. Mill and Factory, v. 69, July 1961, p. 72.

Al to Al, Mg and fiberglass bonding with 1/4 in. diameter hollow Al balls which are spread over the components to be bonded and subjected to pressure. The balls redistribute the pressure evenly over the bond area, including indented and other irregular contours. Cure is effected in an autoclave at 325-350° F. (K11a, K12; Al, Mg)

654-K. New Multi-Weld Lines at Dagenham. H. Baldwin. Tooling, v. 15, June 1961, p. 62, 64.

Production of automobile underbody assemblies from separate components at Ford Motor Co.'s Dagenham factory with a multiweld assembly line which makes 750 spot welds in a complete run. (K3n, 1-52, T21a)

655-K. (French.) Chemical Composition and Weldability. A. Leroy. Revue de Metallurgie, v. 58, Apr. 1961, p. 321-329.

Methods for determining weldability of alloy steels. Effects of chemical composition, mechanical properties and aging behavior. Influence of C, Mn, Si, P, N and S concentration. (K9s, 1-54, 2-60, 2-65, Q-general; AY)

656-K. (French.) Notes on Weldability Tests. H. Granjon and A. Audige. Revue de Metallurgie, v. 58, Apr. 1961, p. 330-338.

Evaluation of operational, local and over-all weldability tests. Criteria are established for developing precision in these tests and for localizing the position occupied by them in welding specifications. 16 ref. (K9s, 1-54)

657-K. Welding Iron Castings. C. G. Bainbridge. Machinery Lloyd (Overseas Edition), v. 33, July 1961, p. 47-50.

Method of repairing fractures in Fe castings by arc or oxy-acetylene welding. Preparation of castings prior to welding by grinding and by separating fracture edges. Use of preheating to prevent chilling and cracking in weld deposits. (K1, K2h, K9p, Q26; Fe, 5, 7-51, 9-72)

658-K. The Metal-Arc Welding of Stainless Steel. M. C. T. Bystram.

Edgar Allen News, v. 40, July 1961, p. 147-149.

Analysis of the mechanism of intergranular cracking in the weld and in the heat affected zone of the stainless steel base metal. Effects of shrinkage stresses, weld boundary precipitates and heat treatment by superimposed runs on weld cracking and failure. 12 ref. (K1g, 2-64, 3-66; SS, 7-51, 9-72)

659-K. Giant Radio-Telescope Will Tune-In Outer Space. Welding Engineer, v. 46, July 1961, p. 35-37.

Manual metal-arc, submerged arc and Mig welding are used to fabricate antenna superstructure of 3/16-3 in. thick 5456 Al. Stress relieving and magnetic particle and ultrasonic inspection of the welds. (K1, J1a, S13g, S13j; Al-b, 7-51)

660-K. Aluminum Alloy Bids for Larger Share of Cryogenic Market. Pt. 2. Welding Engineer, v. 46, July 1961, p. 38-39.

Plates of 5083-H113 Al alloy are Mig welded using a 3/32 in. diameter filler wire with argon atmosphere. Test results indicate good weldability, weld ductility and corrosion and stress concentration resistance at temperatures as low as -320° F. (K1d, K9s, Q23p, Q25k, R-general, 2-63; Al-b, 7-51)

661-K. Giant Steel "Cans" Line Hydroelectric Power Tunnels. Welding Engineer, v. 46, July 1961, p. 48.

Rolled steel plate is joined by submerged arc welding with medium carbon steel wire to form tunnel lining in dam construction. The 24-ft. diameter sections are hydrostatically tested to 120 psi. (K1e, Q10b, T26s; ST, 4-53)

662-K. 192 Joints Brazed Simultaneously to Chemical Reactor. Welding Engineer, v. 46, July 1961, p. 60.

Carbon steel tubing 3/4 in. in diameter is brazed to a vessel chamber with tolerances of ± 0.002 in. in a dry hydrogen furnace at 1950-1980° F. (K8, T29; CN, 4-60)

663-K. The Connection of Zircaloy-2 With Stainless Steel for Operation Over a Wide Temperature Range. C. Gordon Duff. Nuclear Science and Engineering, v. 10, July 1961, p. 278-284.

A method for joining Zircaloy-2 with 347 stainless steel using controlled expansion transition sections consisting of Ni-Fe elements of the Invar type, ranging from low expansion rate 43% Ni-Fe, at the Zircaloy-2 end, to high expansion rate 60% Ni-Fe, at the stainless steel end. Discussion of the mechanical joining and Tig-welding problems in producing a pressurized hot water loop. 14 ref. (K1d, K13, T11, 17-57; Zr-b, Ni-b, SS)

664-K. (Russian.) Electroslag Welding of 1Kh18N9T Steel Using a Wire Electrode. V. I. Rabinovich. Avtomaticheskaya Svarka, Jan. 1961, p. 27-33.

Steel plates 65 mm. thick are welded using Sv-1Kh18N9T, Sv-1Kh18N11M or Sv-0Kh18N9 electrodes and AN-8, AN-26, ANF-6 and 48-OF-6 and nonoxidizing electrodes. The weldments are tested without subsequent heat treatment; after austenitization and air cooling; and after austenitization and water quenching. Properties investigated include macrostructure and microstructure, resistance to intercrystalline corrosion and hot cracking, creep strength, ductility and impact strength of weldments. 6 ref. (K6, K9, M-general, Q-general, 2-64; ST, 7-51)

665-K. (Russian.) Metal Transport in Manual Arc Welding. A. G. Mazel'. Avtomaticheskaya Svarka, Jan. 1961, p. 34-43.

MSt 3 steel is welded using Sv-10G2, Sv-08A, 7064, 7060, Sv-10GS and 7063 electrodes, with the metal transport being studied by cinematography and oscillography. Data are given for effect of nominal voltage, arc length, welding position and polarity on the formation of drops and frequency of short circuits per second. 10 ref. (K1d, K9n; ST)

666-K. (Russian.) Electroslag Welding of Titanium With a Wire Electrode. V. P. Didkovskii and S. M. Guervich. Avtomaticheskaya Svarka, Jan. 1961, p. 48-51.

VT1 Ti plate 40-50 mm. thick is electroslag welded using an electrode of the same material and AN-T2 flux, with clearance of 25-28 mm. and transverse movement imparted to the

electrode. Properties studied include macrostructure, microstructure, tensile and impact strengths, elongation and reduction of area of weldments. 5 ref. (K6, K9, M-general, Q-general; Ti, 7-51)

667-K. (Russian.) Effect of Electroslag Remelting on the Quality of Cr-Ni-Mo Steel. Yu. K. Vorob'ev, V. M. Doronim, M. M. Klyuev, V. V. Topilin, N. A. Shityaev, E. V. Voinovskii, B. I. Medovar, Yu. V. Latash and B. I. Maksimovich. Avtomaticheskaya Svarka, Jan. 1961, p. 52-56.

A 140 mm. diameter bar of EI 847 steel is electroslag remelted into a 320 kg. ingot to study the effect of remelting on structural homogeneity, quantity of nonmetallic inclusions, torsional strength of 900-1300° C. and the tensile and yield strengths at 20 and 600° C. (K6, K9n, M-general, Q-general, 2-62, 9-72; AY)

668-K. (Russian.) Determination of Electrode Pressures Applied in the Spot Welding of Smaller Parts. N. M. Sokolov. Avtomaticheskaya Svarka, Jan. 1961, p. 64-66.

Pressure measurements with an electronic instrument and a transmitting unit based on the piezoelectric effect in the spot welding of light metals. (K3n, K9n, 1-52; EG-a39)

669-K. (Russian.) Use of Radio-Frequency in Buff Welding Stainless Steel Tubing. I. V. Kirdo and Yu. N. Skachko. Avtomaticheskaya Svarka, Jan. 1961, p. 75.

Thin-walled tubing is machine induction welded at a current frequency of 70 kcps. with removal of the resulting flash in a machining operation simultaneously with the welding. Data are presented for process economy and quality of weldments. (K6n, K9; SS, 4-60)

670-K. (Russian.) Aging Behavior of Welded Two-Phase Titanium Alloys. V. F. Grabin, S. M. Gurevich, V. A. Rafalovskii and V. I. Trefilov. Avtomaticheskaya Svarka, Apr. 1961, p. 3-12.

Samples of VT6 alloy containing 6.1% Al and 4.1% V, an alloy with 2.5% Al, 9.7% V and 3.8% Mn and a binary alloy containing 6.34% Mn are submerged arc welded using electrodes of the same composition as the base metal. Properties investigated include microstructure of seams in the welded and artificially aged states; change of volume and electroresistivity in continuous heating up to 1050° C. Effect of holding at 200-500° C. on volume and hardness and mechanical properties after aging from 300-500° C. 14 ref. (K9, K1e, N-general, P-general, Q-general, 2-65; Ti-b)

671-K. (Russian.) Effect of Ferrite Content on the 475° C. Embrittlement of Austenitic-Ferritic Filler Metal. N. I. Kopersak. Avtomaticheskaya Svarka, Apr. 1961, p. 13-17.

The alpha-phase content of filler metal obtained from the welding wire Sv-0Kh18N9 is varied by using granulated fluxes of various Cr contents. Effect of holding at 475° C. for 1000 hr. followed by slow cooling on the impact strength. 4 ref. (K9r, Q6n, Q26s, 2-60, 2-61, W29h; AY, 17-57)

672-K. (Russian.) Optimum Width of Heat Exposed Zone in the Butt Welding of Rails. S. I. Kuchuk-Yatsenko. Avtomaticheskaya Svarka, Apr. 1961, p. 28-34.

Resistance welding of R50 rails containing 0.70-0.78% C, 0.88-1.08% Mn, 0.15-0.24% Si, 0.034-0.043% P, 0.025-0.030% S and 0-0.15% As. Tensile and bend testing. Effect of the heat affected zone width on microstructure, plasticity and strength. (K3, K9h, Q-general, T23p, 3-73; ST)

673-K. (Russian.) Introduction of Elastic Ultrasonic Waves Into the Welding Bath. V. D. Kodolov. Avtomaticheskaya Svarka, Apr. 1961, p. 35-39.

Parameters governing design and use of equipment for applications in the electroslag welding and arc welding of thick plates of austenitic steel. Effect of ultrasonic waves on resistance to hot cracks and intercrystalline corrosion. 12 ref. (K6r, 1-52, 17-51; ST, 4-53)

674-K. (Russian.) Appearance of a D-C. Component During Electroslag Remelting Into a Water Cooled Mold. B. I. Maksimovich. Avtomaticheskaya Svarka, Apr. 1961, p. 47-53.

Armco iron consumable electrodes are remelted at a-c. intensities between 1500 and 2400 amp. to study the

undesired development of a d-c. component, caused by the temperature gradient between electrode and melt. Effects of flux composition, depth of molten slag, electrode diameter and electrical insulation of the mold on the d-c. component. 9 ref. (K9, K6, W29c, W29h, 2-60, 3-73; Fe-a)

675-K. (Russian.) Static Strength of Spot Welds at Room and Low Temperatures. G. V. Zhemchuzhnikov and R. G. Romanovskii. Avtomaticheskaya Svarka, Apr. 1961, p. 54-60.

Spot welded samples of 6-8 mm. carbon steel sheet are tension and shear tested to investigate influence of weld diameter from -55 to 20° C. 5 ref. (K3n, Q27, Q2, 2-61, 3-73; CN, 4-53, 7-51)

676-K. (Russian.) Welding With a Consumable AMg6 Alloy Electrode in an Argon-Chlorine Atmosphere. D. M. Rabkin and B. A. Steblovskii. Avtomaticheskaya Svarka, Apr. 1961, p. 78-82.

Arc welding of Al alloy containing 7% Mg, adding 1-5% Cl to Ar atmosphere to determine effect on porosity, microstructure, tensile and yield strength and elongation. (K1d, P10m, M27, Q-general; Al-b, Mg)

677-K. (Russian.) Effect of the Shape of Melt in Electroslag Welding on the Tendency of Austenitic Steel and Alloys to Develop Heat Cracks. B. I. Medovar and A. H. Safonnikov. Avtomaticheskaya Svarka, Apr. 1961, p. 87-88.

Relationship of width to depth in the weld roof, width of gap, current intensity and voltage are studied as they affect development of heat cracks. (K6, K9n, 9-72)

678-K. (Italian.) Applications of the "Electronic Gun" in Mechanical Working. Sirio Leporatti. Rivista di Ingegneria, v. 11, Apr. 1961, p. 373-380.

Use of the "electronic gun" (Zeiss welding machine) and its application in welding, fusing, drilling and cutting of refractory metals and steels. The process is based on the emission of high accelerated electrons (10,000-150,000 km. per sec.). Upon hitting, the energy changes in form from kinetic to thermal. The advantage of this process is the development of a localized high temperature (6000° C.) which can be confined to a spot as small as 0.02 mm. by focusing the electron cloud. (K6, 1-52)

679-K. (German.) Metallic Bonding Between Uranium and Aluminum for Fuel Elements for Nuclear Reactors. G. Schneider. Metall, v. 15, July 1961, p. 675-679.

Review of application and properties of uranium-to-Al solders including Al-13g Si solder, Zn-Sn pressure solder for water-cooled reactors at temperatures below 230° C. and Ni diffusion solder for temperatures from 350-500° C. Data given for microstructure and corrosion resistance of joints. (K7, T11g; U, Al, SGA-f, 17-57)

680-K. (German-French.) Inert Gas Welding of Copper and Copper Alloys. C. G. Keel and W. Nyffenegger. Pro-Metal, v. 14, June 1961, p. 495-513.

Welding technology and machinery for Tig and Mig welding and inert gas cutting of Cu and Cu-Zn, Cu-Sn, Cu-Al and Cu-Ni alloys. (K1d, G22h; Cu-b)

681-K. Joining Coil Strip on a Continuous Line. Automation, v. 8, Aug. 1961, p. 71.

Coil steel strip is joined on a continuous line by a high speed shearing and automatic end welding machine which uses a tungsten arc process at a rate of 30 ipm. (K1d, 1-52; ST, 4-53)

682-K. (Italian.) Electroslag Welding. Giuseppe Foti. Rivista Italiana della Saldatura, v. 12, Nov-Dec. 1960, p. 282-287.

Applications of process to various types of joint, to the welding of alloy steels and the surfacing and fabrication of pressure vessels, presses and electric machines. 4 ref. (K6, T26q, W11q, W24g; 1-52, 17-57)

683-K. (Italian.) Mechanical and Nondestructive Testing of Welding Processes. G. Moravia. Rivista Italiana della Saldatura, v. 13, Mar-Apr. 1961, p. 53-59.

Parameters of the welding process are reviewed with a discussion of various destructive and nondestructive methods for testing welded joints. (K9; 7-51, 1-52, 1-53, 17-54)

684-K. (Italian.) Importance and Limitations of Controlled Production in Resistance Spot Welding of Light Alloy for Aircraft. Domenico Raffone. Rivista Italiana della Saldatura, v. 13, Mar-Apr. 1961, p. 60-71.

Development of controlled procedures for resistance spot welding of structural aircraft elements in order to improve mechanical properties of welded metal. (K3n, T24a; EG-a39, 1-52)

685-K. (Italian.) Repair Welding of Iron Castings. Giacomo Storace. Fonderia, v. 10, June 1961, p. 247-249.

Techniques for welding castings when exact quality of the Fe is unknown. Use of an electric arc welding machine with Monel, Ni or austenitic 18 Cr-8 Ni electrodes. (K1, 18-72; Fe, 5)

686-K. Eutectic "Quench Weld" Arc Welding Process. Machinery (London), v. 99, July 12, 1961, p. 102.

Process for repairing or building up broken components or castings of cast iron and steel. The mating edges of the broken pieces are veed out. Transverse grooves are then formed and successive layers of weld metal applied. Each layer is quenched by a wet rag or by a blast of compressed air. (K1, 18-72; ST, CI, 5)

687-K. Die Castings Can Be Adhesive Bonded. Precision Metal Molding, v. 19, July 1961, p. 70-71.

Reduction of rejection rates and leak testing operations and elimination of field failures by bonding and sealing two mating Al die castings with die cut AF-6 adhesive film in the production of a pneumatically controlled manifold for a process controller. Properties of the adhesive film. (K12; Al, 5-61)

688-K. How Easily Can You Join Metals by Resistance Spotwelding? R. D. Enquist. Iron Age, v. 188, Aug. 10, 1961, p. 76-78.

Development of a formula for predicting weldability of ferrous metals, light metals, conductive and noble metals and refractory metals and their alloys from data on electrical resistivity, melting point and thermal conductivity. (K9s, K3n, P12n, P11h, P15g; Fe, EG-a39, EG-c, EG-d37)

689-K. Single Purpose Welder Does Seven Jobs. Steel, v. 149, Aug. 7, 1961, p. 81.

Welding of steel, brass, Be-Cu and Ag to produce electrical contacts using a magnetic force bench welder automated by handling, blanking and forming devices. (K-general, 1-52, 18-74; ST, Cu-n, Cu-b, Be, Ag, SGA-r)

690-K. Body Assembly Procedure on the Consul Classic 315. Sheet Metal Industries, v. 38, July 1961, p. 515-527, 540.

Sequence of operations, equipment and layout of main body assembly section at the Dagenham Works of the Ford Motor Co. Ltd. Multispot weld sequence and stations used for welding assemblies other than the fenders. (K-general, K3n, T21a)

691-K. Welding Torch Rides Piggyback. Folke Johanson. American Machinist/Metalworking Manufacturing, v. 105, Aug. 1961, p. 83-84.

Welding of 30 ft. long T-1 steel I-beams with an ML-3 semi-automatic Squirt welder mounted on a small carriage which rides on the parts to be welded. Pre and post weld operations. (K-general, 1-52, K9p, K9q; TS, 4-57)

692-K. (German-French.) Repair Welding of the Transmission Housing of a Rotary Snowplow. Schweisstechnik Soudure, v. 51, July 10, 1961, p. 256-257.

Tig repair welding operations on a cast housing including degreasing by heating up to 400° C., build-up welding of a broken piece, joint preparation by grinding, prevention of crack propagation by drilling, flame preheating and welding. After welding the housing is asbestos-protected against rapid cooling. (K1a, 18-72)

693-K. Aluminum Joining--Tabulation of Techniques. G. O. Hoglund and H. H. Caldwell. Electronics, v. 34, June 16, 1961, p. 76-79.

Summary of brazing, soldering and welding methods and techniques and the alloys to which each process is applicable. (K-general; Al-b)

694-K. Recommended Practice for Arc Welding Titanium Metals. Canadian Machinery and Metalworking, v. 12, June 1961, p. 153-154, 156, 158.

Tungsten or consumable metal inert gas arc welding of MST-40, MST-55 and MST-70 commercially pure Ti and MST-821, 5Al-2.5Sn and 6Al-4V Ti alloys to form fillet, square butt, single and double Vee and single and double U welds. Weld contamination and porosity are minimized by degreasing or mechanical cleaning of surfaces and edges to be joined. Inert gas shielding prevents weld embrittlement by H, N or O. (K1;Ti, 1-52)

695-K. Prototype Friction Welder Proves Process Feasible. Steel, v. 149, July 24, 1961, p. 102.

Tool joints are joined to 1 1/4 in. diameter tubing by friction welding under light pressure at high speeds. A prototype friction welder averages 20-27 welds per hr. (K6, 1-52, 3-67, 3-74; 4-60)

696-K. AC + Emissive Wire = Sound Welding. Steel, v. 149, July 24, 1961, p. 104-105.

Types E308, E308L and E321 stainless welding wires are welded using a-c.,a continuous electrode coated with Rb and Cs compounds and an argon gas shield. Tensile yield, elongation and impact stengths of E308L stainless are compared for a-c. and d-c. welding with an argon shield. (K1d, Q-general; SS, 4-61)

697-K. Multi-Spot Welders Simplify Fabrication. E. C. Hall. Metalworking Production, v. 105, Aug. 2, 1961, p. 57-60.

Techniques and equipment used to assemble washing machine components. Use of Zn-rich primer on mating faces to protect against corrosion. (K3n, 1-52, R10b, T10c)

698-K. (German.) Use of Modern Welding Techniques in Repair of Rail Vehicles. Otto Wolff. Deutsche Eisenbahntechnik, v. 9, June 1961, p. 288-294.

Applications and equipment for UP (under powder) welding, CO_2 inert gas deposit welding and arc welding of various steel and cast iron parts in repair welding of rail vehicles. (K1, 1-52, T23p, 18-72; ST, CI)

699-K. Thermatool High-Frequency Fin Welding. Machinery (London), v. 99, July 26, 1961, p. 188-189.

Zircalloy spiral and parallel fins ranging in thickness from 0.004-3/8 in. are welded at speeds up to 1000 ft. per min. to Zircalloy tubings by a high-frequency resistance process in which the current follows the low inductance path rather than the low resistance path resulting in localized heating of very high intensity. (K3; Zr-b, 4-60)

700-K. Induction Soldering and Brazing. Harold Ottobrini. American Jewelry Manufacturer, v. 6, June 1961, p. 12-13.

Joining by induction heating allows preplacement of parts in a nonconductive mold after applying soft solder, paste or shinstock. The assembly is automatically transported through the induction coil which heats the metal in the assembly. By regulating the field strength and conveyor speed, the output of the machine can be calculated. (K6n, K8, 18-74, T9s; Au, Ag)

701-K. Magnaflash Welding Electrical Contacts. Fansteel, v. 1, no. 2, 1961, p. 2-3.

A wide range of materials including Cu-W and Ag-W, Ag-Cd oxide combinations and ferrous alloys, can be joined by this process achieving bonds of 99-100% of the total weldable areas. Special atmospheres and fluxes are eliminated and ultrasonic inspection is reduced to a sampling basis. (K3r, 1-52, 17-57; Cu-b, Ag-b, Fe-b)

702-K. Some Aspects of Metals Joining for Electron Tube Applications. J. J. Vogi, W. A. Gibeaut, G. E. Faulkner and P. J. Rieppel. Paper from "Advances in Electron Tube Techniques". Fifth U. S. National Conference, Proceedings (Sept. 1960). Pergamon Press Inc., New York 22, 1961, p. 21-30.

Determination of weld characteristics by examination of as-welded cross-wires, weld cross sections and by strength tests. Evaluations are made for Ni to Ni, Mo to Mo and Mo to Ni welds, and for Hf and Cb alloys and various foil materials. 27 ref. (K9, K-general, T1; Ni-b, EG-d37, 4-56, 17-57)

703-K. Theory of Adherence in Ceramic-to-Metal Seals. S. S. Cole, Jr., and H. W. Larisch. Paper from "Advances in Electron Tube Techniques".

Fifth U. S. National Conference, Proceedings (Sept. 1960). Pergamon Press Inc., New York 22, 1961, p. 47-51.

Summary of compression and bond test data obtained on metallizing systems used in fabricating ceramic-to-metal seals by the refractory metal process. Comparison of the alumina reaction and glass migration theories of adherence. 16 ref. (K11b)

704-K. Vapor-Cooled Welder Increases Tube Production. Machinery, v. 67, Aug. 1961, p. 137.

A ribbon-wound core toroidal transformer and a two-section, low-impedance secondary are combined to form a rotary welder, cooled by a fluid dielectric and is sealed within the unit which is used to resistance weld tubing and pipe produced from cold rolled and aluminized steel for automotive tail pipe. (K3, 1-52, T21c; ST, 4-60, 8-62)

705-K. Vertical Electro-Slag Welding Machines. Engineer, v. 212, July 28, 1961, p. 164.

Description and operation of a welding machine for automatic vertical welding of seams in caisson section plates. The welding head assembly is mounted on a carriage which travels up a vertical column at a speed controlled by a differential thermocouple system in accordance with the rate of weld deposit. (K6, 1-52; ST, 4-53)

706-K. Welding Thin Stainless Steels. D. M. Potter. Welding and Metal Fabrication, v. 29, Aug. 1961, p. 314-323.

Layout, equipment and operation of a plant which produces components, tank linings and jet engine insulation blankets from stainless steel sheet. Dimpling, stretch forming, welding, electrolytic cleaning and testing procedures. (K-general, G3, G9 L13n, 1-52; SS, 4-53)

707-K. Projection Welding of Plugs and Bosses to Heavy Mild Steel Plates. C. Phillips. Welding and Metal Fabrication, v. 29, Aug. 1961, p. 324-332.

Testing of weld specimens for leaks, hardness and tensile failing load to determine optimum welding conditions and projection design and dimensions. (K3q, Q29, Q27; CN, 4-53, 7-51)

708-K. Body Production for the Consul Classic. Welding and Metal Fabrication, v. 29, Aug. 1961, p. 333-340.

Layout and operation of a welding line which incorporates automatic press welding machines and a number of spot welding stations for the production of car underbodies from mild steel sheet pressings. (K5, K3n, 1-52, T21a; CN)

709-K. Latest Design Trends in Tube Milling Welding. Machine Production, v. 20, Aug. 1961, p. 23-25.

Butt seam resistance welding of steel tubing and pipe by "Type-V" welder. Discussion of dielectrics and insulating materials. (K3p; St, 4-60)

710-K. How Do You Solve Your Welding Problems? Harry Thomasson. Canadian Metalworking, v. 24, Aug. 1961, p. 44-47.

Design stage of fabrication operations, welding processes, capacity of equipment and base material and its thickness are considered relative to welding problems and their prevention. Importance of residual stress factors and yield strength. (K9, 3-66)

711-K. H-F Induction Brazing and Soldering. Pt. 1. J. Libsch and P. Capolongo. Canadian Metalworking, v. 24, Aug. 1961, p. 49-51.

High-frequency fabrication of Al alloy, steel and brass forgings and stampings to increase service life and to maintain accuracy in alignment of joined components. Surface preparation, atmosphere control and alloy selection. (To be continued.) (K8k, K7e; Al-b, ST, Cu-n, 4-51, 4-59)

712-K. Pipewelding Machine May Save You Money. Canadian Metalworking, v. 24, Aug. 1961, p. 52-54.

Portable pipewelder is applied to butt welding of overland and shop fabrication piping in a variety of materials. Unit utilizes inert-gas metal-arc welding equipment and techniques. Economic considerations in welding of 6 in. diameter schedule 40 and 80 carbon steel pipe as compared to manual welding. (K1d, 1-52; CN, 4-60)

713-K. Fin Welding by High-Frequency Resistance. Light Metals, v. 24, Aug. 1961, p. 228.

Method for welding fine or other continuous projections, odd forms and shapes to tubing and flat sections at very high speeds. Application of the process to flat strips, structural shapes, two tubes of different diameter, lips or edges of drum heads, tapered tubes and perforated strip metal. (K3; 4-53, 4-57, 4-60)

714-K. Solid-Phase Bonding of Columbium. S. J. Paprocki, E. S. Hodge and P. J. Gripshover. Paper from "Columbium Metallurgy". v. 10. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 13-30.

Components of Cb for bonding are enclosed in an evacuated envelope or welded to form a gastight assembly. The assembly is then subjected to an inert gas pressure and heated above the recrystallization temperature of Cb. The inert gas forces the components into the intimate contact necessary for diffusion to occur. Optimum bonding has been achieved at 1150° C. with 10,000 psi. of He gas for a time of 3 hr. (K5k, 2-61; Cb)

715-K. Aluminum Pipeline Automatically Welded. Canadian Welder, v. 52, Aug. 1961, p. 8.

Description and operation of an inert gas machine pipewelder which welds B51S-T4 Al oilfield pipeline sections with a wall thickness of 0.188 in. in the field at high speed. Up to 150 joints are welded in 9 hr. (K1d, 1-52, T26r; Al)

716-K. Welded Ore Bin. Canadian Welder, v. 52, Aug. 1961, p. 14-15.

An A-7 structural steel ore concentrate load-out bin is lined with abrasion resistant T-1 steel plates welded at 200-250° F. Capacity of the bin is 170,000 cu. ft. or 15,000 tons of ore concentrate. (K-general, W12c; TS, SGB-s)

717-K. Commercial Friction Welds Now a Reality. Canadian Welder, v. 52, Aug. 1961, p. 16.

Techniques and equipment for light pressure, high speed friction welding of male and female tool joints 1.75 in. in diameter to form 30 ft. tube lengths. Physical tests and microscopic examination. (K6, 1-52; 4-60)

718-K. (Pamphlet.) British Welding Research Assoc. 16th Annual Report, 1960-1961. 1961. 63 p. British Welding Research Assoc., 19 Fitzroy Square, London W. 1, England.

Survey of research in welding technology, brazing and fatique of weldments. Topics include welding properties of austenitic stainless steel, mild steel, low alloy steels, Al, Cu, Mg and Ti alloys; process involving bare wire CO_2 argon-CO_2 mixtures, gas-metal reactions, the welding ore and heat resisting materials; research on brittle fracture and manufacture of pressure vessels. (K-general, Q26s, T26q, 10-52, 10-54; ST, Al-b, Cu-b, Mg-b, Ti-b)

719-K. Glass-To-Metal Seals Take Hold. S. J. Koch. Iron Age, v. 188, Aug. 31, 1961, p. 88-89.

Mo wire is chromollized diffused with Cr bonding to glass in order to produce a good glass-to-metal seal in the manufacture of vacuum tubes. (K11a, L15, T1j, 17-57; Mo, Cr)

720-K. Broader Use of Aluminum in Air Conditioners Through Zinc-Soldering Production Technique. Industrial Heating, v. 28, Aug. 1961, p. 1480, 1486.

Automatic flame soldering technique for the joining of Al tube to finned Al coils for application in air conditioners. (K7, W10d, 1-52, 17-57; Al)

721-K. Alloying During Welding. George E. Linnert. Metals Engineering Quarterly, v. 1, Aug. 1961, p. 39-56.

Review of techniques which have proved practicable and dependable for welding processes such as manual shielded arc, submerged arc gas tungsten arc and gas-metal arc. Four forms of alloy additions are taken into account including filler wire, powdered metal, metal plating and gases for welding low-alloy, stainless and carbon steels. (K1d, K9n, 2-60; ST)

722-K. The Metallurgy of Weld Heat-Affected Zones in HY-80 High Strength Steel. G. N. Emmanual, D. E. Young and G. L. Spahr. Metals Engineering Quarterly, v. 1, Aug. 1961, p. 82-97.

Transformation characteristics of a commercial plate when austenitized at 2400° F.; hot ductility

tests; effect of base-plate chemistry; preheat temperatures; effects of hydrogen on weldability; influence of variations in chemical analyses on mechanical properties. (K9n, K9s; AY, SGB-a)

723-K. (French.) Comments on Tentative Specifications Relative to Arc Welding. A. Gaubert. Soudage et Techniques Connexes, v. 15, May-June 1961, p. 168-174.

Papers presented at the Society for Welding Engineers covering welding standards and specifications. Topics include dimensional characteristics of covered electrodes, tensile and notch impact tests on fusion weldments and specifications relative to covered electrodes for manual electric arc welding of unalloyed or low-alloy steels. (K1, K9, S22; ST)

724-K. (French.) Study of the Behavior of Brazing Filler Metals Using a Specimen With Variable GAP. B. Blanchet. Soudage et Techniques Connexes, v. 15, May-June 1961, p. 199-210.

Development of a testing method for determining wetting characteristics of brazing meterials of various compositions and resultant joints developed in the brazing of stainless steel. (K8, 1-54; SS, SGA-f, 17-57)

725-K. (French.) Technique for Spot Welding Low-Carbon Steel From 0.022 in. to 1/8 in. Soudage et Techniques Connexes, v. 15, May-June 1961, p. 211-218.

Recommended current, resistance, time, temperature and joint design parameters for producing sound welds in low-carbon steel. Influence of process variables on weld quality. (K3n, K9; CN-g)

726-K. (French.) Some Problems Concerning the Fusion Welding of Wrought Aluminum and Aluminum Alloys. H. Gerbeaux. Soudage et Techniques Connexes, v. 15, May-June 1961, p. 219-237.

Review of the production properties and use of Al and Al alloys with attention to weldability of Al-Mn alloys. Study of the oxy-acetylene and gas-shielded welding of Al and Al-Mg alloys with particular emphasis on prevention of swells, blowholes and crack phenomena. Data are given for radiographic inspection of welds and methods of chemical analysis, especially the determination of Mg. (K1, K2, K9; Al-b, 10-54)

727-K. (German.) Welding Under Inert Gas, Powder and Slag. W. Hummitz. Schweisstechnik, v. 15, Aug. 1961, p. 87-91.

Survey of manual and automatic welding methods such as short-arc welding, using CO_2 and Ar as inert gas; thermit powder welding and electroslag welding. Welding of steel sheet and parts (17 Mn 4 steel, grain refined steels containing 0.8-1.7% Mn, heat resistant steel with 1% Mn and 0.5% Mo). Review of welding mechanisms and process parameters. (K1d, K6, 17-57; SS, 10-54)

728-K. Metallurgical Problems Associated With the Construction of Gas-Cooled Reactor Pressure Vessels. W. C. Holliday and M. J. Noone. Paper from "Steel for Reactor Pressure Circuits". no. 69. Iron and Steel Institute, London SW 1, England, 1961, p. 207-239.

Reasons for selecting mild steel plates having a guaranteed minimum Charpy V-notch impact value of 35 ft. lb. at -10° C. Weld tests to qualify manual and submerged arc welding of thick plates. Results for submerged arc weld metal stress/rupture tests. (K9, K1e, Q6, T11, T26q; CN, 4-53, 17-57)

729-K. Fabrication of Reactor Vessel, Heat Exchangers and Circuitry for Dounreay Fast Reactor. P. K. Richards. Paper from "Steel for Reactor Pressure Circuits". no. 69. Iron and Steel Institute, London SW 1, England, 1961, p. 240-256.

It is possible to manipulate and weld vast amounts of stainless steel to the extra high standard required for nuclear plant and maintain this standard consistently throughout. Inspection methods are available or can be adapted to insure the desired standard is reached. (K-general, T11, T26q; SS, 17-57)

730-K. Shielding Gases--Their Function in the Welding Arc. Welding Engineer, v. 46, Aug. 1961, p. 35-38.

Methods of production and physical properties of Ar, He and CO_2. Effect of shielding gases on arc behavior and weld penetration. Shielding gas requirements for Mig and Tig arc welding of mild steel, low-alloy steel, stainless steel, Ni, Monel, Inconel, Al alloys, Mg, Ti, deoxidized Cu, aluminum bronze and silicon bronze.

(K1d, W29j, 17-57; ST, Ni-b, Al-b, Cu-b, Mg, Ti)

731-K. Will Mig and Tig Meet Your Needs? W. G. Schumacker. Welding Engineer, v. 46, Aug. 1961, p. 40-41.

Physics of welding and process parameters for inert gas shielded metal arc and tungsten arc welding of ferrous and nonferrous metals. Comparison of suitability for joining thin sheets and hard-to-weld metals such as Ti and Zr. (K1d)

732-K. Miles of CO_2-Shielded Welds Fabricate Railroad Hopper Cars. Welding Engineer, v. 46, Aug. 1961, p. 42-43.

Automatic and semi-automatic CO_2 shielded flux cored wire welding used for fabricating steel railroad cars at welding speeds as high as 50 in. per min. (K1d, T23p; ST, 17-57)

733-K. Revolving Tig Unit Cuts Costs but Maintains Quality. W. Twity and W. Purcell. Welding Engineer, v. 46, Aug. 1961, p. 44-45.

Automatic Tig welder with rotating head is used to weld Al tubing in all stages of assembly in the production of refrigerator evaporator compartments. (K1d, T10a; Al, 17-57)

734-K. Three Miles of Runway Girders Are Submerged-Arc Welded. Welding Engineer, v. 46, Aug. 1961, p. 56.

Runway girders, jack trusses and structural columns for a building housing a hot strip mill is fabricated by automatic submerged welding. (K1e; 4-57)

735-K. Designing a Weldable Alloy Using Metallurgical Parameters. W. N. Platte. Metal Progress, v. 80, Sept. 1961, p. 80-85.

The general aspects of developing alloys for weldability involve metallurgical and physical data. These parameters are applied to the design of weldable alloys. (K9s, P-general, Q-general, 2-60; Mo-b, 17-51)

736-K. The Evolution of Ductile High-Temperature Brazing Alloys. D. C. Herrschaft. Metal Progress, v. 80, Sept. 1961, p. 97-100.

Ag brazing alloys containing small amounts of Li, In and Pd are now being used to bond stainless steel honeycomb and alloys containing gold or palladium (or both) look promising for jet engine brazing applications. (K8, Q23p, 2-60, T24; SS, Ag-b, SGA-f, 17-57)

737-K. Brazing of Components for Small Gas Turbine Engines. M. J. Stern. Metal Progress, v. 80, Sept. 1961, p. 101-105.

Techniques and controls employed at Boeing in joining engine components made of Rene 41 and other high-temperature alloys. (K8, T24b; SGA-h, 17-57)

738-K. Calculating Cycles for Brazing. H. M. Lampert, Jr. Metal Progress, v. 80, Sept. 1961, p. 106-107.

When brazing stainless steels parts, it is necessary to know the time and temperatures at which they should be held during the cycle. Calculation of a time-temperature parameter. (K8, 2-61, 3-67; SS)

739-K. "Hot Box" Protects Parts During Welding. Metal Progress, v. 80, Sept. 1961. p. 112, 128.

Special equipment designed for Mig welding of H11 steel accommodates welding fixtures and weldments up to 30 ft. in length. Temperatures of 600° F. for welding and 1200° F. for stress relieving are controlled at 16 heat zones. A protective atmosphere flows into the chamber through a hollow drive shaft of the positioning motor. (K1d, J1a, J2k, 1-52; TS)

740-K. Split-Second Magnetic Force Welding Four Times Faster. Western Metalworking, v. 19, Aug. 1961, p. 27.

Welding process for joining clusters of Zr alloy clad Pu-Al alloy rods used in fuel elements, heat being generated by the electrical resistance of the metal. The welding current energizes an electromagnet which exerts pressure on a movable electrode and pushes the parts together. (K3, T11g; Al-b, Pu, 8-66)

741-K. 12 1/2-Ton Tooling Fixture Aids Saturn Welding. Western Metalworking, v. 19, Aug. 1961, p. 32.

An electronically controlled tooling fixture constructed from Al alloy is used for precision welding of Al alloy segments into 18 ft. diameter dome-shaped bulkheads of Saturn space vehicle. A

2 1/2 ton platform rotates from horizontal to vertical on two 18-ft. high end plates as it moves each segment joint past the welding torch. (K2, 1-52, T24e; Al-b, 17-57)

742-K. Double Driving Fasteners Assure Positive Seal. Western Metalworking, v. 19, Aug. 1961, p. 46, 48.

Process for joining structural members of fuel tanks using two-piece lockbolts consisting of an AISI 4037 alloy steel pin and a 2024-T4 Al alloy collar. When the pin is pulled through the hole, which is smaller in diameter than the pin, the hole is expanded slightly producing a metal-to-metal mechanical seal. (K13q, T7f; Al-b, AY, 17-57)

743-K. Electrode Coatings and Fluxes. W. W. Watson. New Zealand Engineering, v. 16, June 15, 1961, p. 217-220.

Flux coatings and the function of their individual consituents are discussed in terms of physical and chemical reactions and their effects on the metal. (K1a, K9n, W29h)

744-K. Impact Method Promises Light, Cheap Spotwelders. Steel, v. 149, Aug. 28, 1961, p. 75.

Production of mild steel welds with a 1200 lb. resistance in tension shear by using a resistance welding machine consisting of anvil, top electrode and a falling weight. Welds are made by applying power, striking the electrodes and allowing current to continue for a short time. (K3n, 1-52; CN)

745-K. Electron-Beam Welding. Aircraft Production, v. 23, Aug. 1961, p. 303-307.

Description, equipment and applications of process including typical setting for welding alloy steels, Cu, Ta, Be, Ti, Mo, Ni, Zr, Cd and Al alloy. (K6, 1-52, 17-57)

746-K. Designers Control Distortion by Welding Inside Out. Iron Age, v. 188, Sept. 7, 1961, p. 108-109.

Fabrication of 4130 steel shell motor case by short arc welding from within. Thermal expansion of the steel forces the joint tightly against an outer backup bar to control distortion. Rupture is from 1200-1500 psi. (K1, P11h, Q3m; AY, 9-74)

747-K. The Production of Hydraulic Pit-Props. S. C. Poulsen. Machinery (London), v. 99, Aug. 2, 1961, p. 245-249.

CO_2 shrouded arc welding of components using automatic 30-kVA machines. Welding and testing, cleaning and painting routines are outlined as part of final fabrication and assembly. (K1d, 1-52)

748-K. (Russian.) Friction Welding of Pins to a Plate. R. I. Zakson and V. D. Voznesenskii. Avtomaticheskaya Svarka, v. 14, June 1961, p. 58-62.

Mechanical and crystallographic properties of a friction welded joint. Effects of heat treatment. 6 ref. (K6, M26, Q-general, 2-64; 7-51)

749-K. (German-French.) Welding Tests on 13% Chromium Cast Steel. K. Gut and A. Werner. Schweisstechnik-Soudure, v. 51, June 1961, p. 203-211.

Heat treated square bars for water turbines are test welded at preheating temperature from 200-600° C. Investigation of microstructure, hardness, mechanical strength, notch impact strength as influenced by temperature and fatigue strength. (K9r, M-general, Q-general, 2-61)

750-K. Review of Recent Developments in Metals Joining. J. J. Vagi, W. J. Lepkowski, H. W. Mishler and H. E. Pattee. Defense Metals Information Center, Battelle Memorial Institute, DMIC Memo. 125, Sept. 1, 1961, 5 p.

Summary of reports for Apr. 30-July 20, 1961. Topics include the effects of welding on the metallurgical and mechanical properties of Cb alloys; plasma welding of refractory metals; explosive welding of 4340 steel, Ti-6Al-4V, Mo, Ti-13V-11Cr-3Al and of 310 stainless alloys; electroslag welding process and equipment; and development of ceramic adhesives for high-temperature applications. 8 ref. (K-general, 10-54; EG-d37, SGA-h)

751-K. Adhesives for Ordnance. Eileen R. Swick. Ordnance, v. 46, Sept-Oct. 1961, p. 295-298.

Evaluation of adhesive joining with epoxy based resins for use in ordnance field emergency repairs. The effects of curing conditions of fillers and flexibilizers in the adhesive and of temperature and weather conditions

on toughness, impact and heat resistance and shear strength of the bond are tested for steel to steel and Al to Al joints. Attention is given to corrosive effects of the adhesive on the metal. (K12, T2, 18-72; ST, Al, NM-d34, 17-57)

752-K. Volkswagen Depends on Automatic Resistance Welding. Welding Design & Fabrication, v. 34, Aug. 1961, p. 24-25, 58-59.

Techniques and equipment for automatic spot and seam welding and projection and flash welding. (K3, 1-52, T21)

753-K. Welded Design Makes Steel Yacht Safe for Sunday Sailors. Welding Design & Fabrication, v. 34, Aug. 1961 p. 26-27.

Welding, assembling and finishing operations in the construction of hot rolled steel yachts 28 and 32 ft. long. (K-general, L-general, T22; ST)

754-K. Automatic Welding Outdoors. Welding Design & Fabrication, v. 34, Aug. 1961, p. 28-29.

Assembly and CO_2 shielded and submerged arc welding of mild steel tanks 14 ft. in diameter and up to 240 ft. long. (K1d, K1e, T26q; CN)

755-K. Mig Braze Welding Saves Time and Money. Welding Design & Fabrication, v. 34, Aug. 1961, p. 57.

Mig braze welding with phosphor-bronze welding wire of actuating cylinders consisting of SAE 1020 steel cylinder tubes and ductile iron collars whose Ag-brazed joints had failed. (K1d, T21b; CN)

756-K. 7 Typical Joint Designs for Adhesive Bonding. Product Engineering (Design Digest Issue), v. 32, Sept. 4, 1961, p. 364-365.

Lap, angle, butt, stiffener, corner (sheet metal and rigid member) and cylindrical slip joint designs used to fasten structural members. (K12)

757-K. Inert-Gas-Shielded Arc Welding of Ferrous Metals. G. R. Rothschild and A. Lesnewich. Welding Research Council Bulletin, no. 70, July 1961, 21 p.

Review of Tig and Mig welding including physical characteristics of the processes, application to steel, comparison with other welding methods, properties of welded materials, design and operation of equipment and process variables. 18 ref. (K1d, 10-54; ST)

758-K. Heat Treating Teams With Brazing. John J. Lawless. American Machinist/Metalworking Manufacturing, v. 105, Aug. 21, 1961, p. 101-103.

Heating temperatures, furnace atmospheres, brazing alloy compositions and the cooling cycle are evaluated for combined furnace brazing and hardening of 17-7 PH, 440, 440 C, AM 350 and 355 stainless steels. T-T-T diagrams are constructed for austenite, ferrite and martensite transformations at 340-2050° F. (K8j, J2k, N8g, 2-61, 2-64; SS, SGA-f, 17-57)

759-K. How Electron Beam Welding Facilitates High Pressure Vessel Construction. Kenneth J. Miller. Modern Machine Shop, v. 34, Sept. 1961, p. 124-129.

Precision joining of hemispherical pressure-vessel halves made of exotic alloys including Ti, Ta, Cb, Mo, Udimet 500 and Rene 41. Applications of process in high precision milling and drilling. (K6, T26q, 1-52; Ti, Ta, Cb, Mo, Ni-b)

760-K. Submerged Arc Joins Aluminum. Iron Age, v. 188, Sept. 21, 1961, p. 104.

Filler wires in diameters up to 7/32 in. require heavy wire feeders and high-capacity power supplies to butt weld thick Al alloy plates. Submerged-arc equipment, suitably converted to use with Al, is also used for fillet welds. (K13, W29, 1-52; Al-b)

761-K. Brazing for High-Temperature Service. A. F. Haskins. Defense Metals Information Center, Battelle Memorial Institute, DMIC Memo. 48, Mar. 29, 1961, 12 p.

Summary of technical advances in brazing of filler metals with high-temperature, high-strength, corrosion-resistant alloys at temperatures in excess of 600° F. Filler metals analyzed include Ni and noble metal base alloys as well as filler additions of Li, Mn, Si, Cu, Co and Cr. 42 ref. (K8, 2-62, 10-54; SGA-g, SGA-h, SGB-a)

762-K. Percussive Welding Joins Fine Wire. W. A. Owczarski and A. J. Palmer. Metalworking Production, v. 105, Aug. 9, 1961, p. 57-59.

Welding of fine wires using a discharge from a capacitor bank at the moment when the two parts are brought together. Success of the process depends on close timing and control of positioning and clamping of parts to be welded. (K3a, 1-52; 4-61)

763-K. Welding Titanium. Tool and Manufacturing Engineer, v. 47, Sept. 1961, p. 115-116.

Precautions to take during welding to avoid embrittlement and contamination; advantages of sigma welding; data on joint design. (K1d; Ti)

764-K. Liquid Metal Fuel Reactor Experiment--Investigation of Beryllium Welding Techniques for Reactor Port Thimble Joints. P. C. Thys. Babcock & Wilcox. U. S. Office of Technical Services, BAW-1100, Apr. 1960, 23 p. $.75.

Be tubing is successfully joined using tungsten inert gas procedure in fabricating a thimble for insertion into the graphite core assembly of a liquid metal fuel reactor (LMFR). (K1d, T11; Be, 17-57)

765-K. Welded Butt Joints With Fine Wires. Lee Martz. Review of Scientific Instruments, v. 32, Aug. 1961, p. 990-991.

A method of fusing fine wires of dissimilar diameters and melting points by oxy-gas methods. Applications to wires of Cu, Ni, Cr, Pt, Au, Al, Co and their alloys. (K2m, 3-73; Cu-b, Cr-b, Ni-b, Pt-b, Au, Co-b, 4-61)

766-K. New Precision Orbital Welding Method. Metallurgia, v. 64, July 1961, p. 22.

Method effects a butt weld between a fully formed tube in a fixed position and an end fitting properly positioned. Degree of concentricity of weld crown and penetration bead is high. Description of equipment; applications in nuclear industry. (K-general, 1-52; 4-60)

767-K. (Czech.) Welding of Steels Containing 5% Chromium and Stabilized With Molybdenum or Tungsten. Vaclav Pilous. Zvaranie, v. 10, Jan. 1961, p. 5-9.

CSN 17102 and CSN 422900 steel are welded using cored and coated electrodes. Preheating from 200-400° C. and heat treating of weldments at 720° C. 14 ref. (K-general, K9p, K9q; AY, Cr, Mo, W)

768-K. (Czech.) Percussion Welding of Steel Tubing Used in Boilers. Jaroslav Vintr and Juraj Cervenka. Zvaranie, v. 10, Jan. 1961, p. 10-14.

Welding of tubing manufactured from steel containing 0.05-0.22% C, 0.25-0.65% Mn, 0-0.65% Cr and 0-1% Mn. Preparation of joints and percussion welding with simultaneous increase of the internal pressure by supplying compressed air to tube interior. (K3a, 3-74, K9p; ST, 4-60)

769-K. (Slovak.) Vacuum Brazing. Vladimir Horacek. Zvaranie, v. 10, Jan. 1961, p. 14-17.

Brazing of Cd, Zn, Mg, Pb, 18-8 stainless steel, Nimonic 90 or Ti in a vacuum furnace using solders containing Ag, Cu, Sn, Au, In, P, Mn, Ni, Fe, Pt or Mo. Wettability as a function of pressure. 8 ref. (K8, 1-73, 3-74; Cd, Zn, Mg, Pb, SS, Ti, Ni-b)

770-K. (Slovak.) Automatic Submerged Arc Welding of Austenitic Steels. Alfred Missikewitsch. Zvaranie, v. 10, Jan. 1961, p. 18-20.

Welding of 1Kh18N9T austenitic steels using fluxes of various compositions and carbon steel electrodes. Effects of flux composition and welding parameters on composition of weld metal, hot cracking, metal transport, tensile and bend properties and impact strength of weldments. 6 ref. (K1e, 18-74, Q-general; SS-e, 7-51, 9-71)

771-K. (Czech.) Cold Pressure Welding. Rudolf Krnak. Zvaranie, v. 10, Jan. 1961, p. 24-25.

Sheets or wires of various metals and alloys are welded in the cold state at pressures from 50-500 kg. per sq. mm. transmitted to the surfaces by special welding dies. Welding of spot, butt and overlap joints. (K-general, 1-67, 3-74; 4-53, 4-61)

772-K. Exothermic Brazing. Roger A. Long. Welding Journal, v. 40, Aug. 1961, p. 346s-350s.

Theory of exothermic reactions. Average ignition temperatures and approximate duration times of stoichiometric

mixtures. Effects of powder particle size and additions of inert materials on reaction duration. Utilization of the metallic products of the reactions as bonding adhesive and/or the heat from the reaction to braze stainless steel honeycomb panels. (K8; SS, 7-59)

773-K. Ultrasonic Welding of Heat-Resisting Metals. N. E. Weare and R. E. Monroe. Welding Journal, v. 40, Aug. 1961, p. 351s-358s.

Ultrasonic spot welding of various combinations of 316 stainless steel, Ti, Fe, Cb, Inconel and Mo-0.5% Ti alloy. Influence of clamping pressure, welding time and welding tip displacement on formation of welds and their room temperature properties. Metallurgical examination indicates that fatigue cracking occurs at the edge of the weld area. Only welds in Ti and between stainless steel, Fe and Cb had acceptable cross-tension strengths. 13 ref. (K6r, K9, Q7, Q27a; SS, Ti, Fe, Cb, Ni-b, Mo-b, SGA-h, 7-51)

774-K. Welding the Beta Titanium-Base Alloy Ti-13V-11Cr-3Al. H. D. Kessler. Welding Journal, v. 40, Aug. 1961, p. 359s-363s.

Tig welding of the alloy in annealed and aged conditions. Effects of various post-weld heat treatments, repair welding and cold working of welded area on tensile properties and notch sensitivity. (K1d, Q23s, Q27a, 2-64, 3-68; Ti-b, V, Cr, Al)

775-K. Effect of Welding Conditions on the Shrinkage Distortion in Welded Structures. Masaki Watanabe and Kunihiko Satoh. Welding Journal, v. 40, Aug. 1961, p. 377s-384s.

Shrinkage distortion is analyzed from the standpoint of welding heat and external restraint effects. Examples of applications of mathematical expressions for distortion in unrestrained and under external restraint conditions. 12 ref. (K9n; 7-51, 9-67, 9-74)

776-K. An Automatic Process for Welding Girth Joints in Steel Pipelines. J. W. Nelson, G. E. Faulkner, P. J. Rieppel and H. C. Cook. Welding Journal, v. 40, Aug. 1961, p. 813-820.

Automatic CO_2 shielded consumable electrode welding process is used in a fixed horizontal position in field pipe girth-welding. Weld geometry, welding conditions and weld quality. (K1d, 1-52, T26r)

777-K. Semi-Automatic Gas Tungsten-Arc Spot Welding of Stainless Steels and High Temperature Alloys. R. J. Campbell and D. R. Miller. Welding Journal, v. 40, Aug. 1961, p. 828-838.

Process for producing two-ply and multiple-thickness joints in 19-9DL and 316 stainless steels, Inconel, Inconel X, Hastelloy X and Rene 41 sheet. Equipment requirements and welding schedules. 4 ref. (K1d, K3n, 1-52; SS, Ni-b, SGA-h, 4-53)

778-K. Here's What Research at Orenda Revealed About Brazed Joints. Canadian Machinery and Metalworking, v. 72, Sept. 1961, p. 73-79.

Studies of alloys composed of Au (72-100%), Cr (7%), Ni (22-82.45%), Ag (35-92.8%), Cu (7-65%), Mn (5-70%), Pd (20%), Li (0.2%), Si (3.5-9%) and B (1.8-2.9%) for induction brazing of 410 stainless steel, Inconel and mild steel at 1750-2175° F. Alloy brazed joints are tested for shear and tensile strengths, corrosion resistance and stress rupture properties. (K8k, Q2, Q3q, Q27a, R11; ST, Ni-b)

779-K. Friction Welding Takes First Commercial Steps. Canadian Machinery and Metalworking, v. 72, Sept. 1961, p. 80.

Development of a welding technique in which the mechanical energy of two objects rotating in contact with each other is converted into thermal energy. Friction welding joins Cu to brass, brass to Al and Al to steel using light pressure and high speeds. (K6, Cu, Cu-n, Al; ST)

780-K. Stainless Steel Overlaying Using Inert Gas Metal Arc Process--Canadian Pioneer Research. E. G. Brown. Canadian Machinery and Metalworking, v. 72, Sept. 1961, p. 81-84.

Stainless steel wire is used to overlay mild steel A285 plates using standard Mig equipment. Effects of current and welding speed on dilution and penetration and the effect of dilution on hardness. 5 ref. (K1d, 1-52, 17-51; ST, SS)

781-K. Weld 9 3/8 In. Thick on Huge Suction Dredge Stands the Test of "World's Toughest Job". Canadian Machinery and Metalworking, v. 72, Sept. 1961, p. 86-87.

Cracks in solid medium carbon steel are examined by Magnaflux testing and are repaired by welding with low-hydrogen stick electrodes. A welding, peening and Magnaflux testing cycle is repeated to build up the sides of the cracks. (K2j, S13j, T4d; CN, 1-52, 9-72, 17-57)

782-K. Low-Temperature Silver-Brazed Joints Strong, Easily Made on Almost Any Joint. Dudley C. Lloyd. Canadian Machinery and Metalworking, v. 72, Sept. 1961, p. 88-89, 101.

Alloys varying in Ag content (15-50%) are used in torch and furnace brazing of Cu, brass, bronze, Ni, steel, stainless steel and Monel. Applications in plumbing, electronics and aircraft. (K8, 1-52, 1-67, 7-52, 17-57; Ag-b)

783-K. Welding Design, Procedure and Control in Relation to Canadian Standards. Ronald M. Gooderham. Canadian Machinery and Metalworking, v. 72, Sept. 1961, p. 90-95.

Canadian welding codes and processes. Requirements are given for backing bars, strength of weld, effective lengths, design stress requirement and rate of cooling. (K-general, 11-62)

784-K. Welding Secrets Uncovered by Mines Branch. W. P. Campbell. Canadian Machinery and Metalworking, v. 72, Sept. 1961, p. 98-99.

Welding research projects at Dept. of Mines and Technical Surveys, Ottawa, include induction welding and investigations of weldability of steel, uranium and tin-bronze castings. (K6n, K9s; ST, Sn, Cu-s, U)

785-K. Brazing Nickel and Its Alloys Need Proper Methods, Material. Canadian Machinery and Metalworking, v. 72, Sept. 1961, p. 116, 138.

Prebrazing procedures for Ni and Ni-base alloys include stress relief and mechanical or chemical cleaning. Choice of heating methods, fluxes and atmospheres for brazing with Ag-Cu-Zn-Cd alloys. (K8, J1a, L10, L12, 1-52; Ni)

786-K. Half an Acre of Jigs Yields Quality Welds. Canadian Machinery and Metalworking, v. 72, Sept. 1961, p. 130, 132.

Flash and arc welding of heavy equipment components using jigs to provide dimensional control. (K1, K3r, T3, T4, 1-52)

787-K. (French.) Friction Welding. Jan Mandaus and Josef Voboril. Mechanique Electricite, v. 45, Mar. 1961, p. 51-58.

Welding of high alloy, stainless, heat resistant, martensitic-ferritic, austenitic and structural steels, Cu, Al, brass, bronze and Ti. Heat produced as a function of contact pressure, time of operation, friction coefficient, thermal conductivity, rotation velocity and specific heat of the materials welded. (K6, 3-67; ST, Cu, Al, Cu-n, Cu-s, Ti)

788-K. Safeguarding Nichrome Brazing in Hydrogen. Lindsey Hoben. Metal Treating, v. 7, Aug-Sept. 1961, p. 19, 35.

A hydrogen atmosphere is used with brazing processes to prevent discoloration. A parallel two bank supply system incorporating a He purge facility eliminates explosive conditions. (K8, 1-52, 2-66; EG-n)

789-K. Jig Design for Precision Furnace Brazing. Alexander M. Hanfmann. Metalworking Production, v. 105, Aug. 30, 1961, p. 99-107.

Principles and processes for high volume assembly of uniform parts such as cooling coils and manifold joints, either with self-jigging parts or with brazing jigs. Consideration of design, assembly, inspection and maintenance for brazing jigs including tolerance and expansion factors. (K8j)

790-K. How to Calculate Welding Heat Processes. Harry Thomassen. Canadian Metalworking, v. 24, Sept. 1961, p. 40-41.

Analysis of phenomena associated with the flow of heat from the weld area to the adjacent metal. (K9)

791-K. H-F Induction Brazing and Soldering. J. Libsch and P. Capolongo. Canadian Metalworking, v. 24, Sept. 1961, p. 54-56.

Typical joint and coil designs; factors in the selection of generators and fixtures. (K7e, K8k, 1-52)

792-K. Dip Brazing Aluminum. George C. Sargeant. American Jewelry Manufacturer, v. 6, Aug. 1961, p. 24-25, 28.

Advantages of the process and brazability, melting range and suggested brazing temperatures of numerous Al alloys. Techniques for controlling process variables to assure strong, distortion free brazements. Brazing defects and causes. (K8n; Al-b, 7-52, 9)

793-K. New Seam Welder Increases Tube Mill Output. Metalworking Production, v. 105, Aug. 23, 1961, p. 43-44.

Use of V welding unit in the continuous electric resistance welding of pipe and tubes. The unit is based upon a vapor-cooled toroidal transformer which can be incorporated in tube mills. Production, capacity and costs. (K3p, T26p, 1-52)

794-K. Difficult Sealing Problem Solved With Electron Beam Welder. Wild Barfield Heat-Treatment Journal, v. 8, June 1961, p. 7-9.

Application of electron beam welding to high-precision pressure-sensing device of stainless steel and Inconel simplifies fabrication, assures vacuum tight sealing and prevents distortion and variations of joint quality. Electron beam welder is also used as a heat source for Ni, Nicrobraze and Cu brazing of stainless steel. (K6, K8, T24e, 1-52, 17-57; SS, Ni-b)

795-K. How to Design for Adhesive Bonding. R. F. Wegman, M. J. Bodnar and K. J. Taglier. Materials in Design Engineering, v. 54, Aug. 1961, p. 120-121.

Stress analysis and adhesive selection for bonding a cylindrical Al rod to a hollow steel tube. (K12, Q25; ST, 4-60, Al, 4-55, 7-58)

796-K. Vacuum Brazing of "Difficult" Alloys. P. Burtenshaw. Wild Barfield Heat-Treatment, Journal, v. 8, Mar. 1961, p. 4-6.

High temperature brazing of austenitic stainless steels and high performance Ni-Cr alloys in a vacuum brazing furnace prevents metallic oxide formation and impurity absorption. Brazing in a vacuum resistance furnace is compared with the use of chemical fluxes or of purified hydrogen. 7 ref. (K8m, 1-73; SS-e, Ni-b, Cr)

797-K. "Kid Glove" Welding of Zirconium. J. T. Maloney. American Machinist/Metalworking Manufacturing, v. 105, Sept. 4, 1961, p. 109.

Coolant tubes for a pressurized water test tube reactor are produced by arc welding of Zr tubing in a high purity argon atmosphere using Zircaloy-2 filler metal. Extreme cleanliness, controlled heat imput and purity of shielding gas are the critical factors. (K1d, 1-52, T11; Zr, 7-51)

798-K. Welding Titanium. Tool and Manufacturing Engineer, v. 47, Sept. 1961, p. 115-116.

Design data are given for T16 and sigma welding including weld type, thickness range, weld pass number, electrode and filler wire type and diameter and root opening and angle of bevel for joints. Survey of properties of Ti alloys affecting weldability. (K1d, K9s, 10-54; Ti-b)

799-K. Soviets Weld Steel to Aluminum. Iron Age, v. 188, Sept. 14, 1961, p. 181-183.

Tungsten arc process for welding galvanized steel and Al-Mg alloy plate, the arc vaporizing the Zn as the Al coats the hot steel, forming a layer of intermetallic compound at the line of contact. Data are given for mechanical properties of welds and for technological parameters of butt and fillet welding processes. (K1d, K9; Al-b, ST, 8-65)

800-K. Steelmaker Fabricates Vacuum Degassing Tanks. F. T. Tancula. Welding Engineer, v. 46, Sept. 1961, p. 39-41.

Submerged arc welding of mild steel. The top half of the degassing tank is lined with 10-gage stainless steel sheets to protect the carbon steel shell. (K1e; CN, SS)

801-K. Zinc Group Sponsors Tests to Set Spot Welding Standards for Galvanized Steel. Welding Engineer, v. 46, Sept. 1961, p. 42-44.

Cu-Zr electrode is used in test spot, butt and flash welds. Annealed in line and annealed out of line processes for production of Zn-coated steel sheet. Comparison of various weld testing methods. (K3, K9r; ST, Zn)

802-K. Which Water Cooling System Best Suits Your Particular Needs? R. A. Bernard. Welding Engineer, v. 46, Sept. 1961, p. 60, 62, 64, 66.

Cooling systems including use of city water, central cooling systems and self-contained water coolers considered with respect to suitability for plasma, induction, Tig, Mig, arc and resistance welding. (K-general, K9, 1-52)

803-K. Mig + 5086 Aluminum = Lightweight Boats. Welding Engineer, v. 46, Sept. 1961, p. 70.

5086-Al-alloy, 1/4, 3/16 + 1/8 in. thick plate, cut with carbide-tipped woodworking tools and Mig welded around steel jigs. (K1, G10h, T22g, 1-52; Al-b, 4-53)

804-K. (German.) Influence of Electrodes on Shrinkage of Welds. A. Matting and H. Wolf. Schweissen und Schneiden, v. 13, Aug. 1961, p. 315-319.

Electrical butt welding of 10 mm. thick St. 37 steel plates using electrodes of various diameter and coating thickness. Measurement of shrinkage of weld as influenced by electrode diameter and thickness of coating. (K1, K9r, 1-53, 3-73; ST, 7-51)

805-K. (German.) Autogenous Processing Techniques. H. v. Hofe and H. Killing. Schweissen und Schneiden, v. 13, Aug. 1961, p. 320-329.

Oxygen-acetylene techniques established by standard DIN 8522 include welding and soldering; flame cutting, planing and boring; autogenous stress free annealing; flame hardening, autogenous metal spraying flame descaling and polishing (of plastics). (K2, K3, G22, J2h, L10g, L23, 1-52, 11-62)

806-K. (German.) Examples for Random Sampling in the Field of Resistance Welding and Application of Mathematical Statistics. K. Haves. Schweissen und Schneiden, v. 13, Aug. 1961, p. 329-333.

Applications of statistical mathematics to random tests of resistance welded parts. Definitions of terms. (K3, K9, 1-54)

807-K. Big Electrode Promoted for Big Aluminum Plate. Steel, v. 149, Sept. 25, 1961, p. 156.

Welding Al plate more than 2 in. thick employing submerged arc equipment converted by replacement of flux and contact tube system. (K1e, 1-52, 3-73; Al, 4-53)

808-K. Malleable Iron Moves Up on Weldability Scale. Iron Age, v. 188, Sept. 28, 1961, p. 85-87.

Highly satisfactory results are obtained by using a method that avoids high heat concentration. Use of low hydrogen electrodes is the most successful in terms of performance plus economy. (K9s; CI-s)

809-K. (German-French.) Maximum Stresses in Welded Machine Parts. Richard Hanchen. Schweisstechnik Soudure, v. 51, Aug. 1961, p. 267-274.

Analysis of maximum stresses for continuously and discontinuously stressed welded machine parts as influenced by type of welding seam, with emphasis on butt welded seams and filled welds. 6 ref. (K9)

810-K. Welding in the Non-Ferrous Field. N. P. Inglis and E. A. Taylor. British Welding Journal, v. 8, Sept. 1961, p. 419-436.

Developments in the welding of non-ferrous metals including the state of welding design and construction and outline of welding processes. Welding properties, characteristics and applications of Cu, Al, Ni and their alloys and Ag, Ti and Zn. 12 ref. (K-general; Cu, Al, Ni, Ag, Ti, Zn, EG-a38)

811-K. Mechanical Properties and Metallurgical Features of Mild Steel Weld Metals. Pt. 1. H. F. Tremlett, R. G. Baker and J. M. Wheatley. British Welding Journal, v. 8, Sept. 1961, p. 437-447.

Investigation of factors governing strength of mild steel weld metal deposited by various processes and in particular the influence of grain size on yield stress and yield/ultimate ratio. Reasons for differences in strength of as-deposited and reheated weld metal are indicated. (K9, M27c, Q23b, 2-59; CN, 7-51, 17-57)

812-K. Metallographic Examination of Double-Run Specimens. Pt. 2. H. F. Tremlett and R. G. Baker. British Welding Journal, v. 8, Sept. 1961, p. 447-454.

Microstructure study of multirun weld metal deposits with reference to grain structure variations in the various

layers caused by subsequent run reheating and reheating at 950° C. Relationship of such variations to different welding processes. 6 ref. (K9, M27, 2-59; 7-51)

813-K. Automation in Production Welding. A. I. Akulov. NLL (National Lending Library for Science and Technology) Translations, Bulletin, v. 3, Aug. 1961, p. 676-687.

Summary of proceedings of an All-Union (USSR) conference on integrated mechanization and automation of production welding. Topics include gas arc, submerged arc and resistance welding, weld surface reinforcement and gas flame processing. (K-general, 1-52, 10-54, 18-74)

814-K. Selecting High Temperature Brazing Alloys. R. L. Peaslee. Machine Design, v. 33, Sept. 14, 1961, p. 160-163.

Composition, properties and applications for common Ni-base materials as a guide to selection. Filler metals are used for brazing parts for jet and rocket engines, nuclear reactor components, airframe structures and chemical and food-processing equipment. (K8, 17-57; Ni-b)

815-K. Vinyl-Metal Laminates--Strength, Texture, Warmth, Formability. Gerard H. Poll, Jr. Products Finishing, v. 25, Sept. 1961, p. 40-47.

Adhesive bonding techniques employed in the lamination of vinyl plastic to Al, steel and galvanized steel strip. Summary of cleaning, conversion coating, drying and rolling operations. Survey of applications and properties of coated sheets. (K11d; ST, Al)

816-K. Joining Molybdenum. F. G. Cox. Welding and Metal Fabrication, v. 29, Sept. 1961, p. 371-377.

Welding, brazing and mechanical joining of Mo sheet and rods. The testing of welds to determine the effects of the welding method, atmosphere and travel speed and of Mo purity, grain size and recrystallization temperature on weld strength, ductility and ductile-brittle transition temperature. Evaluation of shear strength and stress rupture curves of brazed joints. 13 ref. (K-general, K9r; Mo, 2-59, 3-69, 4-53, 4-55, 7-51)

817-K. (Slovak.) Weldability of Thin Steel Sheet. Michal Basista. Zvaranie, v. 10, Feb. 1961, p. 34-37.

Weldability ratings are determined from the appearance and shape of beads in butt welded samples. Comparison with results obtained in the Erichsen cupping test performed on welded and unwelded samples. (K9s, K9r; ST, 4-53)

818-K. (Slovak.) Quality Control of Resistance Welded Thin Sheets. Milan Lipa. Zvaranie, v. 10, Feb. 1961, p. 37-42.

Design of spot welded, seam welded and resistance welded steel samples for various static and dynamic tensile, shearing and peeling tests. Arrangement for ultrasonic testing. 6 ref. (K9s, K9r, K3, 1-54; ST, 4-53)

819-K. (Czeck.) Submerged Arc Welding of Aluminum. Jindrich Vana. Zvaranie, v. 10, Feb. 1961, p. 42-46.

Welding of 6-20 mm. thick Al plates using automatic equipment SUM 1000 and a 1.2-3.15 mm. electrode at current intensity of 180-470 amp., voltage of 27-28, welding speed of 13-27 m. per hr. and an electrode feed of 191-540 m. per hr. Data are given for macrostructure, microstructure, corrosion resistance in boiling 95% HNO_3, tensile and bend strengths of weldments. (K1e; Al, 4-53)

820-K. Shaped Pellets Aid Epoxy Bonding. Stephen J. Siner. American Machinist/Metalworking Manufacturing, v. 105, Sept. 18, 1961, p. 108-109.

Curing and use of shaped epoxy pellets to make a strong bond between dissimilar metals and to bond glass to metal. Applications and physical properties of the pellets. (K12, K11a, 1-52, 17-57; NM-d34)

821-K. Narrower, Deeper Electron Welds. American Machinist/ Metalworking Manufacturing, v. 105, Sept. 18, 1961, p. 111.

The use of the electron-beam gun in nuclear and missile applications to produce welds with high depth-to-width ratios at voltages of 30,000 v. or less. Depth-to-width ratio as a function of specific beam energy. (K6, 1-52)

822-K. New Inert Gas Barrier Aids Brazing--Of Stainless Honeycomb and of

Titanium Honeycomb. J. F. Cochran and D. R. Torgeson. American Machinist/ Metalworking Manufacturing, v. 105, Sept. 18, 1961, p. 122-125.

Prevention of contamination in brazing honeycomb panels by maintaining a pressure differential between the inside argon brazing atmosphere and an outside vacuum zone. Use of a special brazing alloy and insulation of the graphite block. (K8, 1-73, 2-66; SS, Ti, 7-59)

823-K. Evaluation of the Weldability of Low-Alloy High-Tensile Steels Made With Electrolytic Manganese. P. K. Chakravarty and S. Visvanathan. Indian Institute of Metals, Transactions, v. 14, Mar. 1961, p. 27-52.

Weldability ratings and weldment service performance. Data are obtained for steels containing 1.0-1.4% Mn, 0.1-0.15% Ti, 0.3-0.4% Cu and 0.002-0.004% B. Comparison with TISCOR, TISCROM and Fortiweld steels. 29 ref. (K9r, K9s, 2-60; AY, SGB-a)

824-K. All-Welded Plant Makes 400 Tons of Steelmaking Oxygen a Day. Herman F. Buschow. Welding Design & Fabrication, v. 34, Sept. 1961, p. 35-37.

Tungsten gas-shielded arc and semi-automatic consumable welding processes are used to fabricate Al and stainless steel pressure vessels, heat exchangers, valves and piping of an oxygen plant. (K1d, T29m; SS, Al, 17-57)

825-K. How to Control Distortion and Maintain Dimensional Stability. M. J. Shoelson. Welding Design & Fabrication, v. 34, Sept. 1961, p. 38-39.

Weldment design and process variables including stress relieving for control of shrinkage, warpage and similar distortions during fabrication and for maintaining dimensional stability in service are discussed for mild and structural steels. (K-general, K9, J1a, 9-74; ST)

826-K. Automatic Welder Saves $20,500 a Year. Welding Design & Fabrication, v. 34, Sept. 1961, p. 40.

Spot, projection and upset welding production of dial telephone relays from small parts made of Mg using an automatic feed welder with interchangeable dial tables. (K3, T1n, 1-52; Mg, 17-57)

827-K. Laundry Machines Stay Strong and Clean With Welded Stainless Steel. Welding Design & Fabrication, v. 34, Sept. 1961, p. 46-47.

Submerged arc and spot welding of 0.062 to 0.093-in. 302 stainless steel sheet for fabrication of tubs, cylinders, skirts and trim for automatic washers. (K1e, K3n, T10c; SS, 17-57)

828-K. How We Repair-Weld Machined Parts and Hold Tolerances. Willerd A. Schumbacker. Welding Design & Fabrication, v. 32, Sept. 1961, p. 48-50.

Steel casings and turbine collars machined to size are stress relieved by preheating with a gas torch before arc welding and by peening. (K1, G23n, J1a, 7-51; ST)

829-K. New Welders Make 14% Less Rejects. R. W. Eskelson. Welding Design & Fabrication, v. 34, Sept. 1961, p. 53.

Inside-out argon arc welding of rocket motor cases from 4130 low-alloy steel sheet by the short arc process using automatic equipment. Prevention of distortion in seam, flange and girth welds. Weld quality is examined by X-ray and hydrostatic testing. (K1d, K9, T24e, 1-52; ST, 17-57)

830-K. Wisconsin Welds First Bridge With CO_2. Welding Design & Fabrication, v. 34, Sept. 1961, p. 54-55.

The CO_2 welding process is used to make 3/8 in. fillets and to butt weld 3/8 to 1 3/8 in. thick plates of structural steel. Weld size and shape, quality and welding speed and costs are compared with submerged arc welding. (K1d, T26p; ST, 17-57)

831-K. (Russian.) Investigation of Titanium and Steel Cohesion. I. M. Pavlov and V. N. Brinza. Tsvetnye Metally, Apr. 1961, p. 58-61.

Polishing, etching and insulating by lubrication of the plate surfaces, followed by pressing at 700-1000° C., to determine interlayer diffusion depth and interlayer cohesion and the relationship between cohesion and pressure, temperature and pressing time. 5 ref. (K12, Q10c, 2-61, 3-67, 3-74; Ti, ST)

832-K. Brazing Replaces Machining. Modern Metals, v. 17, Sept. 1961, p. 74, 76.

Dip brazing of "stacks" of Al stampings eliminates machining operations and drill jigs necessary for steel components and increases the savings gained by use of a relatively inexpensive material. (K8n, 1-52; Al, 17-57)

833-K. The Production of House-Wiring Cable. Peter Trippe. Mass Production, v. 37, Sept. 1961, p. 53-63.

Methods of drawing, annealing, tinning and stranding copper wire into conductor cores which are insulated with rubber or polyvinyl chloride sheathing by extrusion and other processes. (K13a, F28, J23, L16; Cu, Sn, NM-d)

834-K. Micro-Wire Welding. L. R. Walker. Welding Fabrication and Design, v. 4, July 1961, p. 9-12.

Low amperage electric arc welding in which smaller-diameter bare-wire electrode is fed into a welding zone shielded by CO_2 or Ar-CO_2 mixture. Welding procedure and equipment design are given for mild steel with CO_2 shielding gas. (K1d; ST)

835-K. The Manufacture of Diesel Locomotive Underframes. J. M. Dudley. Welding Fabrication and Design, v. 4, July 1961, p. 13-16.

Fabrication of mild and high tensile steel underframes using electric arc operating principles for assembling longitudinal sections with attention to maintaining camber. (K1, T23s, 1-52; ST, 17-57)

836-K. (French.) Influence of Composition, Especially of Carbon Content, on Weldability. R. Rousseau. Revue de Metallurgie, v. 58, June 1961, p. 527-535.

Carbon content and its effect on brittle fracture and cracking of carbon or low-alloy steel. Influence of microstructure and composition and preheating before welding. 11 ref. (K9s, Q26s, 2-60, 2-64, 3-71; CN, AY)

837-K. Vacuum Joining by Electron Beam Welding. H. H. Hoffmann. Paper from "Vacuum Metallurgy Conference, Transactions, 1960". Interscience Publishers, Inc., New York 1, 1961, p. 267-287.

Basic principles and technological parameters are reviewed for heating and welding with high and low voltage electron beams. Metallographic analysis of welds produced in Zr, Zircaloy, 304 stainless, Ta, Cb, W, Mo, 2024 Al and Cu with attention to fine grain size obtained, weld penetration depth and narrowness of fusion and heat affected zones. Review of equipment development and design and characteristics of the electron beam. Comparison of the vacuum process to inert gas shielding for avoiding contamination. (K6, 1-73, K9; Zr-b, Ta, Cb, W, Mo, Al-b, Cu, ST)

838-K. Versatile Weld Tooling Saves Costs on Bomarc. T. J. Bosworth and D. S. Hemminger. Western Metalworking, v. 19, Sept. 1961, p. 31-34.

Simultaneous Tig welding in a single production shop of 17-7 PH stainless steel, 4330 modified steel and 2219 and 6061 Al alloys for missile pressure vessels. (K1d, T24e, T26q, 1-52; SS, ST, Al-b)

839-K. (German.) Resistance and Induction Welding of Tubes. E. Hormann. Elektrowarme, v. 19, July 1961, p. 249-266.

Welding processes for Al, Cu, stainless steel and conventional steel tubes including flash butt welding with stationary electrodes, resistance welding with roller electrodes, induction welding with sliding electrodes and induction welding using inductors. Characteristic data are given for the reaction mechanism. (K3, K6n, 1-52; SS, ST, Al, Cu)

840-K. The Technique of Brazing Tools With Sintered Carbide and Its Automation. Karel Pechaty. Czechoslovak Heavy Industry, no. 9, 1961, p. 35-45.

Technological parameters for the brazing of sintered carbide tips to the steel shank include tensile stresses, size and shape of the tip and the composition of both the filler metal and the flux. (K8, 2-60, 3-66, 3-73, T6n; ST, 6-69)

841-K. Stitching Through Metals. Australasian Manufacturer, v. 46, Aug. 19, 1961, p. 44-46.

Fabrication of sheet and strip metals to themselves and to plastics

by stitching with metal wire. Comparison to riveting, bolting and spot welding techniques for joining Cu, brass, Al and cold rolled steel. (K13, 1-52; Cu-b, Al, ST, 4-53)

842-K. New Engineering Laboratory at B.W.R.A. Metal Treatment and Drop Forging, v. 28, Aug. 1961, p. 331-334.

Review of welding research including investigation of fracture in 6 in. mild steel plate; friction welding techniques; continuous seam welding of stainless steels; spot weld temperatures; fabrication of low-alloy steel pressure vessels; and the properties and microstructure of mild weld metal and austenitic stainless steels as observed with the electron microscope. (K-general, K9, A9m, 10-54; ST)

843-K. (German.) Influence of Welder on Wear Resistance of Deposit Welds. H. Uetz and V. Hakenjos. Werkstattstechnik, v. 51, Apr. 1961, p. 173-177.

Autogenous and inert gas welding of St. 37 steel specimens using welding wire containing 33% Cr and 3.5% C and subsequent grinding of the weld to determine wear resistance of weld as a function of the personal skill of the welder. (K1, K3, K9r)

844-K. Three Metals Joined With Inconel Filler Metal 92. Inco Nickel Topics, v. 14, no. 7, 1961, p. 11.

Joining carbon steel, nickel stainless and high Ni alloy to fabricate annealing retort designed to operate at 2100° F. (K-general, 1-52; CN, SS, Ni-b)

845-K. A Design Engineer Looks at Welding. B. W. Spooner. New Zealand Engineering, v. 16, July 15, 1961, p. 255-259.

Use of radiography for flaw detection and testing of experimental techniques. Evaluation of original and repair welds and of thickness of steel as a function of brittle fracture. (K9r, Q26s, S13, S14, 1-53)

846-K. Welding of End Fitting Simplified. Machinery Lloyd (Overseas Edition), v. 33, Sept. 16, 1961, p. 41.

Joining end fittings of stainless steel and Ni-based alloy tubes by an argon arc welding process. Operations can be preset on a control panel. (K1d, 1-52, 18-74; SS, Ni-b, 4-60)

847-K. Costing & Economics of Arc Welding. D. P. Compton. Welding Fabrication and Design, v. 4, Aug. 1961, p. 34-42.

Unit operations and selection of materials are considered in terms of the factors which determine the final process and product cost. Analysis of the cost of weld metal deposition and of methods of improving efficiency. (K1, 17-53, 17-57)

848-K. Significance of Weld Defects and the Bend Test. Light Metals, v. 24, Sept. 1961, p. 253.

The use of bend tests to reveal lack of fusion in pure Al and Al alloy welds. The effects of weld porosity, profile and lack of fusion on the fatigue and tensile properties of the welds. (K9r, Q5; Al-b, 7-51)

849-K. Materials Progress in Organic Adhesives. Metal Progress, v. 80, Oct. 1961, p. 13-I.

Use of a new polyamid epoxy adhesive permits the production of honeycomb panels without the need for vent holes in the core structure. (K12; 7-59)

850-K. What Metal Shall I Use...for Fabrication for Cryogenic Vessels and Equipment? George H. Zennet. Metal Progress, v. 80, Oct. 1961, p. 110.

Techniques for selection and methods for welding metals for industrial cryogenic applications are presented. (K-general, Q23, T26q, 2-63; SGB-r)

851-K. What Metal Shall I Use...for High Strength Welded Structures?... Steels. Metal Progress, v. 80, Oct. 1961, p. 116-121, 158.

Welding of carbon structural steel (ASTM A36-60T); high-strength, low-alloy steel (A441-60T and A242-55); Cb treated steels; heat treated, constructional alloy steel. Typical names, composition, mechanical properties, outstanding characteristics and applications. (K-general, T26; ST, Al, Mg, 7-51, 17-57)

852-K. What Metal Shall I Use...for Resistance-Welded Thermostats? Raymond M. Sears. Metal Progress, v. 80, Oct. 1961, p. 133.

Welding of bimetallic thermostats from high and low expansion metals such as Invar, 430 stainless steel,

B Monel, silicon bronze and Ni. (K3; SGA-a)

853-K. The Technique for Welding Columbium. W. J. Lepkowski, R. E. Monroe and P. J. Rieppel. Welding Design & Fabrication, v. 34, Oct. 1961, p. 54-55.

Tig and Mig welding of Cb alloys containing W, V, Zr, Ti, Hf, Ta, Mo, Cr, Co, Th and Al in gas chambers or in air. Influence of alloying elements which increases hot strength and oxidation resistance on weldability, particularly weld soundness and ductility. (K1d, K9, Q-general, 2-60; Cb-b)

854-K. Brazing the Cobalt Alloys? Here's How. W. J. Lepkowski and R. E. Monroe. Welding Design & Fabrication, v. 34, Oct. 1961, p. 56.

Ag, Ni, Cu and Mn based brazing alloys are specified with brazing temperatures and atmospheres or vacuum conditions for obtaining brazed joints with maximum hot strength and corrosion resistance in Co-bearing superalloys. Application to Multimet (N-155), Udimet 500, M-252 (J-1500), Inconel 700, Rene 41 (J-1610), Haynes 25 and J-1570 (Co-base) alloys. (K8, 10-54; SGA-h, Co, SGA-f, 17-57)

855-K. Techniques for Welding and Fabricating the A-286 High Temperature Alloy. L. J. Hull. Welding Design & Fabrication, v. 34, Oct. 1961, p. 58-60.

Metallurgical design aspects are considered for high strength, heat and oxidation resisting A-286 austenitic alloys, with particular reference to weldability and machinability, as a function of composition and aging and solution treatment. Application of resistance and tungsten arc (with A-286 or Hastelloy W fillers) welding techniques for joining the alloy with cemented carbide tools used for cutting. Effect of hot shortness and work and precipitation hardness on fabricability. Data given for mechanical properties at 68-1300° F. (K-general, K9s, G17, Q-general, 2-60, 2-61, 2-64; SGA-h, ST)

856-K. Welded Design Makes Possible Unique Aluminum Hopper Car. Welding Design & Fabrication, v. 34, Oct. 1961, p. 66-68.

Automatic and semi-automatic fillet and butt welding of extrusions of Alcan 65S-T6 (6061-T6) and sheets of Alcan D54S (6202) by argon shielded arc welding using Alcan 56S (5056) wire to fabricate a covered railroad car with a unique teardrop cross-section. (K1d, T23p, 17-51; Al-b, 4-57, 17-57)

857-K. CO_2-Flux-Shielded Welding Processes Are Fast, Versatile and Economical. Welding Design & Fabrication, v. 34, Oct. 1961, p. 72-74.

Semi-automatic welding of heavy mild steel units by the Dual Shield process using a flux cored electrode and CO_2 shielding, deoxidation of the weld and slag formation being accomplished by the flux. Application of magnetic flux CO_2 shielded welding using Unionarc equipment for fabricating steel bridge girder stiffeners, the flux serving to refine the weld puddle, lower the cooling rate and aid in forming the desired weld contour. (K1d, T26p, 1-52; ST, 17-57)

858-K. Making Minute Parts Faster Is Industry's Big Problem. Henry Lefer. Welding Design & Fabrication, v. 34, Oct. 1961, p. 76-78.

Application of automatic equipment and precision welding processes, including the Tweezer Weld system and capacitor discharge welding, to fabrication of microminiaturized electronic components from tiny wires, whiskers and shapes of Mo, W, steels (including 304 stainless), Au, Ta and other materials. (K-general, T1, 3-73; Mo, W, Au, Ta, ST, 17-57)

859-K. Here's What the Russians Are Doing With Welding. Welding Design & Fabrication, v. 34, Oct. 1961, p. 80-81.

Survey of welding research including ultrasonic spot welding of Al; cold welding of carbon steel, ultrasonic welding of Cu, Ar shielded arc welding of Mo and stainless steel, submerged arc welding of Ni using a ceramic flux, stored energy butt welding of Ti to stainless steel tubing and butt and T-joint welding of plastic sheet and film. (K-general, 10-54)

860-K. Survey of Pipe Couplings. Pt. 2. John Spencer. Engineering Materials and Design, v. 4, Sept. 1961, p. 582-593.

Maximum working pressure and temperature, industrial applications and joint design of steel, stainless steel, gun metal and malleable Fe pipe couplings including screwed, welded, brazed, soldered, capillary, flanged,

self-sealing and quick release. (K-general, T7n; SS, ST, Cu-n, Cu-b, CI-s, 17-57)

861-K. (German.) Palladium in Brazing Technology. J. Sagoschen. Metall, v. 15, Sept. 1961, p. 870-872.

Physical and mechanical properties of high-temperature solders such as Ag-Cu-Pd, Cu-Pd-Ni-Mn, Ni-Mn-Pd, Ag-Pd-Mn and Pd-Ni alloys. Technology of brazing operations including autogenous, dip and induction brazing under protective inert atmosphere. (K8, 1-52, 1-66; SGA-f, Pd)

862-K. (German.) Melting Range and Brazing Temperature for Hard Solders. K. M. Weigert. Metall, v. 15, Sept. 1961, p. 879-880.

Evaluation of melting range and favorable brazing temperatures of solders containing 40-50% Ag, 22-25% Cu and Zn (rest) by investigation of cooling curves and measurement of liquidus temperatures. Relation between working temperature and liquidus temperature. (K7, P12n, M24; Ag-b, Cu-b, Zn-b, SGA-f, 17-57)

863-K. Welding Research--Mines Branch, Dept. of Mines and Technical Surveys. K. Winterton. Canadian Welder, v. 52, Sept. 1961, p. 32-33.

Progress report on research in heat affected zone cracking, on welder joints at temperatures down to -40° F. and on physics of the welding arc. 5 ref. (K9, 10-52)

864-K. (German.) Material Transfer in Electric Arc Welding. William M. Conn. Bergakademie, v. 13, May 1961, p. 307-312.

Theoretic discussion of drop formation and reacting forces in electric arc welding and experimental investigation of the mechanism of drop formation by photographic techniques in the test welding of steel and Al alloys. (K1, K9n, 1-54; ST, Al-b)

865-K. (German.) Development of Aluminum Alloyed Deposit-Welding Electrodes. Friedrich Erdmann-Jesnitzer, Hans Kowalkowski and Walter Schierhorn. Schweisstechnik, v. 15, Sept. 1961, p. 101-106.

Test welding using coated basic electrodes with Al-wire spiral for production of corrosion and wear-resistant deposit welds. Microscopic investigation of welds and production testing of deposit-welded tools for wear resistance and chemical resistance to oxidation and sulphide formation. (K1a, K9, 1-53; Al-b)

866-K. (German.) Processes in the Welding of Alloyed Nonaustenitic Steels. Alfred Schmidt. Schweisstechnik, v. 15, Sept. 1961, p. 106-109.

Review of welding technology including determination of preheating temperature from T-T-T diagram for 25 CrMo 4 steel, assessment of hardening caused by welding using the carbon equivalent, discussion of heat balance in welding of 13 CrMo 44 steel, electrodes and techniques for welding of austenitic-ferritic steels and classification of welding according to difficulty of operation. (K-general, K9, N8, 1-52, 10-54; ST)

867-K. (German.) Principles and Equipment for Electroslag Welding. G. Almquist. Schweisstechnik, v. 15, Sept. 1961, p. 109-112.

Operational parameters include use of 1 to 3 electrodes and of automatic machine for joining sheet steel having wall thicknesses of 20-450 mm. (K6, 1-52; ST, 4-53)

868-K. (Book.) The Science of Adhesive Joints. J. J. Bikerman. 1961. 258 p. Academic Press, Inc., 111 Fifth Ave., New York 3, N. Y.

A broad review of literature covering the joining of glass, rubber, Mg alloys, Mn alloys, Al alloys, brass, bronze, galenite, cast iron and stainless steels with polyethylene, polystyrene, polyvinyl acetate, asphalt, solders, glues and solvent cements. 227 ref. (K12, 10-54, 11-64; SS, CI, Al-b, Cu-b, Mn-b, Pb, NM-d34)

869-K. Seam-Welding Stainless Steel. W. A. Owczarski and R. E. Beach. Machinery (London), v. 99, Sept. 13, 1961, p. 637-639.

Conversion of bench-type spot welder head into a seam welder for processing AISI 304 stainless steel containers, carbon steel, brass and Pt. Surface preparation and microscopic examination of finished welds. (K3p, 1-52; SS, CN, Cu-n, Pt)

870-K. Casting Repair-Welded for Less Than 3% of Replacement Cost. John F. Donnelly. Welding Engineer, v. 46, Oct. 1961, p. 58.

Controlled heat techniques are used for electric welding of a fractured gray iron casting weighing 900 lb. (K-general, 1-52, 18-72; CI-n, 5)

871-K. CO_2-Mig Process Cuts Costs, Man-Hours Per Railroad Car. Welding Engineer, v. 46, Oct. 1961, p. 61.

A fast welding method for fabricating hopper cars from flame-cut steel plate stakes and 88-in. support braces, stack cut and then formed in a press. (K1d, G4d, G22g, T23p, 1-52; ST)

872-K. British Electroslag Welders Speed Caisson Production. S. T. Andrew. Welding Engineer, v. 46, Oct. 1961, p. 66.

Vertical welding of 1 7/8 in. thick steel plate for legs of off-shore oil-drilling rig. Radiographic inspection proves freedom from defects. (K6, S13e, T28, 1-52; ST, 4-53)

873-K. Adhesives May Solve Your Bonding Problems. H. R. Butzlaff and K. F. Charter. Welding Engineer, v. 46, Oct. 1961, p. 70-74.

Dissimilar metals and other materials may be bonded with rubber based adhesives, oil-soluble and oil-resistant elastomers, synthetic and natural resins and resin-elastomer films to form a lightweight, sealed and insulated joint. (K12, 17-57)

874-K. High Strength Yellow Brass Castings Weld Repair. Donald K. Fox. Modern Castings, v. 40, Oct. 1961, p. 89-95.

Tensile and bend testing of test castings oxy-acetylene-gas and inert-gas-shielded-arc welded with several different types of fillers to evaluate the most effective method of repair. 6 ref. (K-general, K9r, 18-72; Cu-n, 5)

875-K. Welding Research Paves Way for Thick Joints in Titanium. Iron Age, v. 188, Oct. 19, 1961, p. 136-137.

Welding of Ti alloy submarine hull plates up to 2-in. thick, preventing cracking by use of an argon-purged welding chamber. Testing of welds to determine the effects of different Ti alloy filler wire compositions on the yield strength and notch toughness of the weld. (K1d, K9r, T22g, 2-60, 10-52; Ti-b)

876-K. Flaw Detector Pinpoints Welds in Aluminum-Covered Wires. W. N. Redstreake. Iron Age, v. 188, Oct. 19, 1961, p. 140-141.

An electronic flaw detector based on a direct current magnetic field detects butt weld and coating flaws in continuously drawn Al-coated steel wire. (K9r, F28h, 1-52; ST, Al)

877-K. (English.) Some Remarks on the Weldability of Aluminum. G. Westendorp. Lastechniek, v. 27, Apr. 1961, p. 70-74.

Consideration of decrease in strength caused by welding heat and porosity in welds of pure and commercially pure Al and 6061 Al alloys. Effect of solubility and diffusion coefficient of hydrogen. (K9n, K9s; Al)

878-K. (English.) Factors Influencing the Properties of Welds in Aluminum. J. C. Bailey and G. W. Eldridge. Lastechniek, v. 27, Apr. 1961, p. 75-83.

Review of procedures for Tig and Mig welding of Al and its alloys. Influence of filler rod composition, impurities, temperature, hydrogen, extent of heat zone and welding speed and current on discontinuities. 16 ref. (K1d, K9, 10-54; Al)

879-K. (English.) Some Design Considerations for Welded Aluminum. S. R. Banks and R. E. Smith. Lastechniek, v. 27, Apr. 1961, p. 91-96.

Relevant factors include composition, corrosion, wear and temperature resistance, deflection, buckling, permissable stress, expansion, static and fatigue strengths and cost. Comparison of Al-Mg, Al-Mg-Si, Al-Cu-Mn-Mg-Si and Al-Zn-Mg alloys with steel. 19 ref. (K9, Q-general, R-general, 10-54, 17-51; Al-b, ST)

880-K. (English.) Aluminum Welding Practice. J. W. A. Wennink, J. Buteyn, L. Capel and A de Sterke. Lastechniek, v. 27, Apr. 1961, p. 97-108.

Edge-preparation, distortion, shrinkage, welding equipment and defects and testing and inspection of welds with reference to Tig and Mig processes. Plate thickness and shrinkage are discussed in comparison with carbon and stainless steels. (K1d, K9, 1-52, 10-54; Al, CN, SS)

881-K. (English.) The Development of Mig Welding Techniques for Al. J. E. Tomlinson and D. Slater. Lastechniek, v. 27, Apr. 1961, p. 109-118.

Procedures and equipment are reviewed in relationship to thermal and other properties of the material. 10 ref. (K1d, P11, 1-52, 10-54; Al)

882-K. Fundamentals of Glass-to-Metal Bonding: Pt. 5. Wettability of Iron by Molten Sodium Disilicate. Robert W. Cline, Richard M. Fulrath and Joseph A. Pask. American Ceramic Society, Journal, v. 44, Sept. 1, 1961, p. 423-428.

Wetting of unoxidized and oxidized Fe and magnetite by sodium disilicate glass at 900-1000° C. under vacuum using a silica tube. Weight loss and contact angles are determined as functions of time, temperature and composition. 9 ref. (K11a, 1-73, 2-60, 2-61; Fe)

883-K. Fundamentals of Glass-to-Metal Bonding: Pt. 6. Reaction Between Metallic Iron and Molten Sodium Disilicate. Lucy G. Hagan and S. Frederick Ravitz. American Ceramic Society, Journal, v. 44, Sept. 1, 1961, p. 428-429.

Finely divided sodium disilicate glass and powdered iron are heated under vacuum at 900-1000° C. in an Armco iron crucible. Weight loss, as affected by temperature, and quantity of Na formed are determined by titrating with a standardized acid. 6 ref. (K11a, S11j, 1-73, 2-61; Fe, Na)

884-K. Fundamentals of Glass-to-Metal Bonding: Pt. 7. Wettability of Iron by Molten Sodium Silicate Containing Iron Oxide. Robert B. Adams and Joseph A. Pask. American Ceramic Society, Journal, v. 44, Sept. 1, 1961, p. 430-433.

Unoxidized Fe and Pt are bonded to Fe-containing sodium disilicate glasses at 1000° C. in a vacuum furnace. Contact angles are determined as functions of composition, time and pressure, with X-ray diffraction and microscopic examination of grain boundaries and interfaces indicating the amount of metal surface irregularity, which influences the degree of adherence. 11 ref. (K11a, M-general, P13h, 2-60, 3-67, 3-74; Fe, Pt)

885-K. Ford Does Its Own Vinyl Coating. Steel, v. 149, Oct. 16, 1961, p. 91-92.

Processing, forming and assembly of vinyl laminates for automotive and other industrial applications. Technological parameters for pretreatment and lamination of cold rolled sheet steel. (K11d, 1-52; ST, 4-53)

886-K. Welding Efficiency Increased. Machinery Lloyd (Overseas Edition), v. 33, Sept. 30, 1961, p. 41-44.

Review of techniques including friction welding of carbon steel, Ti and Al tubes, bars and flat stock; seam welding to produce a pressure-tight bond and bend testing and "pillow" (air pressure) testing of welds. (K3p, K6, K9r, 1-52; CN, Ti, Al)

887-K. How to Join Welded Steel Tubing. Pt. 1. By Welding. R. M. Spencer. Mill & Factory, v. 69, Oct. 1961, p. 114-118.

Arc, gas, spot, projection and stud welding and brazing of carbon steel tubes to tubular products and plates, nuts, rings, fittings and studs. Effect of joint design and tubing wall thickness on choice of method. (K-general, K8n; CN, 4-60)

888-K. Flash-Welding Aluminum to Copper. C. Dana Moore. Machinery (London), v. 99, Oct. 4, 1961, p. 790-792.

Satisfactory joints are produced by forging and fusing on an optimum time cycle. Joints are tested by making 180° bends and by exerting air or liquid pressure. (K3r, K9r, F22j; Al, Cu)

889-K. (German.) Use of Plug-Spot Welding Under Carbon Dioxide in Manufacture of Bodies for Electric Locomotives. H. Rohde. Schweissen und Schneiden, v. 13, Sept. 1961, p. 419-422.

Selection of welding operations such as manual arc welding, electric resistance spot welding and fusion welding with emphasis on plug spot welding under CO_2 for fabrication of various body parts. Apparatus for and mechanism of plug-spot welding. Macrostructure and tensile shear strength of plug-spot welds. (K-general, K3n, T23n)

890-K. (German.) Electroslag Welding of Welding Parts. J. Mennen and F. Thyssen. Schweissen und Schneiden, v. 13, Sept. 1961, p. 430-432.

Application of the electroslag welding process to welding of steel parts including those with wall thicknesses

smaller than 60 mm. Welding technology is discussed in terms of production examples. (K6, 1-52)

891-K. Welding the Stainless Steels. Mechanical World and Engineering Record, v. 141, Oct. 1961, p. 345-346.

Review of oxy-acetylene, atomic hydrogen and electric arc welding of austenitic stainless, low-carbon and martensitic stainless steels. (K-general, 1-52, 10-54; ST)

892-K. (German-French.) Welding of Cast Steel Apparatus. H. P. Siegenthaler. Schweisstechnik--Soudure, v. 51, Sept. 1961, p. 299-305.

Electric welding of heavy (70 mm. wall thickness) cast steel parts containing 0.18-0.25% C. Computation of carbon equivalent; evaluation of preheating temperature; techniques for welding under limited space conditions. (K-general, 1-52; ST, 5)

893-K. Some Special Applications of Welding in Steam, Gas Turbine, and Nuclear Power Plants. J. M. Robertson. British Welding Journal, v. 8, Oct. 1961, p. 463-472.

Butt welding, argon arc welding and submerged arc welding applications involving the joining of austenitic and ferritic steels and Nimonic 90 to produce gas turbine rotors, feedwater heaters, expansion bellows and finned heat exchanger tubes. (K1, T11, W11, 17-57; SS, Ni-b)

894-K. Some Observations on the Notch Toughness of Submerged Arc Weld Deposits. B. Augland and N. Christense. British Welding Journal, v. 8, Oct. 1961, p. 473-476.

Charpy V-notch impact testing from -60 to 20° C. Transition temperatures are given. (K9r, Q23r, Q29, 1-53; 7-51)

895-K. Welding in Shipbuilding. British Welding Journal, v. 8, Oct. 1961, p. 477-481.

A review of papers presented at a London symposium covering cutting, submerged arc, CO_2, automatic, arc and Mig welding of Al-Mg alloys and steel. Radiography and ultrasonics are covered under nondestructive testing. 34 ref. (K-general, S13, T22g, 10-54)

896-K. (Japanese.) The Welding of Tough Pitch Copper by the Inert-Gas Shielded Metal-Arc Process. Keiichi Mizuno. Sumitomo Light Metal Technical Reports, v. 2, July 1961, p. 1-7.

Thick specimens of tough pitch Cu are Mig welded using filler rods of tough pitch Si and P-deoxidized, flux-coated and Ag-bearing (0.23-0.94%) Cu after preheating at 200-500° C. Macrostructure and microstructure, electrical conductivity, mechanical properties and weld. Soundness compared with Tig welded specimens. Joints with X-shapes and 90° root angles and filler rods containing Ag produce best results. 16 ref. (K1d, K9, M27, M28, P15g, Q-general; Cu-a)

897-K. Flux-Cored Electrode Is the Secret in CO_2 Welding Process New to Canada. Canadian Machinery and Metalworking, v. 72, Oct. 1961, p. 136-146.

Automatic and semi-automatic welding of mild, low and medium carbon steels and of alloy steels using the Arcosarc process which combines a wire drive unit, an air or water cooled gun, CO_2 shielding gas and a flux-cored wire. Use of Arcosarc wire in Duomatic and Circomatic machines and in the Electrogas process, based on the electroslag principle. (K1d, K6; CN, AY)

898-K. Electron Welder Beams for Space. Airco News, v. 21, 1961, p. 24-26.

Electron beam welding of W and Mo using heat generated by bombardment with highly accelerated electrons to melt and fuse the metal in a vacuum. Applications in fabrication of vacuum tube components, rocket engine parts and chemical processing equipment. (K6, T-general, 1-73; W, Mo, 17-57)

899-K. How to Fasten Carbide to Steel. Pt. 5. Brazing and Adhesive Bonding. Grant A. Morrison. Machine and Tool Blue Book, v. 56, Nov. 1961, p. 125-129.

Survey of induction heating, furnace and oxy-acetylene torch brazing and adhesive bonding methods used in fastening cemented carbides to steel. Consideration of different brazing alloys, brazing and bonding temperatures, joint and bond strengths, joint design and effect of joint thickness on tensile strength. (K8, K12; ST, 6-69, 7-59)

900-K. Electron Beam Welding Key Tool in Making B-70. Steel, v. 149, Oct. 30, 1961, p. 62-66.

Comparison of transverse weld shrinkage, weld depth to width ratio and weld width plus heat affected zone for electron beam and Tig welding. Consideration of tensile properties, voltage effect, beam current and energy density, tolerance and deformation resistance of Al, Ti and Inconel weldments. (K6, K1d, K9, Q24, Q27a, T24a; Al, Ti, Ni-b, 17-57)

901-K. Flash-Butt Welding Wheel Rims. Welding and Metal Fabrication, v. 29, Oct. 1961, p. 406-408.

Cutting, straightening, bending, flash-butt welding, expanding, recompressing and testing operations for the production of wheel rims for trucks from profiled steel strip. Design and welding cycle of the rim-welding machine. (K3r, T21e, 1-52; ST, 4-53)

902-K. New Arc-Spot Process. Welding and Metal Fabrication, v. 29, Oct. 1961, p. 409.

Design, applications and operation of an arc-spot welding unit based on the arc welding principle and used for spot welding of mild steel and 12 gage stainless steel sheet. Heat and time controls of the unit and sizes of the consumable electrode are discussed for applications in making pallets for the automotive industry. (K1, K3n, T21f, 1-52; CN, SS, 4-53)

903-K. Welding Pittsburgh's Big Dome. Welding and Metal Fabrication, v. 29, Oct. 1961, p. 410-413.

Assembling, bevelling, submerged arc welding and manual welding of steel girder components and flange beams to produce the cantilever framework and movable dome sections for an auditorium roof 400 ft. in diameter. (K-general, K1e, T26n, 1-52, 17-57; ST, 4-57)

904-K. Strong Electron Beam Welds for Pressure Vessels. Kenneth J. Miller. Western Metalworking, v. 19, Oct. 1961, p. 31-32.

Fabrication of high pressure gas storage vessels from 4340 low-alloy steel and special and superalloys such as Inconel X, Inco 713C, 321 and 347 stainless steel, Cb, 6A104V and B-120VCA Ti alloys and Ta by electron beam and Tig automatic welding. (K6, K1d, T26q; AY, SS, Ni-b, Ti-b, Ta, Cb)

905-K. Aspects of CO_2-Shielded Metal-Arc Welding. E. J. Waitman. Welding and Metal Fabrication, v. 29, Oct. 1961, p. 415-420.

A review of the techniques, equipment, welding wires and applications of CO_2-shielded metal arc welding including button welding, spray transfer and dip transfer welding. Joint design and the effects of welding conditions on weld strength, appearance, shape, porosity and penetration pattern. (K1d, K9, 1-52, 10-54)

906-K. Semi-Automatic Welding of Television Components. Instrument Practice, v. 15, Oct. 1961, p. 1277-1278.

Automatic welding techniques are used for welding television chassis and turret tuner spindle assemblies with tolerances down to 0.0015 in. and angular tolerances to 15 min. of arc. (K5, T1, 1-52, 17-55)

907-K. Component Fabrication of Heat Resistant Structures. Stewart M. DePoy. Metal Treating, v. 12, Oct-Nov. 1961, p. 21-23.

Comparison of arc welding and casting techniques for fabrication of Ni and Cr alloy furnace parts on the basis of weight and amount of metal used, repairability and cost. Stress-rupture properties are given for the fabricated components at 1550-1900° F. under pressure of 1000-5000 psi. (K1, G-general, Q3m, W27p, 2-61, 3-74; Ni-b, Cr-b, 17-57)

908-K. (German.) Automatic Multiple-Purpose Welding Machines in Research and Production. A. Smarcan and G. Gerber. Brown Boveri Mitteilungen, v. 48, Aug-Sept. 1961, p. 430-438.

Equipment design and operating principles of welding machines for bonding and deposit welding by thermit powder welding using opposite welding heads or two heads in series (series-arc-process) and Mig and Tig welding using Ar or CO_2 as inert gas with and without additional wire feed. Consideration of macrostructure and shrinkage of weld. (K1d, K9, K11, 1-52)

909-K. (German.) Technology of Mechanical Arc Welding. P. Nobbe. Brown Boveri Mitteilungen, v. 48, Aug-Sept. 1961, p. 448-461.

Fundamentals of semi-automatic and automatic arc welding are given for shape

of weld (bead form coefficients); electrical data including amperage, voltage, current density and kind of current (a-c. or d-c.); welding rate; electrode diameter; electrode and workpiece angle; contact distance; location of mass contact. (K1, K9, W29h, 10-54)

910-K. (German.) Application of Tig Welding to Steels and Copper and Nickel Alloys. A. Schmid. Brown Boveri Mitteilungen, v. 48, Aug-Sept. 1961, p. 462-474.

Review of Tig welding techniques including preparation of seam and testing of welds of machine parts fabricated from unalloyed steel, stainless steels, Ni and Ni alloys and high-melting point metals such as Ti, Zr, Mo, Inconel and Hastelloy. (K1d, K9, T7; ST, SS, Mo, Ni-b, Ti, Zr, 17-57)

911-K. (German.) Problems in Bonding of Steels of Different Composition for Heat Engines by Welding. R. Montandon. Brown Boveri Mitteilungen, v. 48, Aug-Sept. 1961, p. 490-497.

Mechanical testing, investigation of recrystallization by 600-700° C. annealing and stress-rupture testing at 550° C. of specimens consisting of 12% Cr-steel and low-alloyed MoV-steel welded together by electrodes of varying Cr content (0.28-15.5% Cr). Decarburization, age hardening and recrystallization in bond and adjacent material as influenced by weld composition. (K1, K9, N-general, Q-general, 2-60, 2-64; AY, SS, Cr)

912-K. (German.) Nondestructive Testing of Welds, Particularly of Rotor Welds. W. Mohr. Brown Boveri Mitteilungen, v. 48, Aug-Sept. 1961, p. 475-484.

Visual control, X-ray, magnetic and ultrasonic testing of steel weld defects with special attention given to magnetic and ultrasonic testing of circular welds produced by argon-arc and UP (under powder) welding for turbine rotors. (K9r, S13, T7h; ST, 17-57)

913-K. (French.) Flash Welding of Sintered Aluminum as Used for Fuel Element Sheaths. C. Bridoux, H. Foulquier, J. Kaufmann and P. Thome. Revue de Metallurgie, v. 58, Aug. 1961, p. 695-701.

Experimental welding of samples with tensile properties determined as functions of the sparking and upsetting times. Evaluation of relationship between upsetting velocity and length of the upset portion, depth of diffusion zone and creep resistance of weldments at 300 and 500° C. 9 ref. (K3r, K9, Q-general; Al, 6-72)

914-K. Gas-Pressure Bonding. S. J. Paprocki, E. S. Hodge and P. J. Gripshover. Defense Metals Information Center, Battelle Memorial Institute, DMIC Report 159, Sept. 25, 1961, 42 p.

The gas-pressure-bonding process is used for joining, cladding and densifying Al, Be, Mo, Cb, V, Ta, W, Rh, Zr, Cr, Fe, Al, (304, 316, 347, 410) stainless steels and ceramic materials (UO_2, BeO, MgO, UN, UC). The solid state bonding process is conducted in a hot wall high pressure autoclave at 300-2700° F. with gas pressures of 5000-30,000 psi. 36 ref. (K5k, K11, K-general, L22, 2-62, 3-74)

915-K. Arc Welding Heavy Plate for Boring Shields. S. A. Wilson. Machine Production, v. 20, Oct. 1961, p. 27-28.

Heavy plate segments of A-7 mild steel are arc welded with a special low H_2 electrode to form subway boring shields of 16-24 ft. diameter and 40-60 tons weight. The low H_2 electrode contains a high percentage of Fe power and is specified for tacking and for the root pass in groove welds to prevent underbead and root cracks and to eliminate the need for preheating the heavy plate elements. (K1, W29h; ST, 4-53)

916-K. Eight Experts Pinpoint Welding "Mistakes". Steel, v. 149, Oct. 23, 1961, p. 70-75.

Improvement of welding efficiency by eliminating poor fixturing, large metal mass welds and overwelding and by evaluating suitability of equipment design and welding materials. (K9)

917-K. Metallized Plastic Bonded to Aluminum Results in Flashy Product. Products Finishing, v. 26, Nov. 1961, p. 82.

Vacuum metallized polyester plastic film is bonded to Al sheet with a high-strength adhesive for fabrication of an embossed reflector sheet called "Dyrasyl" used for decorative trim and lighting units. (K11d; Al)

918-K. (French.) Welding and Brazing of Copper and Its Alloys. Pt. 8. Cuivre Laitons Alliages, no. 62, Aug. 1961, p. 19-22.

Survey of processes including hydrogen plasma arc, submerged arc, contact arc, stud, pressure gas and cold pressure welding; flame, oxy-arc and powder cutting, metal spraying with Cu and Cu alloys; and thermit welding. (K-general, G22; Cu-b, 10-54)

919-K. Welding 2219 Aluminum for Bomarc Fuel Tanks. Stanley L. Sears and Richard S. Crial. Metal Progress, v. 80, Nov. 1961, p. 88-93.

This important application, the first for 2219, has verified the manufacturing adaptability of the alloy. No other Al has comparable reliability in pressure-vessel applications where postweld heat treatment is required. (K1d, T24, T26q; Al-b, 17-57)

920-K. Flash Welding Copper to Steel. Hermann W. Stieglitz. Metal Progress, v. 80, Nov. 1961, p. 112.

Application of flash welding to the joining of an anode connecter made of a Cu bar which is attached at one end of a steel anode core or billet. Good welded joints are now possible. (K3r, 1-52; ST, Cu)

921-K. Cam-Controlled Welder Joins Irregular Contours. Metalworking Production, v. 105, Oct. 11, 1961, p. 75-76.

Irregular contoured workpieces are automatically submerged arc welded by a universal welding machine having cam co-ordinated workpiece and torch motion. Cams are designed to maintain constant welding conditions throughout the contour. (K1e, 1-52)

922-K. One Way to Make a Brazing Platen. Metalworking Production, v. 105, Oct. 11, 1961, p. 77.

Technique using a specially prepared, contoured plaster reference base on which a flexible epoxy grid, a vinyl sheet, a special cement and a foamed ceramic insulant are laid for brazing stainless steel honeycomb. (K8, 1-52; SS, 7-59)

923-K. The Metal-Arc Welding of Stainless Steels. M. C. T. Bystram. Edgar Allen News, v. 40, Aug. 1961, p. 172-174.

Procedures for welding stainless steel tubing and pipe for service at high temperatures in aggressive atmospheres. Selection of electrodes to provide desired corrosion resistance, creep strength and freedom from cracking. Review of welding physics including embrittlement phenomena and transformations. (K1, K9; SS, 4-60)

924-K. (German.) Steam Shielded Arc Welding. H. W. Rotthaus. Technische Mitteilungen, v. 54, Aug. 1961, p. 286-289.

Test welding of steel using dry and wet steam at various pressures as protective atmosphere and electrodes of various compositions with subsequent investigation of weld quality by mechanical testing and microscopic examination. (K1d, K9; ST)

925-K. (German.) Welding of Thick Sheets Using Automatic Electric Flash-Welding Processes. S. K. Paul and A. Meyer. Technische Mitteilungen, v. 54, Aug. 1961, p. 290-294.

Mechanical thermit powder and CO_2-inert gas shielded welding of 20-60 mm. thick boiler steel sheet. Review of welding technology including electrical aspects, joint preparation, welding efficiency and mechanical strength of welds. 7 ref. (K1d, K3r, K4, 10-54; ST, 4-53)

926-K. (German.) Autogenous Welding-Current Status and Future Development. P. Bernard. Technische Mitteilungen, v. 54, Aug. 1961, p. 306-310.

Review of technology and machinery for autogenous welding, with and without inert-gas shielding, of carbon steels and alloyed austenitic and ferritic steels. Use of autogenous welding in fabrication of thin sheets, boiler manufacture, joining of rails and in aircraft and vehicle production. 6 ref. (K1, 10-54)

927-K. (German.) Technology of Electron Beam Welding. W. Opitz. Technische Mitteilungen, v. 54, Aug. 1961, p. 311-319.

Review of mechanisms and historic development of electron beam welding and classification of fields of application in joining nonferrous and ferrous metals including alloy steels and refractory metals. (K6, 10-54; ST, EG-d37)

928-K. (German.) Current Status and Future Expectations in Resistance Welding. H. Verhoeven. Technische Mitteilungen, v. 54, Aug. 1961, p. 319-323.

Review of technology and machinery design in resistance welding including spot, projection, flash butt, resistance and high-frequency tube and pulse welding. (K3, 10-54)

SECTION L

CLEANING, COATING and FINISHING

1-L. Nickel-Aluminum Coatings Protect Metals up to 1830° F. Materials in Design Engineering, v. 52, Nov. 1960, p. 10.

Coating of steel, Ni and Mo by electroplating with Ni-Al alloys. (L17, Q-general, 1-66; Mo, Ni, ST, Al-b)

2-L. Automobiles/What Materials Are Next? Pt. 3. The Body: A Quest for Quality. Materials in Design Engineering, v. 52, Nov. 1960, p. 151-152.

Rustproofing and painting of steel automobile bodies to improve corrosion resistance. (L26, R-general, T21a; ST)

3-L. Polishing and Cleaning Lighter Bodies. R. E. Green. Machinery, v. 97, Oct. 19, 1960, p. 906-910.

Use of an automatic polishing machine and ultrasonic vibration of trichloroethylene cleaning solution on Cr plated cigarette lighter bodies. (L10b, L12h, 1-74)

4-L The Nickel-Carbonyl Process for Tool Production. Machinery, v. 97, Oct. 19, 1960, p. 911-912.

Production of tool master reproductions composed of pure Ni by electroforming. (L18, T6; Ni)

5-L. Hinac Coatings May See Wider Use. Chemical & Engineering News, v. 38, Oct. 31, 1960, p. 54.

Corrosion, abrasion and fade resistance of chromate-resin coatings for Al, Mg, Zn, carbon steel and stainless steel. (L14c, R-general; Al, Mg, Zn, CN, SS, NM-g33)

6-L. (Swedish.) Electroplating With Metals of the Platinum Group. Uno Tragardh. Teknisk Tidskrift, v. 90, Oct. 14, 1960, p. 995-996.

Use of baths containing $K_2Pt(NO_2)_2SO_4$ in Pt plating. Rh plating with a bath containing its sulphate and excess H_2SO_4. Pd plating by electrodeposition from a solution of palladium tetraminonitrate. Ir plating using Ir electrodes in a fused bath of potassium cyanide and sodium cyanide. Ru plating from a bath containing $Ru(NO)Cl_3$ and HCl. 7 ref. (L17; Ir, Pd, Pt, Rh, Ru)

7-L. Rhodium: Colorer's Care Can Pay Off. J. Newton Perham. American Jewelry Manufacturer, v. 5, Nov. 1960, p. 14-19.

Electroplating of Ni, Au or Ag with Rh for bright, smooth finish. Prevention of foreign metal and organic contamination, Ni build-up and sludge formation in the Rh bath. (L17b; Ag, Au, Ni, Rh)

8-L. (German.) Hard Surfacing of High Alloy Steels. H. Anders. Stahlbau, v. 29, Sept. 1960, p. 295-296.

Use of low-alloyed steel electrodes with a carbon content of no more than 1% and supplying a self-hardening weld metal or of cast iron electrodes containing 1.5-2.5% carbon and up to 40% alloying elements to hard surface stainless steels. (L24, T1f; SS)

9-L. Hard Coat Anodizing Rectifier Adds Control to the Cycle. Iron Age, v. 186, Nov. 17, 1960, p. 146-147.

Hard anodizing of missile components, using a rectifier to control current and voltage in the anodizing bath. (L19, T24e, W11r, 1-52)

10-L. (German.) Economical Pickling of Unalloyed Low Carbon Steel in Sulphuric Acid Using "Wetters". Carl Alex Fischer. Draht-Welt, v. 46, Jan. 1960, p. 17-20.

Pickling with HCl, H_2SO_4 and inhibitors (Rodin 57), with additions of natural (NaCl) and synthetic (HW 54/80030) borax and castor oil containing media called "wetters" which increase pickling rate and improve acid wetting of metals. (L12g; CN-g)

11-L. Plating Costs Tumble Sharply on Lustrous Chrome Line. Iron Age, v. 186, Nov. 10, 1960, p. 184-185.

Use of a new bright Ni plating process. The self-leveling quality of the method eliminates Cu plating and subsequent buffing between the Ni and Cr baths. (L17; Cu, Ni)

12-L. Zinc Plating of Carbonitrided Steel. Leonard R. Kohan and Howard T. Francis. Plating, v. 47, Oct. 1960, p. 1155-1158.

Effect of discontinuity of the barrel-plating process and electrochemical cathodic action of carbonitrided parts on plating efficiency. (L17, J28m; ST, Zn)

13-L. Constant Wattage Hard Anodizing of Aluminum. Martin A. Blumenfeld and W. Fred Schurig. Plating, v. 47, Oct. 1960, p. 1159-1165.

Hard anodic coatings are applied to 6061-T6 Al alloy using constant wattage d-c. power. Effect of temperature, wattage and treatment time on coating rate and abrasion resistance; comparison of coatings with those applied to same alloy using a constant current source. (L19, Q9n; Al)

14-L. "Triclene" Finishing Parts for Corvair Engines. P. C. Bardin. Industrial Finishing, v. 37, Nov. 1960, p. 24-26, 30-32.

Automatic and continuous degreasing, phosphatizing and painting of steel automobile engine parts in an air-free trichlorethylene atmosphere. Use of trichlorethylene in vapor spray degreasing, in phosphatizing solution and as a thinner in paint. (L-general, T21b; ST)

15-L. Fast Finishing of Parts for Warm Air Furnaces. Carl L. Sheets. Industrial Finishing, v. 37, Nov. 1960, p. 64-66.

Electrostatic spraying and baking of enamel coatings on steel panels using a conveyorized system for transferring parts from spray booths to bake ovens. (L26n; ST, 4-53)

16-L. Welding Repairs of Cavitation on Large Hydroelectric Turbines. Martin Friedmann, Jr. Welding Journal, v. 39, Nov. 1960, p. 1124-1126.

Deposition of stainless or mild steel inlays in pits on turbine runners. Chipping as a method of weld preparation. (L24, W11n; CN, SS)

17-L. History and Development of Some Problems Associated With Contract Chemical Cleaning. Charles M. Loucks. Corrosion, v. 16, Oct. 1960, p. 18, 20, 22, 24-26.

Review of chemical cleaning processes using strong mineral acids, alkalis, alkaline salts, CO_2 and weak acids. Behavior of inhibitors in cleaning boilers and feed lines composed of ferrous and nonferrous metals and alloys. 49 ref. (L12, T26q)

18-L. (Italian.) Surface Treatment of Stainless Steels. Giampiero Colombo. Acciaio Inossidabile, v. 27, July-Aug. 1960, p. 461-465.

Washing and degreasing of stainless steels with alkaline solutions. (L12k; SS)

19-L. (Japanese.) Electrodeposition of Nickel Molybdenum Alloy From a $NiSO_4$, Na_2MoO_4 and $Na_3C_6H_5O_7$ Solution Bath. Hiroto Imanaga. Chemical Society of Japan, Journal, Industrial Chemistry Section, v. 63, Aug. 1960, p. 1336-1339.

Effect of time, temperature, current density and concentration of electrolytes on the deposition of a Ni-Mo alloy on a Cu cathode. (L17, 2-60, 2-61, 3-67; Cu, Ni-b, Mo-b)

20-L. Corrosion Prevention in the Aerospace Industries. R. A. Cole. Corrosion Technology, v. 7, Oct. 1960, p. 320-324.

Corrosion prevention by cladding, painting, anodizing and spray coating of aircraft and missile components composed of stainless steel and Al and Mg alloys. (L-general, R10g, T24; Al-b, Mg-b, SS, 17-57)

21-L. Precoated Metals Solve Manufacturers' Problems. Product Finishing, v. 13, Nov. 1960, p. 84-92.

Cutting, welding and forming of steel and Al precoated by galvanizing, painting, laminating or plating with Ni, Cr, or Cu. (L-general, G-general, K-general; Al, ST, Ni, Cr, Cu, 8)

22-L. (German.) Production of Even Uranium Layers of Defined Uranium Content on Aluminum. W. Gebauhr and J. Martin. Atompraxis, v. 6, no. 7, 1960, p. 253-254.

Electrolytic coating of 1 mm. thick cleaned and etched Al sheets in ammoniacal $UO_2(NO_3)_2 \cdot 6H_2O$ solution of pH = 5 at 75° C. Indirect chemical uranium analysis of coatings by cermetric titration of remnant in electrolyte. 16 ref. (L17, S11j; Al, U, 4-53)

23-L. Electrodeposition of Nickel-Zinc Alloys From the Pyrophosphate Bath. T. L. Rama Char and S. K. Panikkar. Electroplating and Metal Finishing, v. 13, Nov. 1960, p. 405-412.

Effect of bath composition, pH, temperature and current density on the composition, Vickers hardness, oxidation resistance and color of the Ni-Zn deposit. 19 ref. (L17, Q29n, R-general; Ni-b, Zn-b)

24-L. Anodizing Copper, Magnesium, Zinc, Cadmium, Steel and Silver. N. P. Fedot'ev and S. Ya. Grilikhes. Electroplating and Metal Finishing, v. 13, Nov. 1960, p. 413-417. (Abstract from English translation of the Russian book "Electropolishing, Anodizing and Electrolytic Pickling of Metals", Robert Draper Ltd., Teddington, England, Feb. 1960.)

Data for bath composition and temperature, current density and cathode composition for anodizing Ag, Cu, Cd, Mg, Zn and steel. Effect of alkali concentration and current density on film thickness. 6 ref. (L19; Ag, Cd, Cu, Mg, Zn, ST)

25-L. A Practical Method of Area Calculation. R. R. Cheffers. Electroplating and Metal Finishing, v. 13, Nov. 1960, p. 418-420.

Areas of complex and hollow workpieces of electroplated metals are determined from calibrations relating cathode area, voltage, current, time and temperature. Plating time for obtaining deposits of exact thickness is then calculated from the effective cathode areas. (L17)

26-L. Chemical Polishing of Aluminium and Its Alloys. Charles C. Cohn. Electroplating and Metal Finishing, v. 13, Nov. 1960, p. 421-423.

Smoothing of Al surfaces by chemical polishing to obtain bright, bright-diffuse and dull-matte finishes. (L12, L19; Al)

27-L. "Trojan" Automatics for Hard Chromium Plating of Cylinder Liners. Electroplating and Metal Finishing, v. 13, Nov. 1960, p. 430-431.

Electroplating of machined, degreased and etched steel cylinder liners produced from deep drawn pressings. (L17; ST, Cr, 4-60)

28-L. Chrome Impregnation Fights Heat and Rust. A. C. Parsons. Canadian Machinery and Metalworking, v. 71, Nov. 1960, p. 90-91.

Chromalloying of steel components by diffusion of Cr into the surface to improve corrosion resistance and mechanical properties. (L15, R-general, Q-general; ST, Cr)

29-L. (German.) Wash-Primer for Metallic Surfaces. H. Kohlhase. Fertigungstechnik und Betrieb, v. 10, Oct. 1960, p. 613-619.

Composition of wash-primers for different metals. Adhesion, corrosion and weathering tests of treated Al alloy, steel sheet and gray cast iron surfaces. (L14, L12; Al-b, CI-n, ST, 4-53)

30-L. (German.) Automation in Electroplating. Fr. Lohrie. Elektro-Anzeiger, v. 13, Oct. 26, 1960, p. 454-455.

Automation of Cu, Ni and Cr electroplating in terms of operation sequence, working and transportation methods and design of baths. Economic considerations. (L17, 18-74; Cu, Cr, Ni)

31-L. Electrodeposition of Copper From Pyrophosphate Bath. S. K. Panikkar and T. L. Rama Char. Research & Industry (India), v. 5, Sept. 1960, p. 277-278.

Plating of Cu on steel from a pyrophosphate bath. Effect of addition agents on deposit brightness. Comparison of throwing power and cathode and anode efficiency of pyrophosphate and cyanide baths. (L17; ST, Cu)

32-L. Factors Producing Tin-Plate Wood Grain. R. F. Higgs and J. A. McCarthy. Plating, v. 47, Nov. 1960, p. 1255-1262.

Effect of melting rate, coating thickness, Sn concentration in the electrolyte, current density, electrolyte temperature and addition-agent activity on

the formation of wood grain, a pattern of bright and dull alternate bands of Sn on finished Sn plate. (L17b; Sn)

33-L. Ni-Al Coating Resists Oxidation. Chemical Engineering, v. 67, Oct. 31, 1960, p. 140.

Electrodeposition of smooth, oxidation resisting Ni-Al coatings on steel capable of withstanding temperatures to 1850° F. Ni is deposited from a Watts bath and Al is electroplated onto the Ni from a fused salt solution containing a mixture of KCl, NaCl and cryolite. (L17, R1h; ST, Ni-b, Al-b)

34-L. Increasing the Life of High Speed Steel Cutting Tools With Carbide Coating. Australasian Manufacturer, v. 45, Oct. 15, 1960, p. 52-55.

Tungsten carbide particles are spark-deposited on the cutting edges of high speed steel tools, to combine the resilience of steel with the hardness and wear resistance of carbides. (L24, T6n; TS-m, W, 14-68)

35-L. The Cleaning of Carbon Steel Wire as Affected by the Metallurgical Nature of the Scale. Allan B. Dove. Wire and Wire Products, v. 35, Nov. 1960, p. 1547-1554, 1589.

Theory of scale formation. Mechanical and chemical descaling of carbon steel wire. Effect of patenting on pickling. 5 ref. (L10, L12; CN, 4-61)

36-L. (Japanese.) Aluminizing of Steel Sheets. Akira Ohmi. Metals, v. 30, Apr. 15, 1960, p. 10-14.

Aluminizing of pickled and electropolished steel sheet and strip with flux melt or flux solution or by the Sendzimer process. Mechanical properties; applications. (L16, Q-general; ST, 4-53)

37-L. (German.) Influence of Film Composition on Alloy Formation in Electrolytic Deposition of Chromium by Other Elements. A. T. Vagramjan, D. N. Ussatschow and N. L. Klimassenko. Zeitschrift fur Physikalische Chemie, v. 215, no. 1-2, 1960, p. 57-62.

Electrolytic decomposition of Cr from cathodic films is investigated by polarization measurements in terms of current density and electrode potential measurements with SeO_3-and H_2SO_4-containing CrO_3 electrolytes. Reaction mechanism; reaction rate. 5 ref. (L17; Cr)

38-L. Influence of Cold-Reduction Practice on Hydrogen Behavior in Enameling Steels. R. M. Hudson, M. Kotyk and G. L. Stragand. American Ceramic Society, Journal, v. 43, Nov. 1960, p. 564-570.

Effect of cold work on hydrogen behavior in steel and influence on hydrogen-caused ground coat reboiling and delayed defect tendency of applied enamel coat. 15 ref. (L26, 9-71, Q26s, 3-68; ST, H)

39-L. Treating Waste From Chromium Plating. Metal Progress, v. 78, Dec. 1960, p. 124.

Process at the Pontiac Motor Division consists of reduction of hexavalent Cr with sulphur dioxide added as a liquid and subsequent precipitation of the Cr as a hydroxide. (L17, A9; Cr)

40-L. Color Anodize or Weld Aluminum Die Castings. Production, v. 1, Dec. 1960, p. 70-71.

Color anodizing of vacuum die castings composed of Hamiloy, a new Al alloy which can also be brazed, porcelain enameled and welded because of its resistance to distortion at high temperatures. (L19; Al-b, 5)

41-L. Institute of Vitreous Enamellers Annual Conference, Birmingham, 1960. Report of the First Technical Session. Metal Finishing Journal, v. 6, Nov. 1960, p. 423-429.

Summaries of papers covering a method of measuring the abrasion resistance of vitreous enamels; acid resistance tests for vitreous enamels used in the chemical industry; the influence of chemical composition of enamel on its alkali resistance. (L27)

42-L. (German.) Nonrigid Fully Automatic Electroplating. H. Henig and F. Kollorz. Metalloberflache, v. 14, Oct. 1960, p. 298-304.

Production of Cd, Cu, brass, Ni and Ag coatings by a fully automatic electroplating process which compensates for measured initial properties, such as surface condition of the material being plated. (L17; Cd, Cu-b, Ni, Ag)

43-L. (English.) Wire Brushing of Aluminum--Mechanism of "Orange Peeling". A. Selwood and J. Molgaard. Wear, v. 3, Sept-Oct. 1960, p. 394-400.

Presentation of experimental results to show that formation of "orange peel" surface finishes during brushing of Al by rotary surface brushes is due to low temperature welding and not to surface melting. 6 ref. (L10e; Al)

44-L. New Anodizing Process Imparts Uniform, Fade-Proof, Built-In Colors. Modern Metals, Nov. 1960, p. 86.

Kaiser Aluminum's Kalcolor process produces color without using organic dyes. Lasting tones are created by converting alloying elements within the metal itself. No perceptible corrosion or fading of Kodacolor occurs during accelerated tests. (L19; Al)

45-L. (German.) General Laws Controlling the Influence of Residual Elements on Reactions in Hot-Dip Galvanizing. Dietrich Horstmann. Stahl und Eisen, v. 80, Oct. 27, 1960, p. 1531-1540.

Kinetics and reaction mechanism of dissolution of pure and alloyed Fe containing P, Ti, Mo, Ni, Mn, Cr, Si and Al in Zn at temperatures from 430-550° C. Influence of heterogeneous precipitations and of phase transformations. 29 ref. (L16, N-general; Fe-b)

46-L. Cleaning Techniques for Stainless Steel. J. M. Henderson. Canadian Metalworking, v. 23, Nov. 1960, p. 56-57.

Chemical cleaning of stainless steel surfaces to prevent rusting and pitting by embedded foreign particles during annealing. (L12; SS)

47-L. Selective Electroplating Saves Time and Dollars. Charles D. LaFond. Missiles and Rockets, v. 7, Nov. 28, 1960, p. 44-45.

Standard or precious metal platings of high purity are selectively deposited on missile components using the Dalic process. Areas are electro-cleaned, etched and made cathodic, then coated by an anode pad saturated with the metal-coating solution. (L17, T24e)

48-L. (Dutch.) Metal Spraying. H. W. Kaletzky. Lastechniek, v. 26, Oct. 1960, p. 199-203.

C35 steel is sprayed with corundum to study the effect of metal spraying on its fatigue strength and the effect of surface roughness and preheating on the adhesion of the sprayed layer. 4 ref. (L23; ST)

49-L. Sandwich Rolling. H. S. Orr and F. R. Romeo. Iron and Steel Engineer, v. 37, Oct. 1960, p. 151-157.

Large, light gage sheets of alloy and stainless steel are rolled to close tolerances with conventional equipment using a sandwich rolling technique in which the plate to be rolled is encased between carbon steel plates prior to hot rolling. Decarburization and crown are minimized and power consumption is reduced. (L22; AY, SS)

50-L. (Czech.) Corrosion Protection by Metal Spraying With Aluminum. M. Zrunek. Strojirenstvi, Oct. 1960, p. 766-768.

Steel constructions are protected by spraying with Al or by spraying a 0.1 mm. thick Al layer over a sprayed Zn layer, also of 0.1 mm. thickness. Data are given for service life of paint protected sprayed layers. 10 ref. (L23, L26; ST, Al, Zn)

51-L. How to Select Steel Abrasives. Steel, v. 147, Nov. 14, 1960, p. 114-115.

Data for optimum hardness, size, density and Mn, P and S content of steel particles for blast cleaning. (L10c; ST, 17-57)

52-L. Blast Descaling Gains as Pre-Inspection Tool. Steel, v. 147, Nov. 18, 1960, p. 126, 129.

Mechanical blast descaling of slabs, billets and bars composed of carbon, stainless and toolsteel, Ti and Zr to produce an exterior that is easy to inspect and has adequate contrast between defect and surrounding material. (L10c; CN, SS, Ti, TS, Zr, 4-52, 4-55)

53-L. Vibratory Finishers for Deburring. Products Finishing, v. 25, Nov. 1960, p. 84-86.

Deburring of Al die castings, steel stampings, machined parts and toolsteels by vibrators which can be loaded to 90% of capacity. Partial suspension of media reduces pressure exerted against the work so that fragile or delicate parts can be batch finished. (L10; Al, ST, TS, 4-59, 5-61)

54-L. Polyester-Glass Coating Saves Corroded Ductwork. Products Finishing, v. 25, Nov. 1960, p. 70.

Application of Atlac 382, a glass-reinforced polyester to badly corroded galvanized iron ductwork to eliminate the

need for replacement of the worn duct system. (L26n, T26r; Fe, 8-65)

55-L. New Gas-Deposition Process for Making Dies. Products Finishing, v. 25, Nov. 1960, p. 66, 68, 70.

Production of pure Ni forming dies and foundry patterns by a gas deposition technique which deposits pure Ni on an eutectic-alloy mold which is then destroyed leaving a pure Ni shell. Reproducibility tolerances average 0.005 in. (L18, E17, W24n; Ni, 17-57)

56-L. Add Color to Your Zinc Plate. Lyne S. Metcalfe. Products Finishing, v. 25, Nov. 1960, p. 62, 64, 66.

Production of colored metallic finishes by a chromating-coloring process which involves dipping Zn plated parts in chromate-coating bath and then immersing them in a dye bath. Colors are fade resistant. (L14c; Zn, 8-62)

57-L. Acid Cleaning of Superheaters and Reheaters. William F. Ashton and Stanley M. Rose. American Society of Mechanical Engineers, Paper no. 60-WA-219, 1960, 4 p.

Chemical cleaning of drainable and nondrainable superheaters and reheaters of carbon and stainless steels using 5% inhibited citric acid or 5% inhibited HCl at 165 and 200° F. for 8 hr. Investigation of corrosion and erosion effects and solvent flow in parallel elements of heaters. (L12g, R6g, W13b; CN, SS)

58-L. When Will Plastic Coated Valves Solve Corrosion Problems? Paul A. Manor. Gas, v. 36, Nov. 1960, p. 112-113.

Coating of steel valves with chlorinated, high molecular weight, linear, crystalline plastic (Penton) to provide a low cost valve with good corrosion resistance. (L26p, R-general, T7b; ST, 17-57)

59-L. Protecting Steel in a Cooling Tower. Crawford Blanchard and M. H. Selby. Gas, v. 36, Nov. 1960, p. 109-111.

Coating of pipes and cooling towers with high solid content, amine-cured epoxy resin, Plasite 712, to protect against severe corrosive and thermal shock conditions. Resin selected is called Plasite 7122. (L26p, R10, T26r, W10h; ST, 17-57)

60-L. Heavy Gold Plating. Goldsmiths Journal, v. 66, Nov. 1960, p. 496.

A new plating process, called Epalex, for depositing 98% pure Au of greater hardness and thickness on any metal surface. Base metal may undergo any operation prior to plating. (L17; Au)

61-L. Protective Coating for High Temperature. Metal Industry, v. 97, Oct. 28, 1960, p. 364.

Production of Ni-Al alloy coating for protecting metals from oxidation at temperatures to 1000° C. by electroplating Ni over the base metal from a water bath and electrodepositing Al from a cryolite bath at 700° C. (L17; Al, Ni)

62-L. (Italian.) Use of Electrolytes Containing Oxalic Acid in the Anodization of Aluminum. E. Sacchi. Aluminio, v. 29, 1960, p. 447-452.

The permissible temperature difference during the anodic oxidation of Al is increased 4° C. by addition of 15 g. per l. of oxalic acid. Effect of oxalic acid on density of oxide produced, wear resistance of anodized samples and corrosion resistance of Al in HCl, H_2SO_4 and a NaCl mist. 7 ref. (L19, R-general, Q9n, 2-66; Al)

63-L. Practical Hints for Electro-Cleaning With Simultaneous Copper Plating. Rene Graner. Electroplating (India), v. 2, Apr-July, 1960, p. 8-10.

Analysis of factors leading to insufficient or too rapid deposition of Cu or to dissolving of the base metal during simultaneous electro-cleaning and Cu plating of Zn. (L13n, L17; Zn, Cu)

64-L. Switch to Automatic Buffing Multiples Output by 20. Steel, v. 147, Dec. 12, 1960, p. 90.

Design of an automatic buffer which polishes stainless steel weights for ultra-precise analytical balances. (L10a; SS)

65-L. Surface Treatment of Germanium for a Diffused Transistor. Osamu Mikami. Electrical Communication Laboratory (Japan), v. 7, Nov. 1959, p. 414-415.

Method for polishing and etching a Ge wafer. (L12, T1k; Ge, 17-57)

66-L. (Pamphlet.) Characteristics of the LW-1N 40 (Extra Tough Tungsten Carbide) Flame-Plated Coating. Linde Flame-Plating Bulletin, Oct. 1, 1960, 2 p. Linde Co., E. 42nd St., New York 17, N. Y.

Coatings contain tungsten carbide with approximately 15-17% Co. Data on surface finish, hardness, mechanical shock resistance, oxidation, corrosion and wear resistance. (L23; W, 6-69)

67-L. (Pamphlet.) Characteristics of the LW-1N 30 (Extra-Strong Tungsten Carbide) Flame Plated Coating. Linde Flame Plating Bulletin, Oct. 1, 1960, 2 p. Linde Co., E. 42nd St., New York 17, N. Y.

Composition, appearance, coating thickness, surface finish, hardness and mechanical shock resistance. Repeated high frequency impacts directly on the coated surface, resulting in considerable plastic flow of annealed steel, Ti alloy and 24S-T4 Al base metals produce no trace of cracking or spalling, while the only damage is mild pitting. (L23; W, 6-69)

68-L (Pamphlet.) Physical Data Flame-Plated Coatings. Linde Flame Plating Bulletin, Oct. 1, 1960, 2 p. Linde Co., E. 42nd St., New York 17, N. Y.

Mechanical and physical properties of LW-1, LW-1N30, LW-1N40 and LW-5 coatings containing tungsten carbide with 6-17% Co. Main features of these coatings are good wear resistance at high temperature and in corrosive media and excellent resistance to high temperature deterioration. (L23; W, 6-69)

69-L. (Pamphlet.) Characteristics of the LW-1 (Tungsten Carbide) Flame-Plated Coating. Linde Flame Plating Bulletin, Oct. 1, 1960, 3 p. Linde Co., 30 E. 42nd St., New York 17, N. Y.

Coatings contain tungsten carbide with 6-8% Co. Data on surface finish, hardness, modulus of elasticity, mechanical shock resistance, thermal conductivity, magnetic characteristics and oxidation resistance. Coatings are generally recommended for service up to 1000° F. under oxidizing conditions. (L23; W, 6-69)

70-L. (Pamphlet.) Tin Mill Products. Steel Products Manual, Nov. 1960, 38 p. American Iron and Steel Institute, 150 E. 42nd St., New York 17, N. Y.

Rolling, annealing and cleaning of steel strip for plating. Manufacture of black plate, tin plate, short terne plate and blue plate. Tolerances for cut sizes and coils. (L16, F23; ST, Sn, 4-53)

71-L (Translation-Brutcher no. 4780.) Development and Testing of an Acid Bath for the Chemical Polishing of V_2A Steel. G. Schmid and H. Steinhausen. Metalloberflache, v. 14, 1960, p. 1-6.

See item 281-L, 1960. (L12f, 2-60; AY, 4-53)

72-L. (French.) Corrosion Protection by Chromium Plating. P. Morissef. Corrosion et Anticorrosion, v. 8, Nov. 1960, p. 407-418.

Effects of surface roughness, bath temperature, current density, thickness of deposited layer and fissure formation on corrosion protection of Cr plated steel. Relationship between residual stress fissures, grooves and plating thickness. 11 ref. (L17, R-general; ST, Cr)

73-L. Novel Technique for Surfacing With Stainless Steel. Engineer, v. 48, Sept. 5, 1960, p. 39-40.

Medium carbon steel shafts for an extrusion press are covered with 18-8 stainless steel at critical areas by submerged arc welding with a heavy duty lathe which carries an automatic arc welding head on the cross carriage. Current setting varies with shaft's diameter. (L24, K1e; CN, SS)

74-L. (German.) Application of "Deposit Welding" by the "Ellira" Process (Under-Powder Welding). Alfred Gschaider. Schweisstechnik, v. 14, Oct. 1960, p. 113-115.

Reconditioning of worn crane wheels, tires for mining vehicles and steel rolls by under-powder welding. Heat treatments to eliminate residual stresses. (L24, J1a, W23k, W12q; ST)

75-L. New Techniques for Cladding With the Gas Shielded Process. Ralph D. Engel. Welding Journal, v. 39, Dec. 1960, p. 1222-1229.

An improved fusion cladding process is developed which combines the extended-electrode gas-shielded process with an oscillating technique to minimize the papillary depression of the fusion line of each

weld bead. Overlay process produces high quality stainless steel, Ni or Cu base alloy overlays on steel bases. (L22, K1d; ST, Cu-b, Ni-b, SS)

76-L. Metallizing Protects Parts From Corrosion. Welding Journal, v. 39, Dec. 1960, p. 1245-1246.

Deposits of Hastelloy alloys are sprayed on new and worn machine parts to increase their service life when exposed to HCl, H_2SO_4, NH_3, Cl_2 and other corrosives used in the chemical industry. (L23, R6, T7; Ni-b)

77-L. Improved Anodizing of Aluminum Extrusions. Charles C. Cohn. Precision Metal Molding, v. 18, Dec. 1960, p. 47, 49.

Survey of anodizing methods including hot water sealing and a dual sulphuric acid anodizing and sealing technique for improved wear and corrosion resistance of Al and Al alloy parts. Discussion of techniques for etching and chemical polishing. (L19, L12; Al-b)

78-L. Painting of Welds. Corrosion, v. 16, Dec. 1960, p. 93-99.

Painted test specimens are exposed to determine methods of obtaining improved paint performance over the weld areas of steel structures. The performance of primers and primer-topcoat systems is observed on various types of welds given various surface preparations and pretreatments before being painted. Residues caused by the electrode coating should be removed from the weld area, preferably by blast cleaning before painting. (L26n; 7-51)

79-L. Glass Linings and Vitreous Enamels. Corrosion, v. 16, Dec. 1960, p. 107-113.

Use and limitations of glass linings and porcelain (vitreous) enamels for metal structures. Nominal composition of glass, production and preparation procedures, application, metal surface preparation, firing atmosphere, equipment design, hydrogen spalling, thermal shock, etching, abrasion resistance, testing techniques, heat transfer characteristics and repair of glassed steel equipment. (L27)

80-L. (German.) Rotating, Longitudinal and Universal Automatic Electroplating. G. Gailert. Metalloberflache, v. 14, Nov. 1960, p. 325-328.

Automatic plants for rinsing, degreasing and electroplating operations. Electroplating of Zn die castings, brass and steel parts with Cu, bright Ni and Cr. (L17, L-general, 1-52; Cu-b, ST, Zn, Ni, Cr)

81-L. (German.) Non-Rigid Automatic Electroplating Machinery. H. Hennig and F. Kollorz. Metalloberflache, v. 14, Nov. 1960, p. 329-332.

Comparison of characteristics of rigid and non-rigid automatic electroplating of ferrous and nonferrous metals with reference to efficiency, output and possible combinations of electroplating programs. (L17, 1-52)

82-L. (German.) Evaporation of Metals in Vacuum as Dependent on Metal Distribution on Evaporation Support. L. E. Preuss and C. E. Alt. Vakuum-Technik, v. 9, Sept. 1960, p. 155-163.

Evaporation of radioactive Au and Cr on a tungsten-wire of 0.5 mm. diameter at 1150-2030° C. and under vacuum of 10^{-2}-9 x 10^{-5} Torr. Autoradiographs are taken with a distillation camera to determine geometry of evaporation. (L25g; W, Au, Cr)

83-L. (Russian.) Cathodic Polarization During Deposition of Copper-Nickel Alloys From Pyrophosphatic Electrolyte. N. Ya. Fedotova and P. S. Titov. Tsvetnaya Metallurgiya, May 1960, p. 126-131.

Mechanism and kinetics of electroplating Cu and Ni (50-70% Ni) simultaneously. Relation of the rate of ion discharge to the composition of the deposit and the electrolyte and of cathodic polarization to the partial activity of the components. 17 ref. (L17; Cu-b, Ni-b)

84-L. When to Choose Ultrasonic Cleaning. H. F. Osterman. Metalworking, v. 16, Dec. 1960, p. 14-15, 22.

Basic principles of the process; pointers in the selection of solutions and solvents; use of transducers; typical applications. (L10f)

85-L. (Russian.) Polarization in the Electrodeposition of Nickel, Cobalt and Iron on a Solid and Liquid Cathode. A. P. Popkov, N. L. Klimashenko and A. T. Vagramyan. Zhurnal Fizicheskoi Khimii, v. 34, Aug. 1960, p. 1741-1744.

Comparison of rate of electrodeposition of Ni, Co and Fe on solid metal

electrode with deposition on liquid Hg electrode. Effect of charge on the surface of the Hg electrode on discharge of Ni, Co and Fe ions. 4 ref. (L17; Ni, Co, Fe)

86-L. Pipe Internally Coated at the Mill. Pipe Line Industry, v. 13, Dec. 1960, p. 34.

Pipe of 16-30 in. o.d. wire is wire brushed and washed, hot air and induction dried and sprayed with epoxy-base paint on an internal coating line incorporating quality control. (L26p; 4-60)

87-L. Successful Internal Roller Burnishing. Metalworking Production, v. 104, Nov. 23, 1960, p. 71-74.

Techniques for roller burnishing of bronze component bores to improve Rockwell C hardness, surface finish, grain structure and dimensional accuracy without extensive honing and lapping. (L10, Q26n; Cu-s)

88-L. Pitting Corrosion on Pellet Mill Dies Can be Curtailed. Inco Nickel Topics, v. 13, no. 8, 1960, p. 9.

Chemical Ni alloy plating on pellet feed mill dies for reducing electrochemical corrosion. (L17, R-general, T29p; Ni)

89-L. Diffusion Coatings Protect Metal to 2300° F. Materials in Design Engineering, v. 51, Dec. 1960, p. 17.

Coatings are metallurgically bonded to the base metal and resist spalling, chipping and thermal shock. Thickness of the coating ranges from 0.001-0.006 in. Ni and Co-base alloys, stainless steels and plain carbon steels have been coated with excellent results. (L15)

90-L. Some Applications of Electropolishing. Machinery (London), v. 97, Nov. 23, 1960, p. 1179-1181.

Use of electropolishing to remove burrs, avoid stress concentration and to remove discoloration caused by heat treatment. Application to stainless, carbon and alloy steels, Ni, Ni alloys, Cu and Cu alloys. (L13p; AY, Cu-b, CN, Ni-b, SS)

91-L. Canning Automatic Hard-Chromium Plating Installation. Machinery (London), v. 97, Nov. 23, 1960, p. 1195-1196.

Cylinder liners of deep drawn steel are plated by hard Cr in a fully automatic installation which also performs turning, boring, grinding and lapping operations prior to plating. (L17, G17; ST, Cr)

92-L. (Russian.) Heat Treatment in Carbon Dioxide. V. A. Shebanov. Metallovedenie i Termicheskaya Obrabotka Metallov, Nov. 1960, p. 37-38.

Experimental hard facing of 45 steel in CO_2 media with and without subsequent heat treatment. Hardness, impact strength, elongation and tensile strength of the deposited and base metals as they are affected by heat treatment. (L24, J-general, Q-general, 2-64; ST)

93-L. (Russian.) Electroplating of Titanium. G. N. Smolenskaya, N. T. Kudryautsev and V. M. Karataev. Metallovedenie i Termicheskaya Obrabotka Metallov, Nov. 1960, p. 42-44.

Preliminary preparation and plating of polished Ti and Ti alloys to obtain Ni, Cu, Zn, Cr, Au and Ag platings which do not scale during filing, grinding or burnishing, show thermal stability at 600-800° C. and can be soldered successfully. (L17; Ti, Ag, Au, Cu, Cr, Ni, Zn)

94-L. (Russian.) Technological Peculiarities in the Production of Fine Tungsten Wire. I. Yu. Klugman. Tsvetnye Metally, Sept. 1960, p. 69-74.

Electrolytic etching of very fine tungsten wire by drawing the wire through a double cell bath with NaOH electrolyte. Uniform wire coating is obtained by decreasing concentration of electrolyte, by switching from a-c. to d-c. and by increasing size of electrolytic bath. 4 ref. (L13q; W, 4-61)

95-L. Electro-Formed Copper Waveguides. L. E. Hall and B. H. Meggs. Metal Industry, v. 97, Nov. 25, 1960, p. 435-438.

Fabrication of Cu waveguides using an electroforming process in which an accurate male mandrel with external dimensions identical with those of the bore required is plated with Cu to the desired thickness. When the mandrel is removed internal surface of the waveguide is an exact replica of the mandrel. (L18, T1; Cu)

96-L. Super Vapor Blasting. Australasian Manufacturer, v. 45, Nov. 5, 1960, p. 104-105.

Removal of forging and heat treating scale from strong, hard and heat resistant alloys for jet engine components by

a vapor blasting machine which shoots a slurry of fine particles against the workpiece. (L10c, T24b; SGA-h, SGB-a, SGB-q)

97-L. One Coat Porcelain Enameling Reaches Production Status at Westinghouse. Metal Products Manufacturing, v. 17, Dec. 1960, p. 42-43, 82.

Direct-on finishing of refrigerator components composed of zero-carbon steels using a new ferric sulphate-sulphuric acid pickling process for metal preparation. Corner brushing and ground coat drain streaking are eliminated. (L27; ST)

98-L. (German.) Decomposition of Anodic (Anodically Produced) Oxide Layers on Tantalum. G. Hahn. Metall, v. 14, Dec. 1960, p. 1171-1174.

Anodic oxidation of rolled and polished Ta sheets by direct current followed by decomposition of oxide layers in boiling 20% NaOH solution. Capacity measurements to determine decomposition times are made with an alternating current (50 cps.) bridge using 1% K_2SO_4 as electrolyte. (L19; Ta, 4-53)

99-L. (Italian.) Surface Treatment of Stainless Steel. Pt. 3. Giampiero Colombo. Acciaio Inossidabile, v. 27, Nov. 15, 1960, p. 497-500.

Descaling and pickling of stainless steel after heat treatment or hot deformation by sand-blasting followed by pickling in a solution containing nitric acid and fluoric acid or descaling in a solution containing 8-10% H_2SO_4 and 2% NaCl at a temperature of 60-70° C. followed by rinsing in water. (L10c, L12; SS)

100-L. (Finnish.) Tinned Containers. Pentti Ranta. Teknillisen Kemian Aikakauslehti, v. 17, Oct. 31, 1960, p. 595-598.

Cans used in the food industry are manufactured from steel sheet containing 0.12% C, 0.20-0.60% Mn, 0.01 max.% Si, 0.005 max.% S, 0.015-0.05% P and 0.06-0.20% Cu then dip-tinned or electro-tin-plated. Effect of tinning process on corrosion resistance. (L17, R-general; ST, Sn, 4-53)

101-L. One-Coat Enameling With Decarburized Steels. L. E. Fussell and F. L. Michael. Ceramic Age, v. 76, Dec. 1960, p. 43-46.

Preparation of steel for one coat enameling by spray pickling, etching and Ni coating. Effect of preparation methods on adherence and texture of the enamel. (L27; ST, 8-62)

102-L. (Japanese.) Structure of Bright Deposits From Nickel, Copper and Iron-Ethanolamine Baths. Akira Nakagawa. Metal Finishing Society of Japan, Journal, v. 11, Nov. 1960, p. 632-637.

Crystal structure, grain size and crystallographic orientation of specimen deposited from TEA-baths for Ni and Fe and MEA-baths for Cu are studied by X-ray diffraction and electron microscopy. Comparisons are made with deposits from the Watts bath for Ni on acid bath for Fe, the cyanide bath for Cu and various bright and leveling baths for each. (L17, M26, M-general; Cu, Fe, Ni)

103-L. (Japanese.) The Effect of Addition Agents on the Electrodeposition of Metals. Pt. 2. The Effect of Addition Agents on Cathode Polarization in Cyanide Zinc Baths. Tadeo Hayashi and Takeo Ishida. Metal Finishing Society of Japan, Journal, v. 11, Nov. 1960, p. 638-643.

Changes in cathode polarization pH of electrolytic solutions by addition of inorganic salts of Se, Ag, Hg, Cd, Ni, Co, W and Mo; inorganic sulphur compounds such as Na_2S and $Na_2S_2O_3$ and various organic compounds. Effect on formation of bright deposits. 10 ref. (L17; Zn)

104-L. (Japanese.) The Effect of Addition Agents on the Electrodeposition of Metals. Pt. 3. The Structure of Bright Zinc Electrodeposits. Tadao Hgyashi and Takeo Ishida. Metal Finishing Society of Japan, Journal, v. 11, Nov. 1960, p. 644-650.

Crystal structure, grain size, preferred orientation and surface smoothness of deposit obtained from cyanide baths are studied by electron diffraction and photomicroscopy. Effect of additions of inorganic salts of Se, V, Ag, Hg and Cd; metallic salts of Ni, Co, Fe, Cu, Mo and W; inorganic sulphur compounds such as Na_2S and Na_2SO_4 and organic compounds. 10 ref. (L17, M26, M-general; Zn)

105-L. Barrel Finishing Offers Efficiency and Low Cost. Design Engineering, v. 7, Jan. 1961, p. 28-32.

Removal of burrs from metal stampings by tumbling a mixture of parts, abrasive media and other compounds in a barrel-like container, a procedure which simultaneously cleans and burnishes the parts. Efficiency depends on shape of abrasive and parts, loading and speed of barrel and size and hardness of part. (L10d; 4-59)

106-L. Electrodeposition of Nickel-Cobalt Alloys. A. J. Steiger. Metal Finishing, v. 58, Dec. 1960, p. 53-55.

Use of separate Ni and Co anodes with individual current supplies for deposition of thick layers of Ni-Co alloy. Variation of alloy composition with electrolyte concentration, pH agitation and current density. (L17; Ni-b, Co)

107-L. Science for Electroplaters. Pt. 62. Adhesion Tests. L. Serota. Metal Finishing, v. 58, Dec. 1960, p. 65-67.

Burgess test, Ollard test, modified Ollard test and cement test for measurement of adhesion of electrodeposited coatings. Adhesion of electrodeposited Ni on various metals. Effect of deposit thickness on adhesion values. (L17, Q10c; Ni, 8-62)

108-L. (German.) Electrolytic Polishing of Heat Resistant Nickel Alloys. Gunter Haussler and Volker Patzold. Neue Hutte, v. 5, Nov. 1960, p. 665-674.

Electrolytic polishing of heat resistant Ni alloys (19.8-21.8% Cr, 0.13-2.99% Ti, 0.15-2.4% Al, 0-1.5% Fe, 0.03-0.19% C) with an apparatus combined with a microscope, using electrolytes containing H_2SO_4, H_3PO_4, HNO_3, HCl, CH_3COOH, CH_3OH and H_2O. (L13p; Ni-b, SGA-h)

109-L. Recent Advances in Arc-Plasma Metallizing. M. A. Levinstein. Metal Finishing Journal, v. 6, Dec. 1960, p. 467-474, 476.

Materials investigated are W, Mo, Hf carbide, Ta carbide, Ce oxide, Zr oxide and Hf oxide. Tungsten and Mo are sprayed in both wire and powder form while the oxides and carbides are in powder form. Spraying parameters are established based on density and microstructure. (L23)

110-L. Satin Finishes on Automatic Polishing Machines. F. W. Anderson. Metal Finishing Journal, v. 6, Dec. 1960, p. 475-476.

Details of the use of water-based liquid polishing compositions. (L10b)

111-L. Technical Developments and Advances in Nickel-Chromium Plating. Metal Finishing Journal, v. 6, Dec. 1960, p. 477-484.

Summaries of four papers presented at a symposium of the Institute of Metal Finishing, Nov. 16, 1960. Topics include a review of recent developments in Ni plating, progress in decorative Cr plating, thick coatings of crack-free Cr, intrinsic porosity of Ni coatings. (L17; Ni, Cr)

112-L. Hardfacing Cuts Maintenance. C. E. Rogers. Pacific Factory, v. 101, Dec. 1960, p. 21-22.

Survey of hardfacing protection of metal parts and equipment using carbides of Cr, Mo, W, Si and V. (L24, 18-72)

113-L. Faraday's Laws Applied to Cleaning. A. Kenneth Graham. Paper from "American Electroplaters' Society, Technical Proceedings", 1960, p. 41-44.

Assuming the removal of the varying amounts of many different organic soils in preliminary cleaning steps, the subsequent electrolytic cleaning and activating treatments determine both the adhesion and the quality of the plated coating. Factors in the development of a successful cleaning cycle. 3 ref. (L13)

114-L. Adhesion of Organic Enamels to Electrodeposited Nickel. F. X. Carlin. Paper from "American Electroplaters' Society, Technical Proceedings", 1960, p. 59-65.

Strong bonds between freshly deposited Ni and subsequent organic enamel finishes are achieved. Various aqueous solutions of organic and inorganic compounds are employed as post-treatments for the electrodeposits. The solutions apparently react either to cause a conversion type film on the Ni surface or to deposit a thin film of material which becomes strongly bonded to Ni. The film produced is receptive to application of a coating of organic enamel. 13 ref. (L26; Ni, 8-62)

115-L. Magnesium Corrosion. E. I. Weed. Paper from "American Electroplaters' Society, Technical Proceedings", 1960, p. 66-67.

Effectiveness of organic coatings in corrosion prevention, with special reference to epoxies and vinyls. Outline of optimum design features to avoid corrosion. (L26, R-general; Mg)

116-L. Recent Developments in Gold Electroplating. Barnet D. Ostrow and Fred I. Nobel. Paper from "American Electroplaters' Society, Technical Proceedings", 1960, p. 68-73.

Relative hardness, thickness and porosity tests on deposits produced by the Bek, acid phosphate Au, Volk, standard cyanide and other principal processes. 16 ref. (L17; Au)

117-L. A Cyanide Bath for Heavy Gold Plating. Robert Seegmiller and James K. Gore. Paper from "American Electroplaters' Society, Technical Proceedings", 1960, p. 74-77.

Deposits are bright to semi-bright with a slightly reddish cast, smooth, fine grained, hard and relatively pore-free. They are more brittle than deposits from industrial type Au baths. Smooth deposits 20-30 mils thick are readily obtained. 4 ref. (L17; Au)

118-L. Acid Gold Plating. R. A. Ehrhardt. Paper from "American Electroplaters' Society, Technical Proceedings", 1960, p. 78-82.

Development of a plating bath for printed circuits. Influence of pH, temperature, current density and bath composition on cathode efficiency and appearance. The bath is formed by the reaction of sodium gold cyanide with citric acid and/or ammonium citrate. 6 ref. (L17; Au)

119-L. A Study of Variations in Certain Characteristics of Bright Nickel Deposits With Variations in Bath Temperature. Richard J. Clauss. Paper from "American Electroplaters' Society, Technical Proceedings", 1960, p. 105-109.

Operation of bright Ni solutions at temperatures above 175° F. Comparison of microstructure, appearance and ductility with the properties of deposits made at normal plating temperatures. The effectiveness of various addition agents at these temperatures is compared to their utility at lower operating temperatures. 9 ref. (L17; Ni)

120-L. Magnetic Properties of Electrodeposited Cobalt Nickel Alloys. Victor Zentner. Paper from "American Electroplaters' Society, Technical Proceedings", 1960, p. 166-169.

Control of plating conditions to produce permanent magnetic coatings on memory drums in digital computers. Effect of plating variables on coercive force and remanence. 5 ref. (L17; Co-b, Ni)

121-L. Plating of Nickel, Cobalt, Iron and Cadmium From Sulphamate Solutions. Richard C. Barrett. Paper from "American Electroplaters' Society, Technical Proceedings", 1960, p. 170-175.

Typical plating baths; effect of addition agents; properties of deposits. 37 ref. (L17; Ni, Co, Fe, Cd)

122-L. The Chemical Reduction of Nickel-Phosphorus Alloys From Pyrophosphate Solutions. Morton Schwartz. Paper from "American Electroplaters' Society, Technical Proceedings", 1960, p. 176-183.

The use of pyrophosphates as complexing agents permits substantial reduction of operating temperatures and increases the deposition rates. The alkaline pyrophosphate-electroless Ni solutions are quite stable and are easily maintained and controlled. Good rates of deposition are obtained. 19 ref. (L29; Ni-b, P)

123-L. Solution Transfer in Barrel Plating. Paul Glab, R. Scott Modjeska and S. P. Gary. Paper from "American Electroplaters' Society, Technical Proceedings", 1960, p. 184-187.

Solution transfer is adequate irrespective of the principal variables in barrel operation. Plating potential decrease in the load from the outside to the center is so sharp that the plating current density must be calculated on the basis of area of periphery rather than the average over the whole load. 8 ref. (L17)

124-L. Cleaning in the Electronics Industry. D. E. Koontz, D. O. Feder and C. O. Thomas. Paper from "American Electroplaters' Society, Technical Proceedings", 1960, p. 188-198.

Practical techniques for the detection, removal and control of contaminants. Application of brushing, grit or vapor blasting, ultrasonic cleaning techniques and chemical removal. 4 ref. (L10f, L12, T1)

125-L. Chromium Plating of Rifle Barrels. Robert J. Girard and Edward F. Koetsch. Paper from "American Electroplaters' Society, Technical Proceedings", 1960, p. 199-206.

Development and adaptation of a process to electropolish and Cr plate the entire bore and chamber of the M14 Springfield rifle. (L13p, L17, T2m; Cr)

126-L. Corrosion Protection With Decorative Chromium. Edgar J. Seyb. Paper from "American Electroplaters' Society, Technical Proceedings", 1960, p. 209-214.

Of the new systems, bright crack-free Cr is not dependent on the sacrificial corrosion of Ni under the Cr; while duplex Cr, like duplex Ni and the older buffed Watts' Ni does depend on sacrificial Ni corrosion. Accelerated tests indicate that greatly improved corrosion resistance is obtained with heavier Cr deposits. 8 ref. (L17, R11; Cr, Ni, 8-62)

127-L. (German.) How to Dye Brass. Thomas Curti-Jung. Metall-Reinigung+ Vorbehandlung, v. 9, Nov. 1960, p. 191-192.

Dyeing of brass by chemical treatment and heating. Processes parameters and composition of dyeing solutions. (L14, L19; Cu-n)

128-L. (German.) Application of a New Bright-Nickel Bath Process. Hans H. Reinsch. Metall-Reinigung + Vorbehandlung, v. 9, Nov. 1960, p. 193-194.

Tests on Steel and Zn die castings coated with bright Ni by the duplex process for comparison of corrosion resistance and adhesion properties with those of conventional Ni coatings. (L17, R11; ST, Zn, Ni)

129-L. Etching Steel for Adherence of Porcelain Enamel. F. W. Beal, R. L. Myers and J. J. Canfield. American Ceramic Society Bulletin, v. 39, Dec. 1960, p. 727-731.

Use of etching, pickling and Ni flashing to improve strength during one-coat porcelain enameling of nonfishscaling, non-boiling steels. (L13q, L12g, L17, L27; ST)

130-L. Chromallize for Heat and Wear Resistance. Metalworking Production, v. 104, Dec. 21, 1960, p. 64-65.

Process for surface alloying by diffusing Cr and/or other elements into a base metal. Coatings will not peel or flake, because they are integral with the base metal and are free from porosity and uniform in depth. (L15; Cr)

131-L. Painting Setup for Diversified Metal Products. Industrial Finishing, v. 37, Dec. 1960, p. 8-9, 12.

Various steel, cast iron and Al components get electrostatic spray painting plus "touch-up" manual hot spray painting, cleaning, draying and baking on conveyorized production line with electrical convection oven. (L26n; Al, CI, ST)

132-L. Painting Components for Steel Buildings. Industrial Finishing, v. 37, Dec. 1960, p. 20-24, 26, 28.

Galvanized sheet steel is unwound from rolls, formed, cut to length, bond coated and automatically painted. Coatings are baked to increase corrosion resistance. (L26n; ST, 4-53, 4-57, 8-65)

133-L. Result of "Doctoring" a Baked Coating. Industrial Finishing, v. 37, Dec. 1960, p. 94-96.

Use of artificial airing agents to obtain complete curing in a short baking cycle results in cracking when a full baking cure is developed at the correct time and temperature. Problem is illustrated by a coating on prefabricated sheet metal which cured satisfactorily at 350° F. but cracked at all formed edges at 375° F. (L26; 4-53)

134-L. (Translation-ConBur.) Phosphatation of Steels in the Presence of Nitrates of Monovalent Metals. I. I. Khain. Journal of Applied Chemistry of the USSR, v. 32, Nov. 1959, p. 2531-2535.

Suitability of Na, K and NH_4 nitrates as phosphatation accelerating agents is investigated. NH_4NO_3 accelerates the phosphate layer formation, increases the phosphatizing solution acidity and decreases the thickness and protective capacity of the phosphate layer. $NaNO_3$ and KNO_3 have no effect. 9 ref. (L14b, 2-66; ST)

135-L. (Translation-ConBur.) Process of Phosphatation of Steel in the Presence of Nitrates of Bivalent Metals. I. I. Khain.

Journal of Applied Chemistry of the USSR, v, 32, Nov. 1959, p. 2542-2547.

Suitability of nitrates of Mn, Zn, Cd, Ca, Sr and Ba as phosphatation accelerating agents is investigated. Rate of phosphate layer formation increases in the presence of $MnNO_3$, $ZnNO_3$ and $CdNO_3$ but decreases in the presence of $CaNO_3$, $SrNO_3$ and $BaNO_3$. With the exception of $ZnNO_3$ all the salts had a deleterious effect on the protective capacity of the phosphate layer. A decorative phosphate layer is obtained in the presence of $CaNO_3$, $SrNO_3$ and $BaNO_3$. 10 ref. (L14b, 2-66; ST)

136-L. (Book.) Mechanical Polishing. Walter Burkart, H. Silman and C. R. Draper. 255 p. 1960. Robert Draper Ltd., Teddington, England. $9.

Detailed account of manual and automatic polishing and buffing, barrel finishing and abrasive blasting of ferrous and nonferrous metals as currently practised in England, America and Germany. Particular attention is paid to the more recent developments such as automatic polishing machines, liquid polishing compositions, wet blasting processes and barrel de-burring and finishing. (L10)

137-L. (Book.) American Electroplaters' Society, Technical Proceedings, 1960. 260 p. 443-445 Broad St., Newark 2, N. J.

Papers and discussions presented at the 47th annual convention, Los Angeles, July 24-28, 1960. Papers abstracted separately. (L-general, L17)

138-L. How Planning Built a Modern, Efficient Barrel Finishing Department. M. M. Patterson. Grinding and Finishing, v. 6, Dec. 1960, p. 26-29.

Grinding, bright homing and coloring of stainless steel, Al and brass parts in barrel finishing machines. Different finishes are achieved by varying the running time, turning speed, size of the work load and type and size of the abrasive used. (L10d; Al, Cu-n, SS)

139-L. The Practical Aspects of Enameling Aluminum. A. H. Symonds. Institute of Vitreous Enamellers Bulletin, v. 11, Dec. 1960, p. 33-38.

Vitreous enamelling of Al to provide corrosion and spalling resistance and durability. Methods of pretreatment, cleaning, spraying and firing, with emphasis on the effect of mill additions on the resistance of the finish. (L27; Al)

140-L. Chemical Conversion Coatings. F. C. Porter. Industrial Finishing, v. 12, Dec. 1960, p. 23-24, 27-28, 30-31.

Characteristics and applications of coating processes suitable for Al including chromate-oxide, chromate-fluoride, chromate-phosphate, zinc-phosphate and Bohmite (deionized water) types. 9 ref. (L14; Al)

141-L. The Controversy About Duplex Nickel. Industrial Finishing, v. 12, Dec. 1960, p. 33-34, 36, 37.

Development of tests comparing the corrosion resistance of Cr, dull Ni and bright Ni platings. Throwing power of plating solutions containing organic compounds. Plating applications in the automobile industry. (L17, R-general; Cr, Ni)

142-L. Vitreous Enamel in Building Design. Industrial Finishing, v. 12, Dec. 1960, p. 40-43.

Fabrication of vitreous enamelled Al panels and their structural application in the building design. (L27, T26n; Al, 4-57)

143-L. How to Stop Molybdenum From Oxidizing. Metalworking Production, v. 104, Nov. 9, 1960, p. 83-84.

Effect of temperature on the oxidation of Mo. Heat resistance and physical and mechanical characteristics of various metal and ceramic coatings. Methods of cladding, electroplating, flame spraying and diffusion coating. (L-general, R1h, 2-61; Mo)

144-L. Bonded Coatings Lubricate Metal Parts. Alfred Disapio. Metalworking Production, v. 104, Nov. 9, 1960, p. 87-92.

Addition of a solid lubricant such as graphite or MoS_2 to a resinous or inorganic binder gives a slippery coating that can be cured in place. These bonded solid film lubricants may be applied to stainless steel and Al, Cu, Mg and Ti alloys for operation under high loads, low speeds and extreme surface temperatures. (L-general, 18-73; Al-b, Cu-b, Mg-b, SS, Ti-b)

145-L. Fast Spin in Cob-Metal Mixture Removes Machining Marks. Iron Age, v. 187, Jan. 12, 1961, p. 60-61.

Directional finishing lines are removed from ball-joint suspensions consisting of a plastic socket mating

with a ball stud made of steel by a spin finishing process in which each processing unit spins parts through a dry, granular compound. (L10h; ST)

146-L. Dry Polishing Increases Metal Removal. William L. Hermann. Production, v. 47, Jan. 1961, p. 86-87, 89.

Flat polishing of 12-gage, 1008 steel bumper blanks using easily replaceable paper belts and wet-type dust collectors to obtain higher metal removal rates at faster polishing speeds. (L10, T21a; ST)

147-L. (French.) Corrosion Proofing of Metal Shapes With Zinc at the Hautmont Plant of Societe Usinor. Manutention, Aug-Sept. 1960, p. 89-94.

Design and operation of continuous automatic installation which shot blasts and metallizes hot rolled sections of different shapes for steel windows. Average thickness of anti-corrosion Zn coating is 20 microns, but 40 microns are applied in certain cases. (L15, L10c, W2; ST, Zn)

148-L. Stran-Steel's Color-Coating Process. Gerard H. Poll, Jr. Products Finishing, v. 25, Dec. 1960, p. 30-47.

Galvanized steel coils are converted into colored ribbed panels for siding and roofing on pre-engineered steel buildings. Procedure includes roll forming, spray priming, baking and vinyl coating. (L26n, G11; ST, 8-65)

149-L. Control of Chromium Plating Baths. Joseph P. Branciardi. Products Finishing, v. 25, Dec. 1960, p. 50-56.

Simplified analytical control methods for Cr plating baths. Procedure for determination of chromic acid, sulphate and fluoride contents in Cr baths. Elimination of plating difficulties. 3 ref. (L17a; Cr)

150-L. Douglas Aircraft Installs Large Hard-Coat Anodizing System. Products Finishing, v. 25, Dec. 1960, p. 58-60.

Hydraulic cylinders for missiles are anodized by a process which creates a relatively thick network of interlocked Al oxide crystals on the surface of Al. The resistance of the Al increases as the thickness of the Al oxide coating increases. (L19, T21b; Al)

151-L. Cleaning and Finishing a Variety of Metal Products. P. J. Hickey. Industrial Finishing, v. 37, Jan. 1961, p. 30-34.

Cold surface cleaning, phosphatizing and electrostatic painting of solid brass, plated or cold rolled steel plated parts using a spinning electrostatic disk to apply final coatings. All coatings are baked at 300° F. (L14b, L26n; Cu-n ST, 8-62)

152-L. Economical Way to a Quality Finish. C. Raymond Syer. Industrial Finishing, v. 37, Jan. 1961, p. 39-40, 42, 44, 46, 48, 50.

Review of methods of surface preparation, mixing and reducing finishing materials, spray painting and testing of finishes. Characteristics of solvents and binders. Cost analysis. (L26n)

153-L. Modern Metal Cleaning: Surface Treatment. Industrial Finishing, v. 37, Jan. 1961, p. 54-55.

Conveyorized washing and phosphatizing of steel components, using a multi-stage power washer and phosphatizing machine operating with pre-established temperatures and conveyor speed. (L14b; ST)

154-L. Touch-Up Smoothing at Wrong Time. Industrial Finishing, v. 37, Jan. 1961, p. 56, 58.

Rubbing Al sheet with steel wool just before spray painting is shown to cause pitting or blistering of the paint film. The phosphate coating is disturbed and particles of steel are embedded on the soft surface of the Al alloy. (L10, L26n; Al, 4-53)

155-L. Finishing Landis Grinding Machines. P. C. Bardin. Industrial Finishing, v. 37, Jan. 1961, p. 98-100, 102.

Shot blast cleaning, solvent cleaning, prime coating, sanding, sealing and enameling of high precision grinders from 1760-183,000 lb. (L10c, L12h, L26n, W25s)

156-L. Cleaning-Phosphatizing; Keep It Going 100%. Industrial Finishing, v. 37, Jan. 1961, p. 111-112.

Use of metering devices to maintain constant strength in the phosphate solution and of sludge tanks and centrifuges to control sludge content during phosphatizing operations. (L14b)

157-L. Controlled Vibration--Key to Parts-Finishing Efficiency. T. W. Black. Tool and Manufacturing Engineer, v. 46, Jan. 1961, p. 77-79.

Deburring and other machining operations are performed on stainless steel and brass components by vibratory barrel finishing, a process in which parts are loaded into a tub filled with abrasives and vibrated during the finishing cycle. (L10d; Cu-n, SS)

158-L. Properties of Plasma-Sprayed Materials. M. A. Levinstein, A. Eisenlohr and B. E. Kramer. Welding Journal, v. 40, Jan. 1961, p. 8s-13s.

Testing of arc-plasma deposited samples of W, Mo, HfC, TaC, CeO ore and ZrO_2 to determine density, Vickers hardness, thermal expansion and microstructure. Tensile properties of sprayed Mo and W at 3000-4500° F. 5 ref. (L23, P10a, Q29n, M27, P11g; Ce, Hf, Mo, Ta, W, Zr, 14-68)

159-L. Hard Surfacing of Blast Furnace Bells and Hoppers. Frank J. Gaydos and Nello Fragasse. Welding Journal, v. 40, Jan. 1961, p. 18-24.

Martensitic, austenitic and 1030 steels and Ni base alloys are used in forming wear-resistant surfaces on blast furnace charging facilities. (L24, W17g, W12b; SS, Ni-b)

160-L. Decorative Plating Abroad. A. C. Benning. Metal Progress, v. 79, Jan. 1961, p. 113-116.

Although some electroplaters still rely on buffed Cu-Ni-Cr systems for decorative parts, many have adopted plating practices such as duplex Ni and crack-free Cr which were developed in this country. (L17, T21; Cr, Ni)

161-L. Blisters in Vitreous Enamels. P. Chu Gordon, E. R. Evans and A. D. Morgan. Metal Progress, v. 79, Jan. 1961, p. 199-200. (Digested from Institute of Vitreous Enamellers Bulletin, Silver Jubilee Conference Edition, p. 1-19, 30, 1960.)

"Fish-scaling" in enameling of five typical steels. Ti-bearing and Si steels are not susceptible to fish-scaling. Effect of hydrogen and of furnace gases. Blistering of cast iron. (L27; ST, CI, 9-71)

162-L. Notes on Improved Ni-Cr Processes. H. J. Bache. Electroplating and Metal Finishing, v. 13, Dec. 1960, p. 451-455, 472.

Evaluation of four electroplating systems including bright Ni, dual Ni, dual Cr and sandwich processes for deposition of corrosion resistant platings on automobile accessories as determined in Cass and Corrodkote accelerated corrosion tests. (L17, R11, T21a; Cr, Ni)

163-L. How to Cut Cost by a Faultless Plating Technique. Horst Schulz and Hans-Wilhelm Leber. Electroplating and Metal Finishing, v. 13, Dec. 1960, p. 456-457.

Prevention of waste in electroplating by keeping the plating solutions in balance, using the ampere hour meter system to indicate all material changes within the electrolyte composition. (L17a)

164-L. Zinc and Cadmium Plating. Electroplating and Metal Finishing, v. 13, Dec. 1960, p. 458-459, 471.

British standard specifications for electroplated coatings of Cd and Zn on Fe and steel. Methods of testing adhesion, local thickness and average thickness of platings. (L17, Q10c, S14; Fe, ST, Cd, Zn)

165-L. Russian Hard Facing Process. Commonwealth Engineer, v. 48, Oct. 5, 1960, p. 48.

Machine components are hard faced using a cellular low-carbon steel electrode containing the hard facing alloy (10% C, 16% Mn, 1.5% Si, 18% Cr) in powder form. (L24, T7)

166-L. Vibratory Finishing Speeds Work on Metals and Plastics. F. D. Hodges. Iron Age, v. 187, Jan. 26, 1961, p. 72-73.

Deburring Al castings, carbon steel, wrought Cu and glass filled melamine parts by a vibratory process in which a vibratory action of a simple container loaded with abrasive media causes a rotary motion that finishes the workpieces. (L10; Al, CN, Cu, NM-d)

167-L. Technical Developments of 1960. Nathaniel Hall. Metal Finishing, v. 59, Jan. 1961, p. 36B-36K, 93.

Review of cleaning, pickling, mechanical, chemical and electrolytic polishing, barrel finishing, anodizing, surface treatment, coating and plating methods for Mg, Al, Zr, Cu, Ti, Au,

Ag, Zn, Sn, brass, bronze and stainless steel. 386 ref. (L-general)

168-L. Organic Finishing Developments of 1960. Daniel A. Marino. Metal Finishing, v. 59, Jan. 1961, p. 36L-36P, 93.

Review of application and testing methods for vinyl and epoxy resins, urethane, fire retardant paints and porcelain enamel finishes on Al and Mg. 123 ref. (L26; Al, Mg)

169-L. Developments in Fluid Bed Coatings. Peter W. Sherwood. Metal Finishing, v. 59, Jan. 1961, p. 42-44.

Complex shapes, glass and steel are coated with plastic resins by a fluid bed process in which a fine plastic powder is blown with nitrogen or air to form a uniform solids-in-gas suspension inside the coating vessel and the object to be coated is submerged therein. (L26p, ST)

170-L. Rhodium Plating Costs. J. Newton Perham. Metal Finishing, v. 59, Jan. 1961, p. 48.

Current density, plating time, cost and weight of Rh platings is calculated for electroplating of an item honing a 100 sq. in. surface area. (L17; Rh)

171-L. Ball Burnishing. Automatic Machining, v. 22, Jan. 1961, p. 39.

Change from steel to carbide balls for burnishing and sizing holes in Al alloy impact forgings results in closer tolerances and greater production. (L10; Al-b, 4-51)

172-L. Barrel Finishing. Automatic Machining, v. 22, Jan. 1961, p. 45-47.

Use of barrel finishing for descaling, deburring, rust removal, generation of radii, surface finish refinement and stress relief operations. (L10d, G23)

173-L. Advances in Materials and Processes Discussed at 22nd PEI Forum. Metal Products Manufacturing, v. 18, Jan. 1961, p. 39-41, 92.

Review of one-coat enameling techniques for decarburized and stainless steels with emphasis on pickling rate as related to weight loss and adherence. Low temperature enameling. (L26, L27, 1-67, L12g; CN-g, SS)

174-L. Evolution of an Infra-Red Porcelain Enameling Furnace. Metal Products Manufacturing, v. 18, Jan. 1961, p. 55-56, 92.

Al sheet, extrusions and castings are porcelain enameled using an Au-lined furnace with an infra-red oven using quartz lamps for firing. (L27; Al, 4-53, 4-58, 5)

175-L. (Spanish.) Use of Molybdenum Bisulphide in Gears and Mechanisms. Francois Gourmel. Metalurgia y Electricidad, v. 24, Dec. 1960, p. 86-88.

Surface treatment of gears by spraying with MoS_2 followed by mechanical polishing or buffing with a paste which also contains MoS_2. The mechanical treatment produces heat which causes the sulphide layer to adhere, thereby increasing wear resistance. (L23, L10, Q9n, T7a)

176-L. (Spanish.) Electrolytic Polishing. Pt. 1. R. Mondon. Metalurgia y Electricidad, v. 24, Dec. 1960, p. 89-96.

Mechanisms of electrolytic polishing. Measurement of friction, wear and corrosion resistance on polished surfaces of steel parts. (L13p, Q9, R-general; ST)

177-L. Electrodeposition of Nickel-Copper Alloys From the Pyrophosphate Bath. S. K. Panikkar and T. L. Rama Char. Journal of Scientific & Industrial Research, v. 19A, Oct. 1960, p. 510-517.

Effect of different variables on alloy composition, cathode efficiency and cathode potential with optimum conditions given for obtaining alloy deposits of 18-55% Ni. X-ray studies indicate that the alloy plates have the same structure as Ni and Cu deposited from the bath. (L17; Ni-b, Cu)

178-L. High Quality Chrome. Metal Industry, v. 97, Dec. 23, 1960, p. 515-518.

Equipment and layout of a plating plant at Jaguar Cars, Ltd., Coventry, England, for producing heavy Cu deposits on steel components and on other materials, Ni and Cr layers much thicker than are customarily met in the automobile industry. (L17, T21c; Cr)

179-L. Production of White-Metal-Lined Camshaft Bearings. Machinery, v. 97, Dec. 21, 1960, p. 1421-1423.

Linings of Pb, Sb and Sn bearing metal are bonded to lengths of steel tubing by a centrifugal casting process. The white metalled tubes are then

rough machined, punched, ground and bored. (L-general, E14; ST, Pb, Sb, Sn, 4-60)

180-L. (Russian.) Hydro-Cleaning and Hydro-Sand Blasting of Castings. L. P. Solovyov. Liteinoe Proizvodstvo, Oct. 1960, p. 22-23.

Efficiency in cleaning as affected by increased water pressure (100-150 atm.), sand additions to the stream of water and the consistency of the core mixture. 13 ref. (L10c; 5)

181-L. Comparative Investigations Into the Chemical and Mechanical Descaling of Rolled Wire, Taking Into Account the Machineability During Subsequent Cold Forming Processes. D. M. Buch. Wire, Dec. 1960, p. 225-232.

Descaling of wire by bending and pickling. Effect of the descaling method on the machinability, taking into account the drawing properties, conditions during galvanizing and cold deformation during bending. (L10, L12, G17k; 4-60)

182-L. Choosing Between Zinc and Cadmium Electroplate for Corrosion Protection of Major Appliance Components. Stanley J. Beyer. Plating, v. 47, Dec. 1960, p. 1361-1363.

Steel appliance components are Zn and Cd plated to protect parts from atmosphere and high humidity. Subsequent chromate coatings provide additional protection. Cd and Zn coatings are compared as to ductility, solderability and susceptibility to embrittlement. (L17, Q23p, Q26s; ST, Cd, Zn, Cr)

183-L. Decorating Anodized Aluminum. Ralph A. Botosan. Plating, v. 47, Dec. 1960, p. 1364-1367.

Al is sulphuric acid anodized, dyed and sealed to produce an abrasion resistant, weather resistant, decorative material. (L19n; Al)

184-L. Photographic Reproduction on Anodized Aluminum. K. S. Indira, A. Jogarao and B. A. Shenoi. Plating, v. 47, Dec. 1960, p. 1368-1371.

An absorbent layer of Al oxide produced by anodic oxidation of Al can be used as a carrier for photo sensitive substances to produce reproductions of all kinds. Detailed description of surface preparation, electrochemical cleaning and film formation methods. (L19; Al)

185-L. Close Control Gives Reproducible Values in Plating Gold Selectively. Otto F. Dingeldein. Plating, v. 47, Dec. 1960, p. 1372-1375.

Production of selectively plated deposits to required specifications after correlation of data on electrolyte agitation, electrolyte temperature, solution composition, electrode geometry and current density. Statistical methods are used to maintain results within narrow limits. (L17; Au)

186-L. Save $30,000 a Year Deburring Die Castings. Precision Metal Molding, v. 19, Jan. 1961, p. 51-52.

Substitution of batch blasting operation in place of individual handling. The matte surface obtained with the blast process provides improved paint adhesion. (L10; 5-61)

187-L. Vibratory Finishing. Precision Metal Molding, v. 19, Jan. 1961, p. 54-55.

Gentle and total agitation between the parts and media takes place in a vibratory hopper which is loaded with parts, media, compound and water as in conventional barrel finishing. The hopper however does not rotate. Among the advantages of this process is an increase in fatigue life of parts due to the absence of stress concentrations caused by the violent agitation of the media in barrel finishing. (L10c)

188-L. Clad Steel: Strength Plus Economy. William J. Powers. Chicago Purchasor, v. 39, Jan. 1961, p. 47-52.

Bonding of plain carbon steel or low alloy steel sheets to high alloy and heat resisting material by pack rolling to produce corrosion resistant, high strength laminates. Specifications for fabrication and flame cutting. (L22, F23, F22g, Q-general; SS, SGA-h, AY, CN)

189-L. Immersion Finish for Trophies. American Jewelry Manufacturer, Jan. 1961, p. 12-13.

Small figures cast in 95-5 Zn-Al or 15% Sb-Pb alloy electroplated with Cu and Ni are surfaced with 24-k. Au by immersion plating. Au deposition occurs through ionic displacement in a

self-stopping process which requires only pH and temperature control with no need for electric current. (L16; Pb-b, Zn-b, Au)

190-L. The Electrodeposition of Precious Metals. P. G. L. Vivian. Product Finishing, v. 14, Jan. 1961, p. 62-67.

Degreasing, washing, pickling, plating and final treatment of Au, Rh and Pd coatings. Data for thickness, adhesion, hardness, porosity and purity of the deposits. (L17, L-general; Au, Pd, Rh)

191-L. Fluid Bed Coating. Product Finishing, v. 14, Jan. 1961, p. 88-91.

Outline of fluidized bed coating, a process in which a fine plastic powder is blown with nitrogen or air to form a solids-in-gas suspension inside the coating vessel. The object to be coated is submerged into this fluid bed under conditions which cause the plastic powder to adhere to its surface. (L26p)

192-L. From Cotton to Convertors. G. D. Broadfoot. Product Finishing, v. 14, Jan. 1961, p. 97-100.

Forming, degreasing, washing and electrostatic enamel spraying of Zn plated sheet steel for heater components. (L26n; ST, 4-53, 8)

193-L. I. M. F. One Day Symposium on Nickel/Chrome Plating. Product Finishing, v. 14, Jan. 1961, p. 101-102.

Review of papers on meeting specifications in Ni-Cr plating, developments in decorative Cr plating, Ni-Cr plating of steel, Cu alloys and Zn die castings and mechanisms of brightening and levelling. (L17; Cr, Ni)

194-L. Electrolytic Polish for Lead Telluride. P. H. Schmidt. Electrochemical Society, Journal, v. 108, Jan. 1961, p. 104-105.

Lead telluride is successfully electropolished in a solution of 100 ml. 85% phosphoric acid containing 10 g. chromic acid at 90-105° C. at a current density of about 3 amp/cm^2. 7 ref. (L13p; Pb, 14-68)

195-L. (German.) Chemical Problems in Electroplating. H. W. Dettner. Angewandte Chemie, v. 72, Oct. 7, 1960, p. 740-744.

Reaction mechanism of and techniques for bright electroplating of Ni, Cu, Zn, Cd, Cr, Ag and Au with emphasis on Ni. Theories to explain levelling effect of electrolytes on metal surfaces. Replacement of cyanide electrolytes by nonpoisonous complex formers. Electroplating of base metals such as Al, Ti and others. (L17)

196-L. Metallizing Gives Worn Parts New Life. Power Transmission Design, v. 2, Dec. 1960, p. 31-33.

Rebuilding worn components including gears, bearing surfaces, drive shafts and other bus and subway components by spraying with steel, Al, Pb, Zn and other common metals and alloys which have been vaporized by an oxy-acetylene flame. (L23, T21d; Al, Pb, ST, Zn)

197-L. Rhodium Plating to Specification. R. R. Benham. Platinum Metals Review, v. 5, Jan. 1961, p. 13-18.

Specifications and recommended procedures for the Rh plating of Ag, Cu, steel and Al components for electrical and electronic applications. Recommendations for Rh thickness and electrolyte composition. (L17; Ag, Al, Cu, ST, Rh)

198-L. (French.) The Treatment of Zamak. H. Richter. Galvano, v. 29, Oct. 1960, p. 577-586.

Electrolytic degreasing, alkaline Cu coating, nickeling and chroming of a Zn die-casting alloy. Effect of bath composition and plating variables on plating thickness and quality. (L17, L13; Zn-b, Cu, Cr, Ni)

199-L. Preparation of Tags for Soldering. Tin and Its Uses, no. 50, 1960, p. 10-12.

The electrodeposition of Sn on Cu, brass or steel tags using an acid stannous sulphate electrolyte at 20° C. Tags are then immersed in hot oil in paraffin. Advantages of precise control of Sn coating thickness and good solderability are attributed to the process. (L17; Cu-n, ST, Sn)

200-L. (French.) Enamelled Copper Conductors for Electrical Construction. Cuivre-Laitons-Alliages, Sept-Oct. 1960, p. 15-19.

Types and principal constituents of insulating varnishes for enameling

electrical conductors. Comparison of dielectric, mechanical, chemical, dimensional and economic characteristics. Thermal classification. (L26, T1; Cu, 17-57)

201-L. Nickel-Silver Brazing Saves $2600. Welding Design & Fabrication, v. 34, Jan. 1961, p. 66.

Repair of worn teeth on the cast iron bull gear of a ball mill by build up with a flux-coated Ni-Ag alloy. Gear is preheated to 600° F. and brazed in alloy flux at 1480-2200° F. using an oxy-acetylene torch. Brinell hardness is increased from 110 to 200 by work hardening. (L24, 18-72, T7a)

202-L. How to Apply Ballizing. Metalworking Production, v. 105, Jan. 11, 1961, p. 59-62.

Sizing and finishing holes in metal by ballizing, a process in which an oversize precision ball is pressed through the unfinished hole to burnish and refine the surface structure. (L10d)

203-L. Vitreous Enameling of Aluminum Is Fast Growing Industry. Arthur Q. Smith. Industrial Gas, v. 39, Jan. 1961, p. 8-9.

Cleaning, enameling and firing procedures for pure Al and several Al alloys with special emphasis on furnace size and design. (L27; Al-b)

204-L. (Hungarian.) Experimental Production of Corrosion-Resistant Titanium Films by Electroplating. P. Csokan and F. Simon. Magyar Kemikusok Lapja, Oct. 1960, p. 442-445.

Electroplating of Ti in solutions of H_2O, of organic compounds such as TiF_3, $TiCl_3$ and of a salt containing K_2TiF_6, using Zn, Al, Fe or Cu as cathode and Pt or C as anode. Quality and quantity of Ti obtained as dependent on current, potential, solution composition. Solution melting point, temperature and time. (L17, R-general; Ti)

205-L. (Czech.) Concentration Changes in Chemical Conversion Coating and Electroplating Baths. Z. Krejci. Strojirenstvi, v. 10, Nov. 1960, p. 838-842.

Concentration computations based on surface area of parts, quantity of solvent adhering to surface unit, concentration of solute adhering to surface unit, starting concentration of bath and concentration changes by evaporation or adsorption on tank walls and components. Concentration as a function of treatment time. 6 ref. (L14, L17a)

206-L. (Czech.) Cladding of Steel With Plastics. Pt. 2. Frantisek Wiesner and Marcela Zezulova. Hutnicke Listy, v. 15, Dec. 1960, p. 971-978.

Cladding of wires by extrusion of half-liquid plastic material while passing the wire through a die. Cladding of heavy parts by sand blasting, application of an adhesive, heating and immersion in molten plastic. Internal cladding and bandaging of pipes. 16 ref. (L22; ST, NM-d30)

207-L. Good Metal Cleaning is Essential. Ceramic Industry, v. 75, Dec. 1960, p. 43-45, 59.

Cast iron, sheet steel and Al are cleaned of oil, grease, pigments, drawing compounds, scale, rust and other oxide films by alkaline cleaners, pickling, deoxidizing, rinsing, neutralizing and drying. New cleaning developments and properties of alkaline cleaners. (L12; Al, CI, ST)

208-L. Report of the Corrosion and Metal Finishing Exhibition, 1960. Corrosion Technology, v. 7, Dec. 1960, p. 385-386, 390.

Finished steel pliable to 180° and autogenously weldable without deterioration of its corrosion resistant qualities after it is coated by the Kenderization process. Industrial cladding by means of a fused plastic coated sheet. Reduction of friction by tin-nickel plating. (L-general, K9s, R-general; ST, Sn, Ni)

209-L. Vitreous Enameling Aluminum. Metal Industry, v. 98, Jan. 6, 1961, p. 7-9.

Production of frits which fire at 560° C. for enameling Al. Application of frit to obtain glass, matte or semimatte finishes in several colors. (L27; Al)

210-L. Molds for Plastics. Copper, no. 10, Winter 1960, p. 2-4.

Electro forming of Cu hollow or cavity molds for use in molding polyvinyl chloride (P.V.C.) and plastic articles. (L18, W19g; Cu, 17-57)

211-L. Centrifugal Force Adds Luster to Barrel Tumbled Parts. R. R. Irving. Iron Age, v. 187, Feb. 2, 1961, p. 84-85.

Centrifugal force is incorporated by a turret which rotates in a counter-clockwise direction at 270 rpm. while the individual barrels move in the opposite direction at only 80 rpm. The barrels are lined with neoprene to keep the parts from abrading. (L10d)

212-L. The Plasma-Arc Torch--Five Years of Evolution. R. M. Gage and J. F. Pelton. American Society of Mechanical Engineers, Paper no. 60-WA-311, Dec. 16, 1960, 5 p. $1.

Application of transferred and non-transferred plasma-arc torches to cutting and plating metals, plating being accomplished by introducing molten metal into the gas stream and propelling it at high velocities as a spray against a surface to form metallic coatings. (L29, 1-52)

213-L. Arc Welding for Overlaying Steel. R. B. Hitchcock. American Society of Mechanical Engineers, Paper no. 60-WA-324, Dec. 16, 1960, 8 p.

Submerged-arc and inert gas-shielded consumable electrode welding processes used to overlay carbon steel flat plates and cylinders with stainless steels and other high alloy materials. Controlled deposition techniques allow the build up of metal layers that have good finishability and resistance to corrosion and wear. (L24; CN, SS)

214-L. Finishing and Forming Aluminum Siding at Wall Master. Modern Metals, v. 16, Jan. 16, 1961, p. 82-83.

High-speed automated line chemically cleans, conversion coats and paints coiled Al stock, then slits and roll forms it to produce siding. (L12, L14, L26, G-general; Al)

215-L. (German.) Method for Extraction of Anodically Produced Tantalum Oxide Films on Tantalum in Terms of Their Capacity Change. G. Hahn. Metalloberflache, v. 14, Dec. 1960, p. 366-367.

Anodic oxidation of Ta sheets in 1% K_2SO_4 solution at 20° C. Stepwise extraction of formed oxide film in boiling 17.5-30% NaOH with capacity measurements made in 1% K_2SO_4 solution. (L19; Ta, 4-53)

216-L. (German.) Microscopic Observation During Deposition of Electrocoatings. Franz Rammele. Metalloberflache, v. 14, Dec. 1960, p. 373-379.

Polished specimens of MS 63 brass are Cd-electroplated in Cd cyanide and Cd sulphate solutions and simultaneously observed at 200 times magnification. Micrographs are taken to illustrate progress of Cd deposition. (L17, M21; Cu-n, Cd)

217-L. (German.) Investigation of Stability of High-Efficiency Brass Plating Solutions. O. Mudroch. Metalloberflache, v. 14, Dec. 1960, p. 380-384.

Current density and potential measurements are made with an anode of cast brass containing 63% Cu and 37% Zn and cathode of steel sheet during brass plating by CuCN, Zn $(CN)_2$ and NaOH containing electrolytes with varying Cu:Zn ratios and constant and varying free CN content. Stabilizing effect of NaCN. (L17a; Cu-n)

218-L. (German.) Electrical Insulating by Phosphate Coatings. Hans H. Reinsch. Metall-Reinigung+Vorbehandlung, v. 9, Dec. 1960, p. 214-218.

Process and machinery for insulating of transformer, generator and core sheets for electrical machines by dip phosphate coating. Testing of maximum insulating voltage for Zn phosphate coatings and alkaline earth metal phosphate coatings containing silicates. (L14b; SGA-n, ST)

219-L. Electroforming as a Quantity Production Method. T. P. Barbicane. Mass Production, v. 36, Nov. 1960, p. 67-70.

Advantages of electroforming for production of wave guides, precision bore tubing and other components requiring fine detail on interior surfaces. Use of permanent and extendable patterns. (L18)

220-L. Finishing Tips for Magnesium Missile Parts. E. I. Weed. Western Metalworking, v. 19, Jan. 1961, p. 23-25.

Corrosion protection finishing of AZ-91 Mg alloy structural parts by dichromate treatment, vinyl wash priming, coating with epoxy phenolic varnish and enamel and, in some cases, anodizing. (L26, L19, T24e; Mg-b, 4-57)

221-L. New Process Shows How Clean a Metal Can be. Western Metalworking, v. 19, Jan. 1961, p. 34.

Use of a new chemical cleaning process for Al alloys to produce greater uniformity of surface resistance and color, higher luster and negligible metal loss. (L12; Al-b)

222-L. Some Metallurgical Aspects of Hot-Dipped Tinplate. J. Le Bas. Australian Institute of Metals, Journal, v. 5, Nov. 1960, p. 246-253.

Application of the coatings; coating characteristics; testing techniques; typical defects. 5 ref. (L16; ST, Sn)

223-L. Prings Develop New "Plating Quality" Wire Plant. Wire Industry, v. 28, Jan. 1961, p. 51-52.

Heat treatment and pickling of steel wire and rod followed by coating with Cu on a versatile through system to produce a quality plating finish which may be hard, interannealed, wet-drawn or coppered with a medium or light weight coat. (L17, J-general, L12g; ST, 4-61)

224-L. How Zinc Fights Corrosion. Ernest W. Horvick. I/EC (Industrial and Engineering Chemistry), v. 53, Feb. 1961, p. 58A-60A.

Hot dip galvanizing, electrogalvanizing, metallizing and painting of steel structural members, tanks, roofing, wire and wire mesh to increase corrosion resistance and reduce maintenance in chemical industry applications. (L16, L23, L26; ST, Zn, 4-57)

225-L. Precision Finishing Parts by Vibration. G. D. DeVere Weston. Metalworking Production, v. 105, Jan. 18, 1961, p. 67-68.

Steel parts are finished in a rubber-lined trough filled with a mash of chips chemicals and water which vibrates at a variable high speed. (L10h; ST)

226-L. Oxidation Prevention During Forming. Metal Industry, v. 98, Jan. 20, 1961, p. 50.

Method of precoating metals used in aircraft production by spraying with Al or Cu to prevent oxidation and material loss during thermal treatment such as hot forming, stress relieving, heat treating or annealing. (L23, T24; Al, Cu)

227-L. Thirty-Five Years of Outplating Experience. Metal Finishing, v. 7, Jan. 1961, p. 5-10, 18.

Description of cleaning, barrel plating, burnishing, barreling polishing, drying and lacquering processes followed in a plating works. Design and layout of conveyor system, barrel shop, spin lacquering machines and disposal system. (L17, L10d, L26n)

228-L. Technical Developments and Advances in Nickel-Chromium Plating. W. G. L. Miller and D. Bouckley. Metal Finishing, v. 7, Jan. 1961, p. 11-18.

Review of specifications for Ni-Cr plating in the automobile industry with emphasis on test methods, causes of brittleness, blistering and contamination. (L17; Cr, Ni)

229-L. Metal Finishing Technology--A Student's Guide. Pt. 6. Metal Finishing, v. 7, Jan. 1961, p. 19-23, 31.

Electrochemistry of dissimilar metals such as Zn and Cu in contact with one another through an electrolytic solution. Application of theory to plating solutions. Effect of brighteners and other organic material. Internal stresses in deposits. (L17)

230-L. Institute of Vitreous Enamellers. Metal Finishing, v. 7, Jan. 1961, p. 26-31.

Review of papers on the influence of water vapor on adherence reactions between enamel ground coat and sheet iron; evaluation of Al enamels; spalling, durability and chemical resistance of Al enamels. (L27; Al, Fe)

231-L. (Japanese.) Hot Dip Aluminum Plating and Aluminizing. Masao Tagaya and Shigeteru Isa. Metal Finishing Society of Japan, Journal, v. 11, Oct. 1960, p. 506-511.

Steel strip is degreased, washed, pickled, pretreated either in an inert gas atmosphere or in a salt bath, aluminized and cooled. Data are given for structure, mechanical properties and corrosion resistance. (L16, L12; ST, Al, 4-53)

232-L. (Japanese.) Tin Plating. Kohzoh Yoshizaki. Metal Finishing Society of Japan, Journal, v. 11, Oct. 1960, p. 512-517.

Hot dip and electrolytic tin plating of steel strip by a sequence of operations including degreasing, pickling, annealing, plating, quenching and polishing. (L16, L17; ST, Sn, 4-53)

233-L. (Japanese.) Hot Dip Lead Plating. Boshin Ryo. Metal Finishing Society of Japan, Journal, v. 11, Oct. 1960, p. 518-521.

Steel is degreased, pickled with HCl and H_2SO_4 and immersed in a solution of $ZnCl_2$ and NH_4Cl, then dipped in a Pb melt bath covered with flux and cooled. Resulting platings are very resistant to corrosion. (L16; ST, Pb)

234-L. (Japanese.) Methods of Cementation. Shigetomo Uyeda. Metal Finishing Society of Japan, Journal, v. 11, Oct. 1960, p. 551-553.

Calorizing, sheradizing and chromizing techniques for steels. Applications. (L15; ST)

235-L. (Japanese.) Chronology of the Anodic Oxidation of Aluminum for the Last Ten Years. Takakado Nakayama. Metal Finishing Society of Japan, Journal, v. 11, Oct. 1960, p. 557-567.

Methods of chemical coating, chemical polishing, electrolytic polishing and anodic coating in H_3PO_4 bath for Al structures. (L19, L14, L12, L13p; Al, 4-57)

236-L. (Japanese.) Surface Hardening of Aluminum. Rihei Tomono. Metal Finishing Society of Japan, Journal, v. 11, Oct. 1960, p. 567-569.

Al is surface hardened by anodic oxidation in H_2SO_4 or HCH_2COOH bath at 1-4° C. and tested to determine resistance to heat, abrasion and corrosion. (L19, 1-67, R-general, Q9; Al)

237-L. (Japanese.) Anodic Oxidation of Optical Instruments. Matao Mitsui. Metal Finishing Society of Japan, Journal, v. 11, Oct. 1960, p. 571-574.

Al rod, sheet, pipe and die castings are anodic coated in H_2SO_4 bath to produce parts of the instruments. (L19; Al, 4-53, 4-60, 5-61)

238-L. (Japanese.) Trends in Anodic Oxidation of Aluminum. Toshio Fukushima. Metal Finishing Society of Japan, Journal, v. 11, Oct. 1960, p. 574-577.

Degreasing, chemical and electropolishing and anodic oxidation techniques for Al alloys. (L19, L12, L13; Al-b)

239-L. (Japanese.) Metallikon I--Theory and Protective Effects. Yoshibumi Mima. Metal Finishing Society of Japan, Journal, v. 11, Oct. 1960, p. 580-584.

Application of flame sprayed Al, Zn, Sn, Ni or Cu coatings to steel to prevent rusting. Data are given for tensile properties and wear, corrosion and heat resistance of the deposits. (L23, Q10c; ST, Al, Cu, Ni, Sn, Zn)

240-L. (Japanese.) Metallikon II--Thickening and Its Devices. Takuzoh Mitsuda. Metal Finishing Society of Japan, Journal, v. 11, Oct. 1960, p. 585-587, 589.

Flame spraying of machine components with a thick layer of carbon steel, 13 Cr high carbon steel or 18-8 stainless steel. Advantages and disadvantages of the process. (L23, T7; CN, SS)

241-L. (Japanese.) Cladding. Shigeru Asou. Metal Finishing Society of Japan, Journal, v. 11, Oct. 1960, p. 587-589.

Rolled mild steel slab is clad with hard stainless steel or high carbon toolsteel by hot or cold rolling, casting, sintering, intermelting or electric arc welding. (L22; CN, SS, TS, 4-52)

242-L. (Japanese.) Immersion Coating in Fluidized Plastics Bath. Masamitsu Nishioka. Metal Finishing Society of Japan, Journal, v. 11, Oct. 1960, p. 598-600.

Preheating temperature and time and composition of plastic as they affect adhesion of immersion plastic coatings on metals. (L16, Q10c)

243-L. (Japanese.) Vinyl Chloride Sol Coating. Masayuki Furuya and Ei-ichi Iida. Metal Finishing Society of Japan, Journal, v. 11, Oct. 1960, p. 600-603.

Metal surface is pickled, sand blasted, degreased and primed, then coated with vinyl chloride either by brushing, spraying or dipping. Applications. (L26p, L12)

244-L. (Japanese.) Recent Methods of Polishing and Honing. Naoharu Kinoshita. Metal Finishing Society of Japan, Journal, v. 11, Oct. 1960, p. 389-394.

Review of grit and sand blasting, buffing, honing and electrolytic polishing techniques for finishing metals. (L10c, L13p, L10a, G19n)

245-L. (Japanese.) Bright Plating. M. Nakamura, K. Saitoh and T. Hayashi. Metal Finishing Society of Japan, Journal, v. 11, Oct. 1960, p. 419-432.

Methods of Cu plating in a $CuSo_4$ bath, Ni plating in a $NiSO_4$ bath and Cr plating in a CrO_3 bath with added fluoride ion. Corrosion testing of Ni-Cr-Cu platings and double layered Ni-platings. (L17; Cr, Cu, Ni)

246-L. (Japanese.) Rust Preventive Platings. Boshin Ryo. Metal Finishing Society of Japan, Journal, v. 11, Oct. 1960, p. 432-438.

Review of Zn, Cd, Sn, Al and Sn alloy plating techniques for steel. Emphasis on composition of baths. Data for corrosion resistance, uniformity, conductivity and hardness of platings. (L17; ST, Al, Cd, Sn-b, Zn)

247-L. (Japanese.) Ornamental Platings. Kinzoh Sadakata. Metal Finishing Society of Japan, Journal, v. 11, Oct. 1960, p. 439-444.

Plating of jewelry with precious metals, Au, Ag, Pt and Rh to improve corrosion resistance, durability and brightness. (L17, T9s; Ag, Au, Pt, Rh)

248-L. (Japanese.) Industrial Chromium Plating. Tohoru Murakami. Metal Finishing Society of Japan, Journal, v. 11, Oct. 1960, p. 444-449.

Machine parts are Cr-plated in a CrO_3 bath containing K_2SiF_6 to improve corrosion and abrasion resistance. (L17, T7; Cr)

249-L. (Japanese.) Recent Advances in Electroforming. Takeshi Kojima. Metal Finishing Society of Japan, Journal, v. 11, Oct. 1960, p. 450-452.

Electrodeposition of Cu, Ni, Fe or Ag from salt solutions onto master patterns. Mechanical properties of deposits. Applications. (L18; Ag, Cu, Fe, Ni)

250-L. (Japanese.) Chemical Plating. Boshin Ryo. Metal Finishing Society of Japan, Journal, v. 11, Oct. 1960, p. 452-454.

Deposition of Ni, Cr or Zn from their salt solutions without use of electrolysis. History, electrochemical theory, composition of salt baths, plating procedure and regulation of baths. (L28; Cr, Ni, Zn)

251-L. (Japanese.) Plating Techniques. Yasuo Noda. Metal Finishing Society of Japan, Journal, v. 11, Oct. 1960, p. 462-466.

Base metal is polished, degreased, washed, dipped in acid or alkaline solution and plated in a filtered bath stirred by a vibrating cathode. (L17, L12)

252-L. (Japanese.) Recent Progress in Priming of Metals. Yoshitaro Nagai. Metal Finishing Society of Japan, Journal, v. 11, Oct. 1960, p. 478-480.

Bonderizing, chromating, phosphatizing and spraying are compared as methods of priming cold rolled sheet steel. Causes of rusting, blistering, mottling and orange peel defects. (L14; ST, 4-53)

253-L. (Japanese.) Painting Processes. Hisao Hachiya. Metal Finishing Society of Japan, Journal, v. 11, Oct. 1960, p. 481-486.

Degreasing, washing with demineralized water, bonderizing or priming, surfacing and electrostatic spray painting of metals. (L26n, L12, L14)

254-L. (Japanese.) Hot Dip Galvanizing. Haruo Gotoh and Kei-ichi Abe. Metal Finishing Society of Japan, Journal, v. 11, Oct. 1960, p. 501-505.

Techniques for galvanizing sheet, strip, wire, tube, tools, machine parts or rods composed of cast iron, malleable iron or steel. (L16, T7; CI, ST, 4-53, 4-60, 4-61)

255-L. Lacromatic Vibrator for Deburring and Polishing Metal Parts. Machinery (London), v. 98, Jan. 11, 1961, p. 78-79.

Gears, stampings and die castings are deburred and polished in a vibrator incorporating a U-shaped, rubber lined container which is oscillated through an elliptical path. Chips and components move relative to each other and also rotate as a complete mass. (L10d, T7a; 4-59, 5-61)

256-L. (Translation-ConBur.) The Physicochemical Processes of Enamelling Aluminum. K. P. Azarov and S. B. Grechanova. Glass and Ceramics, v. 16, Dec. 1960, p. 652-657.

Effect of temperature, coppering, oxidizing and phosphatizing treatments and oxide additions on the wettability of

phosphate enamel coatings on Al and the chemical reaction between the fusion and the metal. Swelling curves are given for phosphate enamels with 10% additions of Al powder. (L27; Al)

257-L. (Translation-ConBur.) Enamelling Steel and Cast-Iron Products in Chinese Factories. E. A. Antonova. Glass and Ceramics, v. 16, Dec. 1960, p. 686-689.

Enamelling of steel and cast iron chemical apparatus and domestic ware. Gravimetric composition analysis and property comparison of various frit and slip materials and priming and finishing enamels, with attention to acid resistance. (L27, T10, T29; ST, CI)

258-L. (Translation-ConBur.) Nickel Plating by Thermal Decomposition of Nickel Tetracarbonyl Vapor. A. M. Verblovskii and A. L. Rotinyan. Journal of Applied Chemistry of the USSR., v. 33, Jan. 1960, p. 98-104.

Preparation of steel surfaces for coating. Rate of formation of coatings as a function of temperature. Chemical composition, structure, porosity, hardness and corrosion resistance of Ni coatings on steel. 16 ref. (L25, Q29n, M27, R-general; ST, Ni)

259-L. (Translation-ConBur.) The Occlusion of Sulphur in Electroplated Metals. A. A. Sutyagina. Academy of Sciences of the USSR., Proceedings, Physical Chemistry Section, v. 131, Mar-Apr. 1960, p. 227-230.

Effect of surface-active agents containing sulphur on the structure and properties of electroplated Ni, Co, Zn and Cu. 9 ref. (L17; AD-p, Co, Cu, Ni, Zn)

260-L. (Translation-ConBur.) Study of Cathodic Films Obtained in the Electrolysis of Chromic Acid. A. N. Sysoev, N. T. Diobantseva and O. A. Platonina. Journal of Applied Chemistry of the USSR., v. 33, Feb. 1960, p. 368-373.

Composition, mechanical properties and dynamics of formation of cathodic Cr films using Cu on steel cathodes and Pt or Pb anodes. 15 ref. (L17; Cu, ST, Cr)

261-L. (Translation-ConBur.) An Attempt to Introduce the Radioactive Isotope W^{185} Into an Anodic Coating of Al_2O_3 During Its Formation. A. F. Bogoyavlenskii and G. N. Dobrotvorskii. Journal of Applied Chemistry of the USSR., v. 33, Feb. 1960, p. 338-341.

Specimens are stamped from sheet duralumin, grade D16AT, degreased and subjected to anodic passivation in Na_2CO_3 solution containing radioactive W^{185} in the form of WO_4^{-2} ions. W^{185} content of the coating is determined with a B-2 apparatus using an end-face counter. 6 ref. (L19; Al)

262-L. (Translation-ConBur.) Chrome Plating of Aluminum With Superimposition of Alternating Current on Direct Current. A. F. Bogoyavlenskii, B. E. Ivanov and V. L. Khudyakov. Journal of Applied Chemistry of the USSR., v. 33, Feb. 1960, p. 364-367.

Study of rectifying effect of the cell with a standard Cr electrolyte and an Al cathode; polarization of the Al cathode in the Cr electrolyte on superimposing the alternating current on the efficiency, microhardness of the cathodic deposit and strength of its bonding with the base metal. (L17; Al, Cr)

263-L. Cleaning, Polishing and Metal Protection. Frank H. Slade. Food Processing & Packaging, v. 29, Nov. 1960, p. 409-411.

Methods and equipment for jet cleaning, grit and soap polishing and Cr or P-Ni electroplating of machinery made of stainless, mild or alloy steel, cast iron, Al, Cu, Ti, U, Zr, glass and ceramics. (L12e, L10c, L17; Al, AY, CN, Cu, SS, Ti)

264-L. Ultrasonic Cleaning Cuts Service Cost. George Spasink. Ultrasonic News, v. 4, Winter 1960, p. 5-6.

Cast iron castings are cleaned at 140° F. by an ultrasonic generator with 16 Type B transducers, rinsed with hot water and dried by compressed air. Rust caused by cleaning is removed with oil. (L10f; CI, 5)

265-L. Physics of Ultrasonic Cleaning. L. D. Rosenberg. Ultrasonic News, v. 4, Winter 1960, p. 16-20.

Mechanisms during ultrasonic cleaning of Al, Pb, Au, ceramics, plastics and varnish are examined by high-speed photography to study acceleration, erosion, bubble penetration and bubble coalescence as affected by temperature,

solubility coefficient and cavitational noise pressure. (L10f; Al, Au, Pb)

266-L. (German.) Grinding and Polishing in Drums. Werner Ulrich and Hans Pimishofer. Fertigungstechnik und Betrieb, v. 10, Dec. 1960, p. 728-731.

Deburring, polishing and grinding of die castings and forged and stamped parts of Fe, steel, Cu, Zn or Al in steel or wooden drums, using stones or metallic bodies and chemicals as grinding media. Operation experiences; limit of applicability. (L10d; Al, Cu, Fe, ST, Zn)

267-L. Barrel Finishing Die Castings. Precision Metal Molding, v. 19, Feb. 1961, p. 43-44.

Barrel finishing Zn die castings using a new finishing compound which was developed to hold better color and improve luster and a special chip which cuts moderately without gouging or peening soft metal. (L10d; Zn, 5-61)

268-L. Jewelry Finish Plating on Zinc Die Castings. Jossel Gerber. Precision Metal Molding, v. 19, Feb. 1961, p. 45-46.

Die design and casting technique as they affect plating finishes. Casting, trimming, polishing and Cu plating methods. (L17; Zn, Cu, 5-61)

269-L. Chromate Coating Has High Corrosion Resistance. Australasian Manufacturer, v. 45, Dec. 24, 1960, p. 21.

Chromate conversion coating process for treating Al and Al alloys produces coating with high corrosion resistance, low electrical resistance and good paint bonding properties. Intensity of coating color is controlled by the immersion time and the pH of the solution. (L14c; Al-b)

270-L. Two Million Pounds of Nickel Anodes Annually. Products Finishing, v. 25, Feb. 1961, p. 58-60.

Automobile bumper parts and springs are Cr and Ni plated in an automatic operation which includes cleaning, rinsing, etching and plating. (L17, T21a; Cr, Ni)

271-L. Plating--A Vital Part of Aircraft Engine Overhaul. Ezra A. Blount. Products Finishing, v. 25, Feb. 1961, p. 42-55.

Outline of Ag, Pb-Sn, Cr, Cu and Cd plating procedures for refinishing aircraft engine components to original specifications. (L17, T24a; Ag, Cd, Cr, Cu, Pb, Sn)

272-L. An Efficient Painting System in 6000 Square Feet. Products Finishing, v. 25, Feb. 1961, p. 72, 74, 76.

Stamped steel parts are painted and finished on a conveyorized finish baking line with a phosphatizing machine, dry-off oven, prime electrostatic booth, double finish electrostatic unit and finish-baking oven. (L26n; ST, 4-59)

273-L. Improve Your Phosphate Coatings. David L. Cramer, Hal Frost, George Pimbley, Archie K. Beard and Robert Jackson. Products Finishing, v. 25, Feb. 1961, p. 78-86, 90, 92, 94.

Metallurgical conditions, bath temperature and composition, sludge contamination and rinsing as they affect the quality of phosphate coatings on Fe, Al, Mn and Zn. Specifications for coating weight. (L14b; Al, Fe, Mn, Zn)

274-L. Weight-Buffing: A Precision Operation. Grinding and Finishing, v. 7, Feb. 1961, p. 34-35.

Buffing and polishing of nonmagnetic stainless steel alloy weights using an automatic machine with 24 spindles on which weights are placed. Rotation of spindles carries weights to the buffing wheels. (L10a; SS)

275-L. The Phosphate-Coating and Lubricating of Steel for Cold Extrusion. D. James. Machinery (London), v. 98, Jan. 18, 1961, p. 137-139.

Discussion of simple immersion, tipping basket, transfer type and rotary barrel methods of phosphate coating and lubricating for mild and Ni, Cr, Mo alloy steels. (L14b, G5, 18-73; AY, CN)

276-L. (Czech.) Dip Aluminum Plating of Cast Iron. Karel Janecky. Slevarenstvi, v. 8, Dec. 1960, p. 446.

Iron castings are sand or shot blasted and dipped in an Al bath at 700-900° C. Effect of bath temperature, dipping time and the ratio of bath volume/cast iron volume on the uniformity and thickness of platings, thickness of diffusion layer and corrosion resistance. (L16; CI, Al, 5)

277-L. Pickling and Descaling of High-Strength, High-Temperature Metals and Alloys. J. A. Gurklis and L. D. McGraw. Defense Metals Information Center, Battelle Memorial Institute, DMIC Memo. 85, Feb. 8, 1961, 16 p. (Available as PB 161235 from U. S. Office of Technical Services, Washington 25, D. C.)

Cleaning of Be, Ti, Mo, Cb, Ta, W, V and highly alloyed metals such as stainless steel and Ni, Co and Fe base alloys using H_2SO_4, HCl, HF and HNO_3 in pickling and sodium hydroxide in descaling. Temperature, agitation, chemical properties of metals and surface desired are influencing factors. 28 ref. (L12g, L12k; SGB-a, SGA-h)

278-L. New Surfacing Process Uses Oxy-acetylene Flame. Materials in Design Engineering, v. 53, Feb. 1961, p. 17.

Brazing and hard surfacing of pistons, valves and saw blade guides using a new oxy-acetylene process in which powdered alloys of Ag, Co and Fe are sprayed and fused onto base metal by an oxy-acetylene flame. (L24, K8; Ag, Co, Fe)

279-L. Evaluation of Electrodeposited Coatings. Lester F. Spencer. Metal Finishing, v. 59, Feb. 1961, p. 38-44.

Review of electrolytic, magnetic, radiation and chemical methods for determining thickness, uniformity, structure, porosity and adhesion of electrodeposited coatings. 78 ref. (L17c)

280-L. Finishing and Marking of Meter Dials. James Lind. Metal Finishing, v. 59, Feb. 1961, p. 45-49.

Description of enameling, baking and printing techniques used in finishing Al, brass and steel dials. (L26n; Al, Cu-n, ST)

281-L. Hardness of Electroless Nickel Deposits. Larissa Domnikov. Metal Finishing, v. 59, Feb. 1961, p. 52-54.

Review of Russian experiments concerning the effect of heat treatment conditions on microhardness of Ni-P coatings on steel parts. X-ray analysis is used to study phase transformations in the Ni-P deposits. 5 ref. (L17c, Q29q, 2-64, S11p; ST, Ni)

282-L. Anodizing Aluminum Alloys. Irving Machlin and Neal J. Whitney. Metal Finishing, v. 59, Feb. 1961, p. 55-57.

Measurement of thickness, abrasion resistance, dielectric breakdown strength, Knoop indenter penetration and salt spray corrosion resistance of thick anodized coatings on 2024-T3 and 6061-T6 alloys. (L19; Al-b)

283-L. Science for Electroplaters. Pt. 63. Nickel Plating. L. Serota. Metal Finishing, v. 59, Feb. 1961, p. 61-64.

Detailed explanation of plating mechanisms in the Watts bath, with emphasis on the action of $NiSO_4$, $NiCl_2$ and boric acid. (L17a)

284-L. Flame Spraying of Alumina. National Bureau of Standards, Technical New Bulletin, v. 44, Dec. 1960, p. 202-203.

Flame deposition of heat resistant coatings on glass, platinum and stainless steel using an air gun at very high temperature. Data are given for bond strength, thermal properties and thickness of coating as a function of temperature, pressure, particle velocity and cooling characteristics. Application to jet engine components. (L23; Pt, SS, NM-f42, Al)

285-L. Determination of the Thickness of Thin Porous Oxide Films on Aluminum. M. S. Hunter and P. F. Towner. Electrochemical Society, Journal, v. 108, Feb. 1961, p. 139-144.

Measurements of film thicknesses down to 7 Å. are made by a technique employing interferometry and precisely controlled anodic oxidation. Applications of the method in measuring film growth in various solutions and electrolytes. 11 ref. (L19, S14; Al)

286-L. A Study of Pore Structures on Anodized Aluminum. I. A. Renshaw. Electrochemical Society, Journal, v. 108, Feb. 1961, p. 185-191.

Presence of surface oxide films on Al prior to anodizing in a pore-forming electrolyte can reduce the number of surface pores and the surface roughness as compared to that normally obtained with fresh Al surfaces. 15 ref. (L19, 9-68; Al)

287-L. (Book.) Institute of Metal Finishing, Transactions, 32, Great Ormond St., London, W. C. 1, England, v. 36, 1958-1959, 246 p.

Papers presented at the 34th Annual Conference on Metal Finishing. Papers

abstracted separately. Topics include mechanical, chemical and electrochemical cleaning and chemical conversion, chemical reduction, electroplating and synthetic resin coating. Technological parameters of processes; properties of coatings. (L-general, A-general)

288-L. The Properties of Nickel Electrodeposited From Sulphamate Bath. D. A. Fanner and R. A. F. Hammond. Institute of Metal Finishing, Transactions, v. 36, 1958-1959, p. 32-42.

Effect of plating variable, acidity, current density and temperature on the internal stress and microstructure of Ni sulphamate deposits. Tensile properties and their effect on fatigue strength of EN 25 (Ni-Cr-Mo) steel are compared with properties of Watts bath deposits. 18 ref. (L17, Q7; ST, Ni)

289-L. The Analysis of Nickel Sulphamate Plating Solutions. G. H. Bush and D. G. Higgs. Institute of Metal Finishing, Transactions, v. 36, 1958-1959, p. 43-47.

Spectrophotometric, polentiometric, absortimetric and titrimetric methods for determination of total N, free NH_4, Ni, H_3BO_3, Cl and 1:3:6 trisulphonic acid in Ni sulphamate plating solutions; examples for analysis of synthetic mixtures. 6 ref. (L17a)

290-L. Hardness of Electrodeposited Speculum Metal and Other Tin-Copper Alloys. V. R. Ramanathan. Institute of Metal Finishing, Transactions, v. 36, 1958-1959, p. 48-50.

Effect of deposit composition on hardness of Sn-Cu alloys containing 10-86% Sn electrodeposited on brass plates. Homogeneity, isotropy, compactness and thickness values are determined with hardness by diamond pyramid microindentation. 4 ref. (L17c; Cu-b, Sn-b)

291-L. Bronze Plating From Modified Stannate Cyanide Baths. W. T. Lee. Institute of Metal Finishing, Transactions, v. 36, 1958-1959, p. 51-57.

Variation in composition of bronze deposits with solution composition and plating variables, including solution metallic content, carbonation, free cyanide and soda, time, temperature and cathode density. Methods for achieving correct balance of anode and cathode efficiencies. Effect of using K and Li based solutions. Comparison with quality of Cu and Ni plating. 8 ref. (L17; Cu-s)

292-L. An Electro-Chemical Method of Obtaining an Index of Porosity of Metal Coatings. M. Clake and S. C. Britton. Institute of Metal Finishing, Transactions, v. 36, 1958-1959, p. 58-66.

Porosity of coatings of Sn, Sn-Ni alloy, speculum, Cu and Ni on steel is determined in an electrolytic solution by measuring the corrosion occurring in the base metal at pores in the coating under the influence of anodic polarization. The ratio of shift of potential to applied current in the solution is measured as an index of porosity. 5 ref. (L17c, P10m; ST, Cu-b, Sn-b, Ni, 8-62)

293-L. Some Experimental Observations on the Effect of Addition Agents on Stress and Cracking in Rhodium Deposits. F. H. Reid. Institute of Metal Finishing, Transactions, v. 36, 1958-1959, p. 74-81.

The effects of Al and Mg sulphate, Cu and selenic acid on internal tensile and compressive stress and cracking of Rh deposits from sulphate electrolytes are measured electrographically and by deflection tests on flexible Be-Cu strip cathodes. 7 ref. (L17c, Q25, Q26; Rh)

294-L. Electroless Palladium Plating. Richard N. Rhoda. Institute of Metal Finishing, Transactions, v. 36, 1958-1959, p. 82-85.

Deposition of Pd by chemical reduction on catalytic surfaces composed of metals, alloys and ceramics using a plating solution containing as essential ingredients a palladium-amine complex, a reducer and a stabilizing agent. Pure Pd deposits of good ductility, adherence, freedom from blistering on heating and of uniform thickness are attributed to the process. (L28; Pd)

295-L. The Properties of Bright Nickel Electrodeposits in Relation to the Period of Service of the Plating Bath. Pt. 3. Composition and Microstructure. J. Edwards. Institute of Metal Finishing, Transactions, v. 36, 1958-1959, p. 86-92.

Determination of C, O, H and N contents of bright Ni deposits from two proprietary solutions by vacuum extraction and vacuum fusion analysis. Effect of organic material incorporated in the bath due to extended service life and of stress reducing additions on deposit ductility, inclusion content, microstructure and internal stress. 3 ref. (L17a, L17c; Ni)

296-L. Electrodeposition of Copper-Nickel Alloys From Citrate Solutions. B. H. Priscott. Institute of Metal Finishing, Transactions, v. 36, 1958-1959, p. 93-96.

Hardness, uniformity, contractile stress, soundness, composition and adherence examined for Cu-Ni alloys deposited from solutions containing Cu and Ni sulphates and tri sodium citrate with a small sodium chloride addition. Effect of solution concentration pH variation, temperature, current density, electrode efficiency and throwing powers on deposit properties. 4 ref. (L17c; Cu-b, Ni-b)

297-L. Developments in Metal Pre-Treatment. R. E. Shaw. Institute of Metal Finishing, Transactions, v. 36, 1958-1959, p. 107-112.

Survey of mechanical and chemical cleaning, conversion coating and surface sealing processes for preparing steel, Al and Zn surfaces for finishing treatments, with particular reference to painting. 12 ref. (L10, L12, L19, 10-54; Al, ST, Zn)

298-L. The Impact of Organic Chemistry on Metal Finishing. R. L. Yeates. Institute of Metal Finishing, Transactions, v. 36, 1958-1959, p. 119-127.

Review of developments in organic finish formulation particularly in the use of synthetic organic chemicals, including nitrocellulose, solvents, plasticisers, phenolic, alkyd, amino, epoxide, vinyl, styrenated, acrylic, polyurethane, polyester and silicone resins. Summary of properties and applications in the automobile and aircraft industries and in the production of other consumer goods. 5 ref. (L26p)

299-L. Anodized Aluminium Mirrors. J. J. Dale, L. H. Esmore and I. J. Howell. Institute of Metal Finishing, Transactions, v. 36, 1958-1959, p. 128-134.

A procedure based on anodizing, stripping and re-anodizing is developed to produce mirror surfaces on super pure Al for use in a camera telescope. The surface quality of the mirror is judged satisfactory for the purpose, but is characterized by a ripple or orange peel effect caused by grain coarsening and preferred orientation and is accentuated by electrochemical treatment. Photographic and X-ray diffraction methods are used to assess and record the severity of the ripple. 8 ref. (L19, 9-71; Al)

300-L. Recent Advances in Fused Plastic Coatings for Metals. D. E. J. Cunningham. Institute of Metal Finishing, Transactions, v. 36, 1958-1959, p. 189-197.

Review of thermoplastic and thermosetting compounds and other synthetic resins used to form homogeneous fused coatings on metals, in particular, steel. Applications and fabrication technique including flame spraying and powder spraying and dipping. Data are given for physical, mechanical and chemical properties and corrosion, heat, abrasion and impact resistance characteristics. (L26p, 17-52; ST)

301-L. Some Techniques in Studying Rates of Deposition and Formation of Inorganic Films on Metal Surfaces. H. R. Thirsk and W. F. K. Wynne-Jones. Institute of Metal Finishing, Transactions, v. 36, 1958-1959, p. 198-202.

Review of relaxation methods including potential step, current step, galvanostatic and a-c. techniques for studying the electrochemical kinetics of metal deposition. Theoretical determination of rate constant, exchange current, transfer coefficient interface potential difference and reaction stoichiometry as a function of time, concentration, current density, polarization and other variables. Application to deposition of Ag, Cu, Zn and Cd and inorganic films. 18 ref. (L17b, P13, P15; Ag, Cu, Zn, 14-62)

302-L. Sealing Anodic Oxide Films on Aluminium. G. C. Wood. Institute of Metal Finishing, Transactions, v. 36, 1958-1959, p. 220-229.

Review of the literature on anodic oxide film formation, structures and composition and sealing methods. Theoretical analysis of sealing mechanisms using physical and electrical models. Summary of electrical, permeability, corrosion, abrasion, dye absorption, weight charge and metallographic studies. 127 ref. (L19, M-general, P-general; Al, 8-73)

303-L. The Application of Tin Coatings in the Manufacture of Tinplate. G. E. Jones. Paper from "Production of Wide Steel Strip". Iron and Steel Institute, London, England. May 1960, p. 151-160.

Operation and advantages of alkaline, acid-ferrostan and acid-halogen electrolytic Sn plating lines. Review

of hot dip tinning processes. (L16, L17; ST, Sn, 4-53)

304-L. Galvanizing: A Review of the Hot Dip Process With Some Reference to Electrogalvanizing. H. Edwards, E. D. Harry and E. Jenkins. Paper from "Production of Wide Steel Strip". Iron and Steel Institute, London, England. May 1960, p. 161-172.

Hot dip galvanizing of rimmed steel sheets in bath of Zn, Al and Pb by various industrial processes. Mechanical and physical properties. Effect of bath temperature, Al content, immersion time and surface variables on alloy growth. (L16; ST-d, Al, Pb, Zn)

305-L. Plastic-Coated Steel: A Promising New Sheet Material. S. S. Carlisle and W. Bullough. Paper from "Production of Wide Steel Strip". Iron and Steel Institute, London, England. May 1960, p. 173-180.

Cold reduced steel strip is coated with polyvinyl chloride, cured at 200-425° C. in radiant or forced air furnaces and tested to determine adhesion strength and abrasion and blistering resistance. (L22, Q10c; ST, 4-53)

306-L. Measurement of the Thickness of Electroplates by Electrolytic Stripping Method. P. B. Mathur and N. Karuppanan. Plating, v. 48, Feb. 1961, p. 170-172.

Current efficiency and the actions of different stripping solutions on Ag electroplates over Cu, brass, mild steel and Ni are measured in terms of stripping time and plating thickness as related to different current densities. Anodic thickness values are tabulated with those obtained by microscopic methods. (L17c; CN, Cu-b, Ni, Ag)

307-L. Effect of Addition Agents in Copper Plating From the Sulphamate Bath. S. Venkatachalam and T. L. Rama Char. Electroplating and Metal Finishing, v. 14, Jan. 1961, p. 3-5.

Effect of gelatin, glue, EDTA, sulphosalicylic acid and other addition agents on the bath performance, cathode polarization and nature of deposit. (L17; Cu)

308-L. Nickel Plating--A Review of Recent Developments. H. C. Castell. Electroplating and Metal Finishing, v. 14, Jan. 1961, p. 6-13.

Study of corrosion resistance of Ni and Cr coatings during accelerated tests; bath levelling power, throwing power and deposit brightness in relation to various concentrations of organic agents; mechanisms involved in bright Ni plating. (L17; Ni)

309-L. Experiences With Some Bright Nickel Plating Solutions. G. Buss. Electroplating and Metal Finishing, v. 14, Jan. 1961, p. 15-17.

Comparison of optimum operating data used with three bright Ni plating baths, one being Efco-Udylite No. 66 bath which avoids the use of wetting agents and can be filtered continuously through active carbon. (L17; Ni)

310-L. (French.) Carbide Coating for Prolonging the Useful Life of High-Speed Steel Tools. Charles H. Wick. Machine Moderne, v. 54, Dec. 1960, p. 16-18.

Spark deposition methods and equipment for applying carbide coating to high speed steel tools using a carbon electrode. Data are given for coating, thickness and wear resistance of tools. (L29, T6n; TS-m)

311-L. The Protection of Structural Steel Against Corrosion. J. C. Hudson. Chemistry & Industry, Jan. 7, 1961, p. 3-11.

Application of Zn, Al, Pb, Sn, paints, bitumens and pitches, vitreous enamel, cement and concrete, plastics and organic and inorganic compounds as coatings on hot rolled structural steel for protection against corrosion by air, soil and water. 8 ref. (L-general, R-general; ST)

312-L. Vibration Finishing Ends Deformation of Light Parts. Steel, v. 148, Feb. 27, 1961, p. 116-117.

Vibration deburring is used for cleaning, descaling, radiusing, coloring and internal finishing of small spring metal parts. (L10; SGA-b)

313-L. (German.) Electrolytic Process for Metal Cleaning. A. Pollack. Metall-Reinigung + Vorbehandlung, v. 10, Jan. 1961, p. 1-3.

Review of electrolytic degreasing by cathodic, anodic and combined cathodic-anodic treatment. Electrolytic descaling with acid and alkaline electrolytes by an automatic operation with reaction

gases removed as generated. Electrolytic cleaning of cast iron by anodic and cathodic melting in "Kolone-E" salt at 450-500° C. (L13n; CI)

314-L. (German.) Pretreatment of Aluminum for Welding. Hans H. Reinsch. Schweisstechnik, v. 15, Feb. 1961, p. 19-22.

Mechanical cleaning, chemical degreasing by alkaline and neutral (organic) solutions at 20-120° C. and pickling by H_2SiF_6, HNO_3 and H_3PO_4 solutions at 23-82° C. of Al sheets, profiles and cast parts. (L10, L12; Al, 4-53, 5)

315-L. Mechanical Descaling of Steel Wire Rod in France. Andre Line and Jean Peignier. Wire and Wire Products, v. 36, Feb. 1961, p. 181-190.

Scale cracking and rod cleaning procedures for descaling low carbon steel wire rod as related to scale composition and heat generated during wire cold drawing. Lubrication processes for descaled rod and wire drawing and factors governing them. (L10; CN-g, 4-61)

316-L. Production by Autogeneous Extrusion. Alvin N. Gray. Wire and Wire Products, v. 36, Feb. 1961, p. 202-204.

Wire coating by a new type autogenous extrusion screw with its own back pressure, heat direction and feeding, mixing and pumping features. Advantages of process include uniform discharge temperature at any screw speed, simplified operation, design and installation, material conservation and higher production potential. (L22; 4-61)

317-L. Processing and Painting AC Air Cleaners. Herbert Chase. Industrial Finishing, v. 37, Feb. 1961, p. 24-26, 28, 30-31.

Production of a heat and corrosion resistant finish on steel automobile engine stampings by a sequence of operations including cleaning, phosphatizing, rinsing, drying, electrostatic painting and baking. (L26n, T21b; ST, 4-59)

318-L. Sulphamate Nickel: Boon to Electroformed Microwave Components. David G. Brown. Electronic Design, v. 9, Jan. 18, 1961, p. 140-143.

Precision parts of Ag, Cu, brass and ferrous materials with complicated shapes fabricated by the Barrett sulphamate-nickel plating process. Effect of bath, formulation on deposit stresses, chemical purity, grain structure and ductility, high and low temperature stability, machinability and corrosion resistance. (L18, T1; Ag, Cu-b, Fe-b, Ni)

319-L. Flame Spray Alumina Coatings. Industrial Finishing, v. 13, Jan. 1961, p. 36.

Thermal protection of jet and rocket engine components by flame-spray coating with alumina at 2050-1800° C. using oxy-acetylene powder gun and rod gun. Influence of surface roughness, particle temperature and cooling characteristics on the strength of the bond between alumina and Fe, Pt and glass substrates. (L23; Fe, Pt, Al)

320-L. New Technique Increases Gold Deposits. Industrial Finishing, v. 13, Jan. 1961, p. 47-48.

Cu and Cu-base alloys are covered with Au deposits up to 3 mg/in^2 using a special plating bath which operates at 35-47° C. and pH 7-8 or 80-100° C. and pH 5.0-5.2. (L17; Cu-b, Au)

321-L. Vitreous Enamelled Aluminum. Metal Industry, v. 98, Feb. 3, 1961, p. 87-89.

Preparation of sheet and spraying and drying of frit in the production of architectural panelling. (L27; Al)

322-L. (Japanese.) Treatment of Metal Surface by Hydrogen Peroxide Solution. Kaichi Kawamura. Japan Institute of Metals, Journal, v. 24, Nov. 1960, p. 710-714.

Aqueous solutions of hydrogen peroxide, with various acids and additional reagents are used for descaling, chemical polishing and etching of stainless, heat resisting and plain carbon steels and alloys of Cu, Ti, Ni, Mg, Al and Pb. Metal and oxide dissolution rates are determined with optimum bath composition for efficient chemical action. (L12; Al-b, Cu-b, Mg-b, Ni-b, Pb-b, Ti-b, ST)

323-L. Physical Metallurgy of Refractory Metals. The Removal of Interstitial Impurities From Niobium by Zinc-Niobium

Compounds. R. J. Goode, A. J. Pollard and R. A. Meussner. Report of NRL (Naval Research Laboratory) Progress, Jan. 1961, p. 32-34.

Removal of O, N and C and N in combination from Cb by coating with Zn is examined for specimens coated by vapor deposition at 1600° F. with subsequent heating at 1800° F. for various times. The inclusions are extracted by electrolytic isolation, with their identification and identification of phase formation and microstructure of the specimen being achieved by X-ray diffraction. (L25, C26, M22g, 3-69; Cb, Zn)

324-L. Plastic Coated Steel Wire. Dartrey Lewis. Wire and Wire Products, v. 36, Jan. 1961, p. 41-46, 120-121.

Corrosion protection and decoration of steel wire with plastics of various compositions, lacquer and vitreous enamel coatings, using rust inhibiting primer, galvanized Zn or phosphate undercoatings. Process parameters and resultant corrosion resistance, water permeability, thickness and other properties of the coatings. (L26, L23, R-general; ST, 4-61)

325-L. Low-Temperature Metal Cleaning Pays Off. Industrial Gas, v. 38, Feb. 1961, p. 5.

Proofing and cleaning sheet metal furnace and air-conditioning parts at 120-400° F. in a burn-off oven resulting in increased cleaning efficiency and lower operating costs by ridding the parts of soot, dirt and grease in a single operation. (L10g; 4-53)

326-L. Radiant Firing Doubles Kettle Life. J. Atkinson. Industrial Gas, v. 38, Feb. 1961, p. 7.

Hot dip galvanizing of low-carbon steel grave vaults in direct radiant fired kettles. Gradiation heating by radiant gas burners with ceramic cups permits better temperature distribution and prevents bath turbulence. (L16; CN-g)

327-L. (French.) Protection of Structural Parts by Painting and Zn Plating. P. Blancheteau. Corrosion et Anticorrosion, v. 8, Dec. 1960, p. 455-461.

Permissible pitting corrosion of painted parts after a certain service time. Protection by galvanizing, painting and Zn metal spraying. Repair of Zn platings damaged in welding operations by metal spraying. (L16, L23, L26, R2j; ST, Zn)

328-L. (French.) Corrosion Protection of Gasholders by Painting. Henri Prim. Corrosion et Anticorrosion, v. 8, Dec. 1960, p. 462-471.

Protection by various paints on drying oil, bitumen and polymer bases. Samples are tested in humidity saturated atmospheres containing CO_2 and SO_2, atomized sea water, a dry atmosphere at 20-80° C., an emulsion of benzene in water containing SO_2 and in sea water at 25° C., for 1-15 hr. 11 ref. (L26, R11)

329-L. Acceptance Requirements for Nickel-Chromium Plating. W. G. L. Miller. Electroplating and Metal Finishing, v. 14, Feb. 1961, p. 40-47.

Specifications for Ni-Cr plating of steel, Cu alloys and Zn-based die castings. SO_2, acetic acid salt spray and Cu accelerated salt spray tests to determine corrosion resistance. Methods of measuring coating thickness. (L17, R11j; Cu-b, ST, Zn-b, Cr, Ni)

330-L. Pretreatment of Polished Copper Alloy and Zinc Components for Bright Nickel Plating. H. Reymond. Electroplating and Metal Finishing, v. 14, Feb. 1961, p. 53-54.

Development of treatment cycles for Cu and Zn alloy components based on electrolytic degreasing in a cyanide bath. This is followed by alkaline Cu plating, in the case of Zn, and by weak treatment in citric acid in the case of Cu. (L13n, L17; Cu-b, Zn-b, Ni)

331-L. Plating of Magnesium. Arthur S. Dwyer. National Conference on Aeronautical Electronics, Proceedings, May 1958, p. 530-533.

Methods of overcoming porosity in the deposited metal and lack of adhesion of the plate during plating of Mg alloys by applying an immersion Zn coating followed by a Cu strike, then electroplating in standard baths. (L17; Mg-b, Cu, Sn, Zn)

332-L. (Russian.) Electroplating of Structural Steels. M. A. Figelman. Metallovedenie i Obrabotka Metallov, Dec. 1960, p. 21-25.

Samples of 38KHA, 30KHGSA, 18KHNVA and 1KH18N9T structural steels are heat treated and electroplated with Cd, Zn and Cd with Zn. Effect of coating composition on plasticity, impact and bend strength, elongation, reduction in area and tensile strength at elevated temperatures (200-700° C.) (L17c, Q-general; ST, Cd, Zn)

333-L. Hard Chromium Plating of Piston Rods. Preparation and Finishing. Machinery (London), v. 97, Dec. 28, 1960, p. 1466-1467.

Plating of steel rods used in high and low pressure hydraulic installations to improve corrosion resistance and wear properties. Work surfaces of 5-10 micro-inches are obtained by finishing on a centerless polishing machine. (L17, T7; ST, Cr)

334-L. How de Havilland Hard Anodize Missile Parts. W. J. Campbell. Metalworking Production, v. 105, Feb. 1, 1961, p. 59-62.

Al alloy missile forgings are hard anodized by the Hardas technique at 10-30° C. using 30-300 amp. per sq. ft. The Hardas process prescribes rates of flow of electrolyte in relation to the size of the anode and specifies blends of d-c. and a-c. currents which permit the production of hard coatings on alloys containing Si and Cu. (L19, L24, T24e; Al-b, 4-51)

335-L. (Italian.) Electrodeposition of Nickel. L. Peraldo Bicelli and G. Serravalle. Metallurgia Italiana, v. 52, Nov. 1960, p. 703-709.

Electrolytic Ni deposit obtained at different temperatures and current densities from hydrochloric-sulphamic and hydrochloric-perchloric baths, with different $NiCl_2$ contents and at different pH. Determination of cathodic current yields with preferred orientation investigation by X-ray. 17 ref. (L17; Ni)

336-L. (German.) Pickling Plants With Particular Reference to Modern Pickling. W. Heynemann. Draht, v. 12, Jan. 1961, p. 16-25.

Wire is pickled by H_2SO_4 at 70° C. in steam heated Pb coated steel containers. Pickling vapors are removed by plastic exhausters and waste acid is neutralized by slaked lime or carbide mud. (L12g; ST, 4-61)

337-L. (Italian.) Bright Nickel Plating of Fused Castings. Gianluigi Galli. Fonderia, v. 9, Dec. 1960, p. 533-535.

Investigation of the composition and surface properties of fused castings of bronze, brass and aluminum-bronze, welded with lead-tin alloys for nickel plating. Effect of porosity, passivity, composition and crystal structure on coating adherence. (L17c; Cu-b, Pb-b, 5)

338-L. Color Finishing of Galvanized Steel Sheet Panels. Engineer, v. 211, Feb. 10, 1961, p. 228-229.

Steel ribbed panels are coated with a high-molecular weight vinyl acetal resin combined with active compounds such as phosphoric acid, chromates and alcohols prior to coloring. Three color coats are then applied by automatic spray guns. (L26; ST, 4-53, 8-65)

339-L. (French.) Electrolytic Polishing and Brightening. H. Richter. Galvano, v. 29, Dec. 1960, p. 709-713.

Mechanism of electrolytic surface treatment. Application of acid baths and proprietary solutions, such as Alutol (for Al) and Brytol in metal brightening processes. Methods of process control, including heating, cooling and feeding the bath. (L12f)

340-L. (French.) Electrolytic Deposition of "Monel". A. P. Van Peteghem and H. F. Demeyre. Galvano, v. 29, Dec. 1960, p. 715-716.

Electrodeposition of Monel from $NiSO_4$ baths on cathodes of Cu, Zn-Cu, Fe, steel and zamac. Optimum bath composition, plating conditions and preparation of cathode surface. (L17; Cu-b, Fe, ST, Zn-b, Ni)

341-L. (French.) Electrolytic Deposits on Aluminum and Its Alloys. Guy Bacquias. Galvano, v. 29, Dec. 1960, p. 719-722.

Electroplating of Al and AG3, AG5, AUG4G, ASG and AUGT Al alloys using Zn, Cu, Ni and Cr baths. Methods of surface preparation and metal deposition. Selection of optimum bath composition and plating variables. (L17; Al-b, Cr, Cu, Ni, Zn)

342-L. (French.) New Process of Galvanizing Steel Wire. R. Lourdin. Galvano, v. 29, Dec. 1960, p. 729-731.

Hot dip galvanizing of wire in a line incorporating surface preparation, oxidizing preheating, annealing in a reducing atmosphere, galvanizing in a molten Zn bath and cooling. Design and operation of wire handling and heating equipment. Properties of the Zn coated wire. (L16; ST, 4-61)

343-L. (French.) Macrodispersion, Microdispersion and Leveling in Electrolytic Baths. Galvano, v. 29, Dec. 1960, p. 732-734.

Review of process, kinetics and variables during electrodeposition, including genuine and apparent leveling, limit between macro and microdispersion, effect of ion concentration in the bath and conditions in the diffusion layer. 10 ref. (L17b)

344-L. Measurement of the Thickness of Electroplates by Electrolytic Stripping Method. Prem Behari Mathur and Nithiyanandan J. Paul. Electroplating (India), Aug-Dec. 1960, p. 19-21.

Experimental results on the use of a 17% NaOH stripping solution for testing Cr coatings of various industrial thicknesses over Cu and brass bases. 7 ref. (L17c; Cu-b, Cr)

345-L. Anodizing and Coloring of Aluminum. K. C. Srevastava. Electroplating (India), Aug-Dec. 1960, p. 22-28.

Bright polishing by mechanical and chemical methods, anodizing, coloring and sealing techniques for Al surfaces. Design of equipment. 6 ref. (L10, L12, L19; Al)

346-L. (Russian.) Chromium Coatings for Engine Cylinders. A. A. Polyakov. Vestnik Mashinostroeniya, v. 41, Jan. 1961, p. 9-15.

Evaluation of porous and solid Cr coatings and the efficiency of Cr plating on knurled surfaces by friction and wear resistance tests. Study of lubricant distribution on the surface and computation of lubrication power. 21 ref. (L17, T21b; Cr)

347-L. (Japanese.) Ultrasonic Electroplating. Genrokuroh Nishimura. Ohm, v. 47, Nov. 1960, p. 67-74.

Use of ultrasonic vibration during electroplating of brass or steel plates or Mo wire with Cu, Cr, Ni, Au or Ag at various temperatures, times and current densities. Data are given for current efficiencies, surface roughness, microstructure, hardness, porosity, thickness and abrasion resistance of the deposits. (L17, 1-74; Cu-b, ST, 4-53, Mo, 4-61, Ag, Au, Cr, Cu, Ni)

348-L. Refractory Coatings for High-Temperature Protection. John V. Long. Metal Progress, v. 79, Mar. 1961, p. 114-121.

Base metals can be made more heat resistant by converting them to "composites" with techniques that modify the surface or apply a refractory coat, such as glassy and matte ceramics, cermets, metallic and diffused metallic coatings. (L27, L15, L23, 2-62)

349-L. Quantity Production of a Varied Range of Wirework. Wire Industry, v. 28, Feb. 1961, p. 151-155.

Mass production of forms composed of wire which are coated with Cu, Zn, brass or Cr are painted by dipping or hand spraying. Method is determined by the complexity of the form. (L17, L16, L23; Cu-b, Cr, Zn, 4-61)

350-L. Cleaning Bares Flaws in Missiles. John F. Judge. Missiles and Rockets, v. 8, Mar. 6, 1961, p. 32.

Ultrasonic solvent and acid cleaning, demineralized water rinsing and infrared drying operations are used to clean critical steel missile system components. (L12, T24e; ST, 17-57)

351-L. Try the Advanced Coating Methods. L. McD. Schetky. Metalworking, v. 17, Mar. 1961, p. 14-19.

Ceramic and refractory metal coating by vapor phase deposition, plasma flame spraying and electron beam evaporation at 70-1650° F. to produce films of high purity, precise thickness and low porosity. Examination of photomicrographs. (L-general)

352-L. (German.) Influence of Ultrasonic Vibration on Electroplating. R. Weiner. Metall, v. 15, Feb. 1961, p. 97-101.

Investigation of electroplating with Cu, Zn, Ni, Ag and Au during ultrasonic oscillation of acid and complex electrolytes at a frequency of 20 kHz

and 5 W per cm^2 intensity by a supersonic generator, having magnetostrictive and pizoelectric agitators. Influence of ultrasonics on current recovery and current density, potential and quality of coating. (L17, 1-74; Ag, Au, Cu, Ni, Zn)

353-L. Republic Installs 74-In. Sheet Polisher. Iron and Steel Engineer, v. 38, Feb. 1961, p. 147.

Polishing of steel sheet at 20-60 ft. per min. on a pinch roll sheet polisher used as either a through feed or reciprocating machine. (L10b; ST, 4-53)

354-L. Preparing Metal for Vinyl Lamination. James I. Maurer. Production, v. 47, Mar. 1961, p. 68-69.

Treatment of steel, Al and Zn surfaces by cleaner bath, water rinse, coating bath and chromate-containing rinse. Coating systems are varied to give high quality bonding, an iron phosphate being used for steel, an oxide chromate for Al and a zinc phosphate coating for Zn. (L14, L26p; Al, ST, Zn)

355-L. Finishing Supplement: Cleaning of Surfaces. E. E. Bishop. Metal Industry, v. 98, Feb. 17, 1961, p. 127-130, 132.

Cleaning mild and alloy steel, Cr, Ca and Ni by solvent degreasing, alkali degreasing and pickling. Ultrasonic and mechanical methods. (L12, L10; AY, CN, Cr, Cu, Ni)

356-L. (French.) Cleaning of Steel Bars and Wires. Chaleur & Industrie, v. 41, Dec. 1960, p. 334-342.

Solvent acid and blast cleaning methods and surface qualities of the cleaned semi-finished articles. Reconstitution of the acids from the baths used. (L10c, L12; ST, 4-55, 4-61)

357-L. Rhodium Plating to Specifications. R. R. Benham. Metalworking Production, v. 105, Feb. 15, 1961, p. 63-65.

Recommended procedures for undercoating, masking, cleaning and plating on steel, Al and a Sn-Ag-Pb solder. (L17; Al, ST, SGA-f)

358-L. (Russian.) Separation of Slag Crust From the Weld. N. A. Grinberg and E. M. Rogova. Svarochnoe Proizvodstvo, Nov. 1960, p. 18-20.

Factors influencing separation of slag crust which is fastened to the seam during hard facing because of oxide film formed between slag and melt during solidification. Effect of Mn content in the oxide film, acidity of slag, heterogeneity of granulation of electrode components and the ratio of slag and metal volume on solidification. 3 ref. (L24, K1)

359-L. (Translation-Brutcher no. 4881.) Shot Blasting and Subsequent Cleaning of Steel Strip for Cold Rolling. G. Hohle. Stahl und Eisen, v. 80, no. 14, 1960, p. 913-918.

Development work on the mechanical descaling of steel strip in a cold rolling mill and the difficulties encountered and finally overcome in removing the resulting black coating of very fine dust. Best shot-blasting speed and shot size for hot rolled low-carbon steel strip. Yield point, tensile strength, elongation, hardness distribution in depth and surface condition of strip before and after shot blasting. (L10c; ST, 4-53)

360-L. (Translation-Brutcher no. 5023.) Hot Dip Aluminizing of Steel Wire. K. Janecky. Hutnik, v. 10, Feb. 1960, p. 61-64.

Czech work on fluxes for hot aluminizing, based on borax plus ammonium chloride; composition data. Best temperature of Al bath in connection with this flux. Cracked ammonia atmosphere for cleaning the surface of the stock. (L15; ST, 4-61, Al)

361-L. Protective Coating Service for Food, Brewery Industries. Corrosion Prevention & Control, v. 8, Jan. 1961, p. 36.

Coating and metal and flame spraying methods and equipment for applying synthetic resin and metallic coatings to food processing equipment for corrosion and contamination prevention. Materials used include epoxy resins, phenolics, PVC and PTFE compounds, silicones, polythem, nylon, Zn, Al and stainless steels. (L-general, T29p)

362-L. Special Reciprocator for Coating Office Furniture. Industrial Finishing, v. 13, Feb. 1961, p. 23-24.

Description of degreasing, electrostatic spray painting and stoving operations on office furniture made from sheet steel. Design of reciprocator used

to supply paint with only 5% wastage. (L26n, T10b; ST, 4-53)

363-L. Mechanization in Metal Cleaning. Industrial Finishing, v. 13, Feb. 1961, p. 32-33.

Comparison of degreasing and other cleaning operations including soaking, spray washing, machine cleaning and gyro-vertical cleaning. Swarf separation. (L12, L10)

364-L. Degreasing. Pt. 1. Industrial Finishing, v. 13, Feb. 1961, p. 37-38.

Description of degreasing methods, materials and equipment at two German plants, one using ultrasonic methods to clean cold rolled steel band and the other using a high-speed process and a special plastic additive to eliminate need for an alkaline soak. (L12)

365-L. Organic Finishing Zinc and Aluminum Die Castings. P. J. Provin. Precision Metal Molding, v. 19, Mar. 1961, p. 46-47.

Chemical cleaning, conversion coating and organic painting of Al and Zn die castings to improve appearance and resistance to corrosion by detergents and in humid atmospheres. (L26; Al, Zn, 5-61)

366-L. How to Polish Long Extrusions Automatically. Precision Metal Molding, v. 19, Mar. 1961, p. 63-64.

Buffing of 5-30 ft. Al extrusions using a automatic reciprocating straight line buffing machine. Design and operation of equipment. (L10a; Al, 4-58)

367-L. Grinding With Cup-Wheels. R. R. Cole. Machinery, v. 67, Mar. 1961, p. 134-140.

Electrolytic grinding of tempered carbon steel by a phosphor bronze diamond cup wheel and an electrolyte containing potassium nitrate and nitrite. Measurements are made with a dynamometer to determine effect of current density on metal removing rate and Faraday current efficiency. (L13p, W25c; CN)

368-L. Recent Developments in Phosphating. H. A. Holden. Corrosion Technology, v. 8, Feb. 1961, p. 40-44.

Surface preparation methods including pickling and derusting with HCl, HSO_4 and H_3PO_3 and cleaning with alkaline cleaner and a Ti phosphate complex. Phosphating of Fe and steel with Zn, Mn and Fe phosphate. Corrosion testing of phosphated products. (L14b, L12; Fe, ST)

369-L. One-Coat Porcelain Enameling in Commercial Refrigerator Production. Metal Products Manufacturing, v. 18, Mar. 1961, p. 49, 54, 96.

Coating steel components with one coat of porcelain enamel in a direct-on application. Equipment and technique used in the citric acid pickling of the steel in preparation for the enamel coating. (L27, L12g; ST)

370-L. New Strip Coating Line for Aluminum and Steel. Metal Products Manufacturing, v. 18, Mar. 1961, p. 59-61, 73.

Surface preparation and organic roll coating of Al and steel strip on an automic, continuous coating line. (L26; Al, ST, 4-53)

371-L. Machine Steps Up Point Mileage. E. A. Zahn. Iron Age, v. 187, Mar. 16, 1961, p. 116-117.

Advantages of flow casting for painting automobile frames and other sheet metal parts. Oscillating jets of paints coat articles with very little waste. (L26n, T21a)

372-L. Protective Coatings for Chemical Service. L. S. Van Delinder. Paper from "Short Course on Process Industry Corrosion, Proceedings". National Association of Corrosion Engineers, Houston 2, Texas, 1960, p. 365-406.

Surface preparation. Application of lacquer, enamel, plastic, Zn, rubber and other coatings to chemical processing equipment. Tests for determining adherence, abrasion and corrosion resistance, thickness and flexibility of coatings. 24 ref. (L-general, R10, Q10c, T29)

373-L. (German.) Influence of Hydrogen Produced in Pickling on Properties of Silicon Alloyed Sheet. S. Bohmer. Neue Hutte, v. 6, Jan. 1961, p. 56-60.

Measurements of magnetic permeability, induction, coercive force and magnetizing losses of transformer sheet specimens (3.93-4.42% Si) after H_2SO_4 pickling at various pickling times and

acid concentrations and after varying aging times to evaluate effect of hydrogen pick-up during pickling. (L12g, P16; SGA-n, Si)

374-L. (Croatian.) Plating of Aluminum Sheet by Rolling. Milan B. Pajevic and Niloka Voroncov. Saopstenja, v. 7, June 1959, p. 3-13.

Theoretical background and experimental testing of Al sheets plated with Cu by rolling. Results indicate that cleanliness, homogeneity of surface contact, temperature, heating time and speed and compression of rolling are factors related to achieving high quality platings. Doubling of plated metal is recommended as a technique for quality control. 12 ref. (L22, F23; Al, Cu, 4-53)

375-L. (French.) Electrolytic Deposits on Tungsten and Molybdenum. Galvano, v. 30, Jan. 1961, p. 27-30.

Heat treatment, mechanical and chemical treatment of the surface before electroplating. Deposition of Cu, Ni, Cr, Au and Pt, with subsequent annealing. 9 ref. (L17, L-general, J-general; Mo, W, Au, Cr, Cu, Ni, Pt)

376-L. Gelled Primers Prevent Sag, Speed Up Painting Time. Corrosion Prevention & Control, v. 8, Feb. 1961, p. 49-51.

Gelled or thixotropic primers give thickness equivalent to four or five coatings of normal primer with only two coatings. Performance on seagoing vessels and structural steel work. (L26n, T22; ST, 4-57)

377-L. (Translation-ConBur.) Cathode Processes During Electrodeposition of Titanium From Aqueous Solutions. N. T. Kudryavtsev, R. G. Golovchanskaya and N. K. Baraboshkina. Academy of Sciences of the USSR, Proceedings, Physical Chemistry Section, v. 132, May-June 1960, p. 441-443.

Electrodeposition of Ti from alkaline or acidic solutions of titaniferrous salts as affected by cathode composition, current distribution and addition of surface-active agents. (L17; Ti)

378-L. (Polish.) Effect of Process Conditions on the Properties of Aluminum and Zinc Coatings. S. Socha. Prace Instytutow Hutniczych, v. 12, May 1960, p. 239-247.

Selection of adequate temperature, time and media for annealing of low carbon steel wires prior to hot dip plating. Effect of plating in hydrogen atmosphere and time and temperature of the process on the thickness, density, structure, corrosion resistance and mechanical properties of coatings. 13 ref. (L17; CN-g, Al, Zn, 4-61)

379-L. The Purpose, Theory and Application of Nickel Dip. N. S. C. Millar. Metal Finishing Journal, v. 7, Feb. 1961, p. 49-55.

Use of Ni dip in ground and cover coating of steel by enamels. Description of pickling cycle, plating parameters and application methods. Methods of determining Ni content in dip solution and on steel plates. (L16, L26n; ST)

380-L. A Survey of Progress in the Electrodeposition of Precious Metals. W. T. Lee. Metal Finishing Journal, v. 7, Feb. 1961, p. 63-70.

Plating of precious metals from acidic and alkaline aqueous solutions. Effect of agitation, current density, metal concentration, pH, cathode efficiency, time cycle and temperature on the brightness, ductility and corrosion resistance of Ag, Pt, Rh, Pd and Au deposits. 17 ref. (L17; Ag, Au, Pd, Pt, Rh)

381-L. Evaporated Chromium Films on Hot Substrates. Dorothy M. Hoffman and J. Riseman. Paper from "Vacuum Technology Transactions". Pergamon Press, New York, 1959, p. 218-221.

Electrical properties of thin Cr films have been shown to depend primarily on conditions and method of preparation. Films here obtained behave as thin metal foils which differ from the bulk material only because of geometrical effects. 10 ref. (L25g; Cr)

382-L. Gas Absorption by Vacuum Evaporated Magnetic Films. F. R. Gleason, J. H. Greiner and L. R. Yetter. Paper from "Vacuum Technology Transactions". Pergamon Press, New York, 1959, p. 222-227.

Mass spectrometric determinations are made of the types and amounts of gases absorbed during the deposition of thin Ni-Fe films. (L25g, S11r; Ni-b, Fe-b, 14-62)

383-L. Flow Coating Beats Dip Five Ways. American Machinist/Metalworking Manufacturing, v. 105, Mar. 6, 1961, p. 81.

Application of paint primer to automobile body parts by flow coating process. Paint is deposited on the upper areas of each part by fixed nozzles as the parts pass by on a conveyor, then flows downward to complete coverage. (L26, T21a)

384-L. Hard Chrome Plating of Cast Iron. T. J. Glover. BCIRA Journal (British Cast Iron Research Assoc.), v. 9, Jan. 1961, p. 95-102.

Results show that surface finish is a very important factor in ease of plating cast iron; size and distribution of flake graphite appear to have little effect and matrix structure none at all. Nodular graphite irons can be plated at lower current densities than flake graphite irons; a high phosphorus content leads to difficulty in plating. (L17; CI, Cr)

385-L. (Italian.) Surface Treatment of Stainless Steel. Giampiero Colombo. Acciaio Inossidabile, v. 27, Nov-Dec. 1960, p. 533-535.

Comparison of descaling methods for stainless steel, with emphasis on the Virgo process in which workpiece is immersed in fused NaOH containing NaH, then rapidly cooled in water. Other treatments include immersion in H_2SO_4, followed by rinsing. (L12; SS)

386-L. Jelled Plating Solutions for Barrel Plating Precision Parts. Harry J. West and Richard F. Gieselman. Products Finishing, v. 25, Feb. 1961, p. 44-45.

Plating of precision parts with Ag, Cd, Ni, Ca and Sn using a colloidal plating bath jelled to an extent which protects the parts from damage. Addition of the colloid to the bath also improves the appearance of the plating and the throwing power of the bath. (L17a)

387-L. An Electrochemical Index for Porosity. Products Finishing, v. 25, Mar. 1961, p. 74, 76, 78, 80.

Detection of pores in Sn, Cu and Ni electroplates by a test method in which a small current is passed from the plated panel under test to a separate cathode. Comparison of pore count, pore resistance and thickness of specimens. (L17c, 9-68; Cu, Ni, Sn)

388-L. Refrigerated Dip Tank Solves Finishing Problem. Gilbert C. Close. Products Finishing, v. 25, Mar. 1961, p. 49-51.

Application of epoxy resin primer to small aircraft parts by dipping in a refrigerated tank containing the resin. Refrigeration increases pot life of resin to one week. (L16, L26p; T24)

389-L. Finishing to a Microinch. Eric H. Sieke. American Machinist/Metalworking Manufacturing, v. 105, Feb. 20, 1961, p. 118.

Precision finishing of watch parts using rotary lapping machines and Linde A alumina powder as abrasive. Shellac is used as the clamping fixture to hold parts on flat round steel blocks. (L10b)

390-L. Metallizing Nickel Powder Involves Vacuum Blasting to Prepare Steel Before Surfacing With Metal Spray-Gun. W. B. Keyser. Welding Journal, v. 40, Mar. 1961, p. 229-231.

Surface preparation and metal spraying methods for applying a metallizing Ni powder coating to steel to increase corrosion resistance properties. Metallographic and X-ray diffraction examination and bend testing are used to evaluate the microstructure and tensile and bond strength of the coating. 3 ref. (L23, L-general; ST, Ni)

391-L. (Translation-ConBur.) Copper Plating of Aluminum by Contact Reduction. N. S. Tsvetkov and O. S. Zarechnyuk. Journal of Applied Chemistry of the USSR, v. 33, Mar. 1960, p. 641-648.

Conditions are given for formation of compact contact deposits of Cu on Al from alcoholic cupric chloride solutions. Amount of Cu formed is a linear function of water concentration in the solution. 20 ref. (L17; Al, Cu)

392-L. (Translation-ConBur.) Microinvestigation of the Cathode Process in Electrodeposition of Chromium. M. A. Shluger and V. A. Kazahov. Journal of Applied Chemistry of the USSR, v. 33, Mar. 1960, p. 649-655.

Direct microscopic observations of the cathode surface are used to study reduction of chromic acid solutions in two different ranges of cathode potential as affected by SO_4^{-2} ion concentration, current density and electrolysis temperature. 14 ref. (L17; Cr)

393-L. (Translation-ConBur.) A Method of Improving Resistance to Corrosion and Friction of Protected and Unprotected Surfaces of Articles. A. F. Krutikov. Journal of Applied Chemistry of the USSR, v. 33, Mar. 1960, p. 690-693.

Techniques of phosphate passivation, oxidation phosphatation and block phosphatation for improving the protective and antifrictional properties and adhesiveness of Cd and Zn surface layers. 5 ref. (L14b)

394-L. (Translation-ConBur.) Kinetics of Scale Removal From 1Cr18Ni9Ti Stainless Steel Ribbons in Nitric Acid Solutions. A. I. Matantsev. Journal of Applied Chemistry of the USSR, v. 33, Mar. 1960, p. 679-689.

Scale is formed during heat treatment of a cold rolled steel ribbon in an oxidizing atmosphere at 1110-1120° C. Efficiency of scale removal is then compared in HNO_3 solutions at concentrations varying from 0.4-40% and temperatures from 18-80° C. 35 ref. (L12g; SS)

395-L. New Plating Process for High Strength Steel. Western Metalworking, v. 19, Mar. 1961, p. 36-38.

Development of a Cd plating technique for aircraft components which eliminates hydrogen embrittlement problems and permits use of less steel at critical airframe juncture points. Process uses a nitrate compound and a throwing power additive to increase bath plating efficiency. (L17, T24; ST, Cd)

396-L. High-Temperature Insulation for Wire. K. N. Harris and J. D. Walton, Jr. Georgia Institute of Technology (Wright Air Development Division). U. S. Office of Technical Services, PB 161788, Mar. 1960, 40 p. $1.

High-temperature frit-resin insulation coating for electric wire, effective at 800° F., developed in a search for new insulating materials capable of meeting demands imposed by increasing air and space vehicle speeds. Applied to wire anodized with sulphuric acid and magnesium chloride, the coating gives low dielectric constant, low dissipation factor and good continuity. Wire thus treated is capable of operating after 750 hr. at 800° F. (L26p; 4-61)

397-L. (English.) Research on Buffing. (111). Yukio Tanaka. Kansai University, Technology Reports, Sept. 1960, p. 21-48.

Relationships between buffing temperature and time is obtained from experiments on Al, Cu and steel plates. Effect of adding fatty grease to buffing compound. Deformation processes during buffing. 14 ref. (L10a; Al, Cu, ST, 4-53)

398-L. Specifications and Physical Tests for Copper Plating Rotogravure Rolls. Harold T. Wilson. Plating, v. 48, Mar. 1961, p. 271-276.

Description of porosity, thickness, hardness, tensile and ductility tests made on steel tubes plated first with cyanide Cu or Ni, then acid Cu and finally with a layer of Cr. 3 ref. (L17c; ST, Cr, Cu, 4-60)

399-L. Belt Grinder Deburrs 28 Types of Aluminum, Steel and Titanium. Grinding and Finishing, v. 7, Mar. 1961, p. 35.

Deburring of Al, steel and Ti parts to 120-250 micro-in. finishes, using a belt grinding machine. Description of production tests on the grinder. (L10; Al, ST, Ti)

400-L. Heavy Parts--Deburring by Vibration. Paul C. Moushey. Grinding and Finishing, v. 7, Mar. 1961, p. 44-46.

A method of deburring castings and heavy components of engine, turbines and hydraulic rotors and others using a vibrator machine and an abrasive mixture. Surface finish quality and appearance of the parts. (L10; 5)

401-L. Surface Finishes for Aluminum. Aluminium Courier, Dec. 1960, p. 16-19.

Summary of mechanical and chemical treatments, vitreous enamelling, painting, anodizing and electroplating techniques for Al. (L-general; Al)

402-L. Electrodeposition of Tin From the Potassium Stannous Pyrophosphate Bath. Vasanta Sree. Journal of Scientific & Industrial Research (India), v. 20D, Jan. 1961, p. 18-22.

Comparison of the electrodeposition of Sn on Pt or Cu from pyrophosphate and stannate plating baths. Baths are compared as to cathode efficiency, plating speed, bath voltage, resistivity, throwing power and anode control. 11 ref. (L17; Cu, Pt, Sn)

403-L. (English.) Electrolytic Deposition of Alpha and Beta Modifications of

Cobalt. N. Pangarov and S. Rashkov. Comptes Rendus de l'Academie Bulgare des Sciences, v. 13, July-Aug. 1960, p. 439-442.

Electrodeposition from a $CoSO_4$ + H_3BO_3 + NaCl solution using two Co plates as anodes and a 0.5 mm. diameter (Pt) wire as a cathode. The effects of temperature, current density and the addition of low-surface tension substances on the structure of Co deposits are studied by means of X-ray diffraction. 6 ref. (L17c; Co)

404-L. A New Stellite Hard-Facing Process. Machinery (London), v. 98, Mar. 8, 1961, p. 538-539.

Powder welding of Co based and Ni based deposits on oxidation resistant stainless steel. The steel is cleaned and preheated to 600-700° C. prior to hard facing at 1170-1020° C. with oxy-acetylene torch. A protective coating is deposited which is heat, abrasion and corrosion resistant. (L24; SS, Co-b, Ni-b, 6)

405-L. Jaguar Buys Big Stake in Chrome's Future. Metalworking Production, v. 105, Mar. 8, 1961, p. 68-69.

Design and operation of a semi-automatic Cu-Ni-Cr electroplating installation for automobile components and trim. (L17, 1-52, T21a; Cu, Cr, Ni, 17-57)

406-L. Barrel Plating With Gold. P. G. L. Vivian. Product Finishing, v. 14, Mar. 1961, p. 64-66.

Barrel plating of contacts for electronic apparatus using an Au-KCN solution to obtain corrosion and wear resistant deposits. Formulas are derived for calculating average batch thickness. (L17, Ti; Au)

407-L. Pick the Right Paint for the Job. J. E. Spector. American Machinist/Metalworking Manufacturing, v. 105, Mar. 20, 1961, p. 135-137.

A guide to surface preparation, selection, application and drying of organic and synthetic resin paints for metal surfaces. Suggestions are made for repainting machine tools, office and plant equipment, furnishings and other fabricated metal products. (L26, T-general)

408-L. Current-Distribution Improving Aids. Robert H. Rousselot. Metal Finishing, v. 59, Mar. 1961, p. 57-63.

Fundamental principles of current distribution during electrodeposition. Effects of shield, conducting shell, bipolar conductor, auxiliary anodes and auxiliary cathodes on the current distribution in a two-dimensional field. (L17b)

409-L. Science for Electroplaters. Pt. 64. Nickel Plating--Watts Bath. L. Serota. Metal Finishing, v. 59, Mar. 1961, p. 66-70.

Effect of current density and temperature on the concentration gradient in the electrolyte at the cathode. Influence of temperature, current density and pH on the characteristics of deposited Ni. (To be continued.) (L17; Ni)

410-L. Produce One-Coat PE Products on New Low-Carbon Steels. Ceramic Industry, v. 76, Mar. 1961, p. 54-57.

Production experiences with one coat porcelain enameling of decarburized steels. Control of metal preparation processes. (L27; ST)

411-L. (Japanese.) Spangles in Hot-Dip Galvanized Coating. Genjiro-Mima, Kazuo Kajikawa and Tadashi Kato. Tetsu-to-Hagane (Iron & Steel Institute of Japan, Journal), v. 47, Feb. 1961, p. 129-133.

Influence of Al and Sn additions to the electrolytic Zn bath on the shape, size and aesthetic appearance of spangles (flowers of Zn) formed on hot dip galvanized coatings. Nucleation and growth rates are determined as a function of super cooling and time. 4 ref. (L16; ST, Zn)

412-L. Anodic Oxidation of Palladium. A. Hickling and G. G. Vrjosek. Faraday Society, Transactions, v. 57, Jan. 1961, p. 123-129.

The anodic oxidation of Pd in acid, neutral and alkaline solutions is investigated by the charging-curve technique using the cathode-ray oscillograph and the breaks in the oscillograms are compared with the experimental potentials of redox systems which are likely to be formed. 11 ref. (L19)

413-L. Sprayed Metal Coatings in the Gas Industry. R. E. Mansford. Chemistry & Industry, Feb. 11, 1961, p. 150-160.

Protection of steel structures and equipment of gas plants from corrosion

by atmosphere and gas by-products using sprayed Al and Zn coating. Survey of paint systems for application over sprayed metal coatings. Use of sprayed Al and Ni alloy coating for protection of steel, cast iron and Cu alloys against oxidation at elevated temperatures. 14 ref. (L23, T29; ST, CI, Cu, Al, Zn, 17-57)

414-L. Chromallizing Protects Missile Probes From High Temperature Damage. Product Engineering, v. 32, Feb. 20, 1961, p. 17.

Alloy diffusion process development which lessens problems of oxidation and metal erosion of Mo alloy probes for guided missiles. The process is based on diffusion of complexes of Cr and other metals into the surface of the probe. (L15; Mo, Cr)

415-L. Maritime Foundry Slashes Cleaning Costs. Canadian Metalworking, v. 24, Mar. 1961, p. 38-39.

Use of a machine with abrasive separation facilities for knocking out sand cores and blast cleaning of gray iron castings. (L10c, 1-52; CI-n, 5-60)

416-L. Phosphate Coating and Lubricating Steel for Cold Extrusion. D. James. Sheet Metal Industries, v. 38, Mar. 1961, p. 171-189, 207.

Chemistry of Zn phosphate coating process and properties of phosphate coatings and lubricant films in degreasing, pickling, coating and lubricating treatment of steel slugs. 17 ref. (L14b, 18-73; ST)

417-L. A Survey of Recent Developments in Chromium Plating. L. W. Baier. Metal Finishing Journal, v. 7, Mar. 1961, p. 89-95.

Plating solutions and conditions for obtaining decorative and wear resistant coating. Effect of plating temperature and current density on quality and durability of Cr overlays and porosity and cracking of plating. Plating procedures for steel, cast iron and Al, including barrel and alloy plating. 18 ref. (L17, 10-54; ST, CI, Al, Cr)

418-L. Metal Finishing Technology--A Student's Guide. Pt. 7. A. Alexander. Metal Finishing Journal, v. 7, Mar. 1961, p. 97-100.

Analysis of conditions at the interface between a metal and an electrolyte, with calculation of potential differences at the metal-solution juncture. Effect of polarization and passivity of the electrodes, decomposition voltage and overvoltage. (L17)

419-L. Plastic Coated Metal Sheet. Corrosion Prevention & Control, v. 8, Mar. 1961, p. 47-48, 49.

Steel, Al and Mg sheets are coated with polyvinyl chloride plastic foil by heating the foil and the sheet which is pretreated for adherence to 160° C. and rolling. In another method, a p.v.c. plastisol or organosol is applied by roller and curtain coating or by spraying on cold or preheated sheets which are then heated to coalesce the plastic particles into a continuous film. (L26p; ST, Al, Mg, 4-53)

420-L. Flame Sprayed Plastics Coatings. Corrosion Prevention & Control, v. 8, Mar. 1961, p. 49-50.

Large metal valves, pump bodies, rollers, impellors and mixers are coated with plastic powder and nylon by flame spraying techniques. (L26p)

421-L. Range of Dip-Coated Plastics Extended. Corrosion Prevention & Control, v. 8, Mar. 1961, p. 50-51.

Wire and other metal articles are dip coated with polythene, cellulose acetate butyrate, p.v.c. and plastisol thermoplastics. Properties of plastics and epoxy resin powders are reviewed for application to electronic apparatus. (L26p, T1; 4-61)

422-L. Vinyl Resin and Glass Fiber Properties Combined. Corrosion Prevention & Control, v. 8, Mar. 1961, p. 51-52.

A formulated polyester resin for bonding glass fiber reinforcement intimately to a prepared vinyl sheet producing a strong homogeneous laminate. Application in tanks, containers, pipes and allied equipment in chemical, food and processing industries. (L26p, T-general, 17-57)

423-L. Metallic Pigments for Anti-Corrosion Primers. Corrosion Prevention & Control, v. 8, Mar. 1961, p. 54-56.

Flake Al and Mg and powdered Fe are alloyed with Zn dust to produce a metallic paint for application to Al, Mg and steel to prevent corrosion. Similar

paints under research would include a binder, Fe powder, Mg, Cu, Zn, Pb oxide or powder and active charcoal. (L26p, R-general; Al, Mg, ST)

424-L. Recent Developments in the Electrodeposition of Zinc and Cadmium. T. E. Such. Electroplating and Metal Finishing, v. 14, Mar. 1961, p. 79-83.

Survey of plating methods and properties of coatings; baths and coatings, including corrosion protection offered by Cd and Zn coatings; composition and characteristics of cyanide, sulphate, chloride, pyrophosphate and fluoberate solution for Zn plating and a bath for deposition of Sn-Zn alloys. (To be continued.) (L17; Cd, Zn)

425-L. Mechanical Polishing of Precious Metals. W. Burkart, H. Silman and C. R. Draper. Electroplating and Metal Finishing, v. 14, Mar. 1961, p. 85-88.

Review of surface conditions and defects of Au, Ag and Pt metal surfaces and methods and compounds for cleaning and surface finishing, including causes of spotting, staining and clouding and sanding, brushing and barrel polishing techniques. (L10, 10-54; EG-c31, Au, Ag, Pt)

426-L. Polishing of Steel With a Jet of Electrolyte. E. Yu. Yuganson. Electroplating and Metal Finishing, v. 14, Mar. 1961, p. 96-97.

Jet of orthophosphoric acid-sulphuric acid solution used for electropolishing of steel parts. Design and operation of electropolishing apparatus. (L12g, L13p, 1-52; ST)

427-L. Spread of Molten Tin on Mild Steel Reduced in Hydrogen or Treated With Molten Fluxes. E. T. Turkdogan and Susan Zador. Iron and Steel Institute, Journal, v. 197, Mar. 1961, p. 233-239.

Effects of reduction for various lengths of time and at 750° C. in dry or wet hydrogen and treatments with molten chloride fluxes on the tinning of mild steel strips. Electromotive force of measurement of Fe-flux-Sn galvanic cells to determine reactions occurring during tinning operations in the presence of fluxes. 10 ref. (L16, P13h, P15g, 2-64; CN, Sn)

428-L. Mechanical Plating: A Solution to Hydrogen Embrittlement? Iron Age, v. 187, Mar. 30, 1961, p. 107-109.

Use of mechanical plating, a process in which small metal-powder particles are cold welded onto parts in a wet tumbler, to prevent embrittlement when applying thickly plated protective coatings. (L29)

429-L. Upgrading Materials With Wear-Resistant and Refractory Coatings. Western Machinery and Steel World, v. 52, Mar. 1961, p. 46-48.

Flame and plasma processes for applying thin resistant coatings of metals, oxides and carbides to ordinary metals and other base materials to increase wear, abrasion and corrosion resistance. (L29)

430-L. (Translation-ConBur.) Cathodic Liberation of Vanadium Compounds. A. S. Goncharenko and O. A. Suvorova. Journal of Applied Chemistry of the USSR, v. 33, Apr. 1960, p. 847-850.

Study of the electrolysis of alkaline solutions containing quinquevalent vanadium to determine polarization curves and the nature of the resulting vanadium compounds. 14 ref. (L17; V)

431-L. (Translation-ConBur.) Influence of Impurities in Sulphamate Electrolyte on the Quality of Cathodic Tin. A. I. Levin and Chang Kuo-heng. Journal of Applied Chemistry of the USSR, v. 33, Apr. 1961, p. 855-860.

Influence of Cu, Fe, Pb, Sb, As, Bi and Zn impurities in the electrolyte on the composition and structure of the Sn deposit. 5 ref. (L17; Sn)

432-L. (Japanese.) Effects of Pattern Shape and Dimensions on Nickel Electroplating. Naoji Kinoshita and Isoji Toyoshima. Institute of Physical and Chemical Research, Reports, v. 36, Sept. 1960, p. 444-449.

Electrodeposition of Ni on a notched pattern from a 50° C. salt bath which is agitated by rotation of the cathode, bubbling with air or supersonic vibration. Data are given for the effect of agitation, current density and pattern shape on plating efficiency. (L17; Ni)

433-L. (Polish.) Defects of Galvanized Bull-Rope Cables. Zygmunt Jasiewicz, Adam Mazur and Boleslaw Mazela. Hutnik, v. 27, Oct. 1960, p. 368-372.

Technological causes of defects in Zn coatings on steel cables for use in

mines. Effects of patenting and electroplating conditions on uniformity, thickness, porosity, microhardness and adhesion (particularly during twisting) of the coatings. 3 ref. (L16, T7g; ST, 17-57)

434-L. Burrs Spur Finishing Progress. Iron Age, v. 187, Apr. 13, 1961, p. 77.

Use of bearingizing tools and high-speed steel cutting blades to deburr materials of 300 Bhn. and above. (L10; SGB-q)

435-L. Superior Plating Shows the Way. Metal Finishing, v. 59, Apr. 1961, p. 45-48.

Plating of Au, Ag, Rh, Pt and other precious metals on electronic and missile parts. Plating thickness is determined using an electronic thickness tester. Automatic Zn, Cd, Cu and Nichrome platings are also produced. (L17, T1, T24e; Ag, Au, Pt, Rh)

436-L. Electroplated Coatings in Boriding of Steel. Larissa Domnikov. Metal Finishing, v. 59, Apr. 1961, p. 49-51, 53.

Study of Ni and Cu platings as a means of protecting local areas during the boriding of steels. (L17, J28; ST, Cu, Ni)

437-L. Electroless Gold Plating. S. Duffield Swan and E. Lamar Gostin. Metal Finishing, v. 59, Apr. 1961, p. 52-53.

Electroless Au platings are deposited on small electronic and missile parts by chemical reduction of the Au in solution. Deposition of electroless Au over electroless Ni produces a very high finish. (L28, T24e; Au)

438-L. Production of Coated Aluminum. James S. Nelson. Metal Finishing, v. 59, Apr. 1961, p. 61-63.

Roll coating of Al strip with a thermosetting acrylic resin. The finished product has good exterior durability and a good balance of characteristics for formability. (L26p; Al)

439-L. Science for Electroplaters. Pt. 64. Nickel Plating--Watts Bath. L. Serota. Metal Finishing, v. 59, Apr. 1961, p. 64-66.

Effect of temperature, pH and current density on the cathode efficiency of a Watts electroplating bath are determined by measuring the weight of Ni deposited on an Au rod. The relationship between the cathode efficiency and the throwing power of the bath is shown. (L17a; Ni)

440-L. Low Cost Way to Coat Pipe. Materials in Design Engineering, v. 53, Apr. 1961, p. 10-11.

Development of a powder process for coating the inside of metal pipe with various thermoplastics. (L26p; 4-60)

441-L. (German.) Electrolytes for Polishing and Etching of Austenitic Chromium-Nickel and Manganese Steels. Guido Bassi. Zeitschrift fur Metallkunde, v. 52, Feb. 1961, p. 141-142.

Electrolytic polishing and etching of CrNi steel (10.5% Ni, 18.8% Cr) and Mn steel (11.7% Mn, 1% C) using electrolytes free of perchloric acid which allow polishing at low voltages (5-15 volts) at polishing times from 2-5 min. Composition of electrolytes. (L13; SS-e)

442-L. Electroplating Technique and pH Value. Corrosion Technology, v. 8, Mar. 1961, p. 92.

Effect of hydrogen ion concentration in plating bath on pH discoloration, brittleness and roughness of plated parts. (L17a)

443-L. Organic and Metallic Finishes. R. J. Brown. Metal Industry, v. 98, Mar. 24, 1961, p. 229-230.

Electroplating of automotive Zn-alloy die castings, steel, brass and stainless iron with Ni, Cr and Cd. Review of corrosion and thickness tests for castings. Use of metallized plastic materials. (L17, T21; Cu-b, Fe, ST, Zn-b, Cd, Cr, Ni)

444-L. (French.) Throwing Power of Nickel and Other Solutions Used in Electroplating. S. A. Watson. Galvano, v. 30, Jan. 1961, p. 24.

The throwing power of Ni, Co-Ni, Sn-Ni, Cu and Cr baths as investigated by a new method using the Hull cell. (L17b; Ni-b, Co-b, Cr-b, Cu-b, Sn)

445-L. (French.) Structure of Electrolytic Copper Deposits. G. G. Storey and S. C. Barnes. Galvano, v. 30, Jan. 1961, p. 26.

Influence of working conditions on the structure of Cu deposits from acid baths,

determined by microscopic, X-ray diffraction and optical goniometric examination. (L17c, M-general; Cu)

446-L. (Italian.) Departmental Modernization and Reorganization by Introduction of White-Metal Coatings. F. Forti and R. Indrigo. Fonderia Italiana, v. 9, Dec. 1960, p. 475-483.

Centrifugal casting, vibration solidification, degreasing, surface treatment by sand blasting and by $ZnCl_2$ dip tinning methods in a plant for steel friction-wear resistant parts for Diesel engines and turbines. 13 ref. (L16, L-general, E14, T21e; ST, Sn-b, 17-57)

447-L. Electrocleaning: A Report on Current Practice. Products Finishing, v. 25, Jan. 1961, p. 50-52, 54, 56, 58, 60.

Review of principles and application of cathodic and anodic electrocleaning and factors which affect cleaning quality. (L13n)

448-L. Painters' Problems. Pt. 2. Products Finishing, v. 25, Jan. 1961, p. 62, 64, 66, 68, 70, 72, 74.

Panel discussion of chemical conversion, dip galvanizing, anodic coating, painting and organic coating. Problems such as blistering and poor adherence and resistance to corrosion. Methods are evaluated for obtaining coating with optimum qualities. (L-general, 10-54)

449-L. Nickel Plate Cuts Buffing Costs. Products Finishing, v. 25, Jan. 1961, p. 76-79.

A bright nickel deposit, Superlume, with good leveling properties is used to fill in roughness on brass hardware items, eliminating much of the subsequent buffing operation. (L17; Cu-n, Ni)

450-L. Why Barrel Zinc Plating of Carbonitrided Steel Is Difficult. Products Finishing, v. 25, Jan. 1961, p. 84, 86, 88, 90.

Incomplete coverage or complete lack of deposition of Zn caused by deplating that takes place in the cyanide solutions when no current is passing from anode to cathode, resulting in anodic dissolution, because of the cathodic reaction of carbonitrited steel with Zn. (L17; ST, Zn)

451-L. (Russian.) Electrodic Polarization During Electrolytic Deposition of Cd, Sn and Sb. P. N. Kovalenko and K. N. Bagdasarov. Ukrainskii Khimicheskii Zhurnal, v. 26, May 1960, p. 573-578.

Electrodeposition of Cd, Sn and Sb using cathodes of Al, Nichrome or Pt plated either with Cu or Ni. Effect of cathode, temperature and pH on cathodic voltage, effective activation energy and deposition rate. 11 ref. (L17; Cd, Sb, Sn)

452-L. Present and Future Problem Areas for High Temperature Inorganic Coatings. J. D. Walton, Jr. American Ceramic Society Bulletin, v. 40, Mar. 15, 1961, p. 136-141.

Thermal and corrosion protection of rocket and missile parts with high-temperature inorganic coatings which are effective at 2500-5000° F. Substrates being coated are graphite, W, Mo, Cb and Tb. Deposition of $SiCl_4$, Rh, Al-Si, Teflon, Micarta, phenyl silane and silica is by vapor plating, electroplating, cementation, arc spraying, flame spraying and arc evaporation followed by sintering. (L-general, T24e)

453-L. Vapour Plating the Nuclear Metals. Australasian Manufacturer, v. 45, Mar. 4, 1961, p. 91.

Dry plating of uranium by diffusion bonding with Ni carbonyl, Mo carbonyl and W carbonyl at 600-650° C. Coating by deposition of Zr and Ti vapors. Coating by reduction of Mo halide, W halide, Ta halide and Cb halide. (L15, L18, L25g; U, Mo, W, Ni, Zr, Ta, Cb, Ti)

454-L. Lacquer Coating of Aluminum Magnesium Alloys. R. D. Guminski and F. M. P. Meredith. Oil & Color Chemists' Assoc., Journal, v. 44, Feb. 1961, p. 93-110.

Failure of lacquer coatings on Al-Mg alloys during deformation is traced to a hard, brittle and slightly alkaline oxide film formed during production. Correction of poor lacquer adhesion by applying an acid, chemical or electrochemical pretreatment. (L26n; Al-b, Mg)

455-L. Spray Phosphoric Acid Pickling. H. J. McVey. Paper from "Porcelain Enamel Institute Forum, Proceedings". v. 20. Porcelain Enamel Institute, Inc., Washington, D. C., 1958, p. 26-28.

Application of acid pickling by spraying instead of immersion for surface preparation of Fe for subsequent porcelain enameling. Method offers continuous sludge-free operation with constant solution composition, a high rate of pickling with uniform and consistent metal loss and a more economical process. (L12g; Fe)

456-L. Pickling Procedures--Adjustments for Various Soils. Harold C. Wilson. Paper from "Porcelain Enamel Institute Forum, Proceedings". v. 20. Porcelain Enamel Institute, Inc., Washington, D. C., 1958, p. 29-31.

Methods for removing various types of soil that are incurred during drawing and forming operations. Metal preparation for porcelain enameling. (L12g)

457-L. Growth of Aluminum During Porcelain Enameling. A. L. Sopp, Jr. Paper from "Porcelain Enamel Institute Forum, Proceedings". v. 20. Porcelain Enamel Institute, Inc., Washington, D. C., 1958, p. 88-91.

Factors affecting dimensional change in Al alloy specimens during firing. Measurements by a dial-gage extensometer are made of initial length, length after firing at 980° F. for 10 min. without coating and length after firing with porcelain enamel coating. Influence of alloy composition, metal thickness and enamel processing variables on the magnitude of change of length. (L27, P10d; Al-b)

458-L. Base Metals for One Coat Porcelain Enameling. R. L. Myers. Paper from "Porcelain Enamel Institute Forum, Proceedings". v. 21. Porcelain Enamel Institute, Inc., Washington, D. C., 1959, p. 38-39.

Review of the properties of various base metals (enameling sheet, cold rolled sheet, Univit and Ti Namel) as they affect one coat enameling. Properties discussed are uniformity, chemical composition, bond development, sag resistance, enamel fishscaling and boiling and workability range. (L27; 4-53)

459-L. Ultrasonic Cleaning Improves Reliability of Precision Ball Bearings. M. Tamas. Microtecnic, v. 15, Feb. 1961, p. 12-14.

Ultrasonic cleaning of miniature ball bearing parts in aqueous solutions, trichlorethylene or perchlorethylene excited by ceramic transducer. (L12, 1-74, T7d)

460-L. Electroforming Waveguide Parts. N. J. Pierce. Bell Laboratories Record, v. 39, Apr. 1961, p. 138-141.

Electroplating of Cu on Al, stainless steel, wax and plastic mandrels in an acid bath of copper sulphate. (L17, T1; Al, SS, Cu)

461-L. Chromizing Turns Steel Into Stainless. Chemical Engineering, v. 68, Mar. 20, 1961, p. 188-192.

Effect of a Cr coating applied by a diffusion process on corrosion resistance, Rockwell hardness, wear and heat resistance of carbon steels. (L15; CN, Cr)

462-L. Electrocrystallization of Copper on Single Crystal Spheres. Pt. 1. Morphology of the Deposit. N. A. Economou and D. Trivich. Electrochimica Acta, v. 3, Jan. 1961, p. 292-297.

Study of electrodeposition of Cu from an acid Cu bath on single crystal Cu spheres in the current density range of 1-20 mA per cm.^{2} Resulting growth structures are dependent on the base crystal and determined by a principal pole representing one of the densest planes of Cu (100), (110) and (111). 14 ref. (L17; Cu, Cu)

463-L. Electrocrystallization of Copper on Single Crystal Spheres. Pt. 2. Tracer Measurement of Distribution of the Deposit. N. A. Economou and D. Trivich. Electrochimica Acta, v. 3, Jan. 1961, p. 298-306.

Use of tracer techniques to study the distribution of Cu electrodeposited on single crystal Cu spheres from an acid Cu bath. Results indicate that minimum deposit thickness is dependent on average current density rather than plating time. 5 ref. (L17; Cu, Cu)

464-L. Calculation of Potential Energy Profile Diagrams for Processes in Electrolytic Metal Deposition. B. E. Conway and J. O'M. Bockris. Electrochimica Acta, v. 3, Jan. 1961, p. 340-366.

Construction of potential and free energy profile diagrams for successive and alternate steps in electrolytic metal deposition. Processes considered include ion transfer to different types of

metal surface sites, surface diffusion of adsorbed ions and successive dehydration of adsorbed ions in lattice building. 66 ref. (L17)

465-L. "Triple Threat" Protection for Cooling Water Systems. Chemical Processing, v. 24, Apr. 1961, p. 90-91.

Chemical pretreatment of surfaces in cooling water systems by a compound for removing organic and inorganic deposits and by rendering the metal surface inert to all chemicals except the filming inhibitor contained in the solution. (L12, W10g)

466-L. (French.) Protection of Surfaces Against Oxidation at Elevated Temperatures. J. Tragnan. Metallurgie, v. 22, Mar. 4, 1961, p. 43-46.

Application of coatings of plastic, Al, Ni-Cr alloy, cermets, refractories by the Schoop process. Choice of coating is dependent upon temperature. (L23)

467-L. (Japanese.) Observation of the Appearance of the Boundary Surface Between Enamel-Glass and Metal. Mechanism of Adherence of Aluminum Enamels. Toshio Yamada. Ceramic Association of Japan, Journal, v. 69, no. 781, 1961, p. 29-33.

Effect of oxide film compactness and uniformity as formed by anodic oxidation on the base metal on the adherence of enamel to Al plate. Metal-oxide-enamel interface bonding and diffusion are compared by metallographic and electron microscopy with conditions produced by surface chemical treatment. 3 ref. (L19, L27, M-general; Al-b, 4-53)

468-L. Phosphating in Cold Solutions. Robert C. Gibson. Metal Progress, v. 79, Apr. 1961, p. 100.

Improved techniques such as cold phosphating have resulted in expanded applications for phosphate coatings in protecting metal surfaces from corrosion and in preparing them for paints, vinyl and plastisol finishes. (L12, L14b)

469-L. Phosphating in a Nonaqueous Solution. Metal Progress, v. 79, Apr. 1961, p. 103.

Nonaqueous phosphating solutions based on trichlorethylene combine fast action and low operating costs. They can be used in separate tanks to process parts in batches or in automatic machines which degrease, phosphate and finish parts with paints thinned with trichlorethylene. (L12, L14b)

470-L. (Dutch.) The Fine-Honing of Surfaces. J. Tiedemann. Metaalbewerking, v. 26, Jan. 19, 1961, p. 286-290.

In the surface perfection of automotive parts such as crankshafts, camshafts, piston pins and valve stems, honing is given preference to other polishing methods because it reduces the roughness without creating a heat influenced surface layer. Effects of rotation speed, contact pressure, stone frequency and amplitude on surface quality. (L10h)

471-L. (German.) Processing Techniques in Nonferrous Semifinished Product Industry. Pt. 3. Ernst Muller. Zeitschrift fur Metallkunde, v. 52, Mar. 1961, p. 147-152.

Continuous extrusion of Pb and Al cable coatings 10-12 mm. diameter by a process which eliminates stop marks on coatings caused by recharging of press. Design and operation of the extruding mechanism. (L22, T7g; Pb-b, Al-b, 17-57)

472-L. Kaiser West Virginia Plant Coats Coil 66 Inches Wide. Metal Products Manufacturing, v. 18, Apr. 1961, p. 67-68, 96.

Design and operation of a strip coating line which paints aluminum strip up to 66 in. in width at speeds up to 100 ft. per min. (L26n; Al, 4-53)

473-L. Control and Techniques in Barrel Finishing. J. Burr. Industrial Finishing, v. 13, Mar. 1961, p. 29-32.

Effects of chip size, mass level, water level, speed of rotation, work load, compound type and processing time on the finish obtained on metal components. (L10d)

474-L. "Stripping Problems" in Industry. W. B. Hanley. Industrial Finishing, v. 13, Mar. 1961, p. 37.

Use of hot alkali and solvent type strippers for the removal of durable finishes. (L12h, L12k)

475-L. Automatic Solvent Degreasing Plant. Industrial Finishing, v. 13, Mar. 1961, p. 38-41.

Equipment for immersion and vapor degreasing with trichloroethylene. (L12, 1-53)

476-L. Vibratory Movement Speeds Finishing. G. D. de Vere Weston. Industrial Finishing, v. 13, Mar. 1961, p. 42-45.

Rubber lined steel trough is coupled to vibrator mechanism to vibrate parts in a mass of chips, compound and water. Reduced damage and entanglement of parts, shorter processing times and other advantages of vibrator process compared to precision barreling. (L10d)

477-L. Spray Cleaning in Automation. C. Holman. Industrial Finishing, v. 13, Mar. 1961, p. 46.

Aqueous degreasing materials suitable for spraying. Their application to metal cleaning. Limitations of spray techniques. (L12)

478-L. Exceptional Choice of Pretreatments. G. Turner. Industrial Finishing, v. 13, Mar. 1961, p. 53.

Special degreasing materials for prephosphating, precleaning, pre-electroplating, previtreous enamelling, pregalvanizing and aluminum processing treatment. (L12)

479-L. (Russian.) Mechanism of Electrodeposition of Cr. A. V. Pamfilov and A. I. Lopyshanskaya. Ukrainskii Khimicheskii Zhurnal, v. 26, Apr. 1960, p. 461-465.

The significance of cathodic films during Cr electrodeposition is investigated using Cr, Pt and Hg electrodes and Cr^{51} radioactive tracers. Determination of electrode capacities and relation to current, electrode and electrolyte. 15 ref. (L17b, 1-59; Cr)

480-L. Reaction Studies of Ceramic-Coated Tungsten. C. G. Bergeron, V. J. Tennery and A. L. Friedberg. American Ceramic Society, Journal, v. 44, Apr. 1961, p. 156-160.

Microstructural and X-ray diffraction analyses of glass and zircon-coated tungsten wires after oxidation testing in air at 3000° F. Glass, monoclinic zirconia and tungsten oxides are present in the coating, suggesting the gradual migration of oxygen through the coating. 5 ref. (L27, M-general, R1h; W, 4-61)

481-L. Electropolishing and Chemical Polishing of High-Strength, High-Temperature Metals and Alloys. J. A. Gurklis, L. D. McGraw and C. L. Faust. Defense Metals Information Center, Battelle Memorial Institute, DMIC Memo. 98, Apr. 12, 1961, 14 p. (Available as PB 161248 from U. S. Office of Technical Services, Washington 25, D. C.)

Chemical and electropolishing of 300 and 400 stainless steels, Nimonic 80, Waspalloy, S-816 alloy, AMS 5615 alloy, Be, Ti and Te alloys, Cb, Ta, V and W to remove burrs, provide dependable antifriction surfaces and improve corrosion resistance because of the absence of differential surface stresses caused by mechanical finishing. 30 ref. (L12, L13p; Be, Cb, Ni-b, SS, Ta, V, W, SGA-h)

482-L. Flame-Sprayed Alumina. Metal Industry, v. 98, Mar. 31, 1961, p. 249-250.

Adhesion testing of flame-sprayed alumina coatings on metals to determine the effects of metal substrate roughness, alumina particle velocity and alumina layer cooling rate on band strength and coating characteristics. (L23)

483-L. Thick Chromium Plating for Better Corrosion Resistance. Precision Metal Molding, v. 19, Apr. 1961, p. 59-61.

Increased bath operating temperature, current density and chromic acid to sulphuric acid ratio are used to produce thick, crack-free Cr platings. (L17; Cr)

484-L. (Italian.) Control of Sealing Processes of Anodic Oxidation Layers by Drop Tests. F. Sacchi and G. Paolini. Alluminio, v. 30, Jan. 1961, p. 9-17.

Quality control testing of anodic oxidation layers on Al after immersion into HNO_3 by a 2% alcoholic solution of methyl violet. Effect of Ni salt sealing and aging of oxidation layers. 4 ref. (L19, 1-54; Al)

485-L. (French.) Anodes. Galvano, v. 30, Feb. 1961, p. 81-86.

Review of inert, insoluble, auxiliary and bipolar anodes. Survey of applications and roles in the electrolytic process. 22 ref. (L17, W3h)

486-L. (French.) Chromium-Plating Baths. Guy Bacquias. Galvano, v. 30, Feb. 1961, p. 89-90.

Composition and application of baths based on chromic and sulphuric acid, sulphates, fluosilicide and potassium fluoride. Evaluation of classical, self-regulating high speed and Bornhauser baths. (L17c; Cr)

487-L. (French.) Defects in Electrolytic Deposits: Pinholes. H. Richter. Galvano, v. 30, Feb. 1961, p. 91-93.
Role of hydrogen in pinhole formation. Preventive measures in the electrodeposition of Cd. (L17, 2-60, 9-68; Cd, H)

488-L. Molten Caustic De-Sands Cylinder Heads. Metalworking Production, v. 105, Apr. 5, 1961, p. 54-55.
Leaching of sand particles from diesel engine cylinder head castings by pickling the castings in molten NaOH at 500° C. for 25 min. (L12g; 5)

489-L. (Translation-Brutcher no. 4930.) Diffusional Boride Coatings on (NF) Metals. A. N. Minkevich. Izvestiya Vuz-Chernaya Metallurgiya, July 1960, p. 171-179.
Production and properties of boride coatings on refractory metals obtained by liquid boronizing in fused borax with boron carbide additions and by vacuum treatment in powders of metallic boron or boron carbide. (L15; EG-d37)

490-L. (Italian.) Standard Specifications for Nickel Plating on Copper and Zinc Base Alloys. Nickel, Dec. 1960, p. 13-14.
Minimum thickness requirements for Ni deposits. (L17c, S22; Cu-b, Zn-b, Ni)

491-L. Designing With Vinyl-Metal Laminates. James K. Baker. Machine Design, v. 33, Apr. 27, 1961, p. 102-107.
Design factors in selecting and specifying vinyl films for lamination to cold rolled, aluminized and stainless steels, galvanized Zn tinplate, Al and Al alloys and Mg. Technique for welding brackets, studs and body joints in vinyl-metal parts. (L22; Al-b, Mg, ST)

492-L. Nickel Dip. N. S. C. Millar. Institute of Vitreous Enamellers Bulletin, v. 11, Mar. 1961, p. 77-84.
Flash coating of Ni on sheet steel by galvanic and chemical reduction processes in preparation for enameling. Coating prevents oxidation and results in consistently good adhesion. 7 ref. (L16; ST, Ni, 4-53)

493-L. Applications of Tin-Nickel. Product Finishing, v. 14, Apr. 1961, p. 54-56.
Corrosion resistance, low coefficients of friction and high reflectivity in infrared region make Sn-Ni suitable for plating analytical weights, watch parts, musical instruments, drawing instruments, domestic hardware and reflectors for infrared ovens. (L17; Ni, Sn)

494-L. Electroless Nickel Plating. G. Fitzgerald-Lee. Product Finishing, v. 14, Apr. 1961, p. 60-61, 79, 99, 101.
Techniques for plating by chemical reduction. Properties and applications of chemically deposited Ni. Response of deposits to heat treatment. (L28; Ni)

495-L. Adherence of Electrolytic Coatings. Product Finishing, v. 14, Apr. 1961, p. 81-84.
Obstacles to good adherence. Importance of reactive surfaces. Electrolytic degreasing with and without cyanide. Degreasing combined with electrodeposition of Cu. (L17, L12; Cu)

496-L. A Service to Industry. Product Finishing, v. 14, Apr. 1961, p. 88-90.
Hard anodizing of Al. Properties of hard anodic films. Applications; decorative anodizing. (L19)

497-L. A New Cobalt-Nickel Sulphamate Bath. Ignatius Tsu. Plating, v. 48, Apr. 1961, p. 379-381.
Sulphamate bath for electroplating of Co-Ni films having a wide range of magnetic properties. Effect of chloride ions on bath performance. 13 ref. (L17; Co, Ni)

498-L. Porosity of Electrodeposits. Causes, Classification and Assessment. Artur Kutzelnigg. Plating, v. 48, Apr. 1961, p. 382-387.
System of classification and symbols for different types of pores and cracks encountered in electrodeposits. Causes of and principle method of assessing porosity. 30 ref. (L17, 9-68)

499-L. Deposition of Iron From Salts of Fluoro Acids. Jean H. Connor and Vernon

A. Lamb. Plating, v. 48, Apr. 1961, p. 388-389.

Performance of Fe plating baths based on ferrous salts of several fluophosphoric acids and of trifluoroacetic acid and heptafluorobutyric acid. Nature of deposits. (L17; Fe)

500-L. Seal Leakage Reduced by Blasting. Grinding and Finishing, v. 7, Apr. 1961, p. 32-33.

Wet blasting with ultrafine glass beads produces a nondirectional finish on steel shaft which reduces leakage between the shaft and the rubber seal. (L10c; ST)

501-L. Plating Aluminum for Exterior Service. Products Finishing, v. 25, Apr. 1961, p. 34-37.

Al is electroplated by various techniques using Cu-Ni-Cr plate. Preparatory processes are either zincate immersion or phosphoric anodizing. It is found that Al panels plated heavily with Zn prior to regular Cu-Ni-Cr plating show best corrosion resistance. (L17; Al, Cr, Cu, Ni)

502-L. Precision Buffing of Weight for Analytical Balances. Products Finishing, v. 25, Apr. 1961, p. 82, 84, 86.

Permanent-mass, nonmagnetic stainless steel alloy precision-made weights are buffed to a smooth bright finish by an automatic buffing machine equipped with 24 spindles. Production rate 500 per day. (L10a; SS)

503-L. Refractory Metal and Non-Metal Coatings Deposited at Higher Rates With New Electron Beam Evaporator. Industrial Heating, v. 28, Feb. 1961, p. 352.

Remote controlled electron beam gun is capable of producing a thin film coating on microminiaturized electronic circuitry, optical filter film and similar thin metallic or nonmetallic materials. (L29, T1)

504-L. (Translation-ConBur.) Electroplating of Copper and Cadmium on Solid Electrodes Using High Current Densities. G. A. Emel'yanenko and E. Ya. Baibarova. Academy of Sciences of the USSR, Proceedings, Physical Chemistry Section, v. 129, Nov-Dec. 1959, p. 1045-1047.

Study shows that under the above conditions electrochemical changes occurring on the solid electrodes may be explained by delayed discharge and concentration polarization. When solution in vicinity of cathode becomes deficient in discharging metal ions, making the potential more negative, the process rapidly becomes controlled by diffusion instead of by the electrochemical reaction. At the same time, the electroplated metal changes from a compact to a loose deposit. (L17; Cd, Cu)

505-L. Drying Ovens Facilitate New Technique for Rust-Proofing Automobile Bodies. Industrial Heating, v. 28, Mar. 1961, p. 537-538, 540, 551.

Rust proofing sequence includes cleaning in alkaline solution, rinsing, bonderizing at 130° F., chromic acid conditioning and dip and spray coating with rubber-base water emulsion. Parts are baked in gas-fired ovens with four control zones. (L16, L26n, T21a)

506-L. (German.) Roughening of Metal Surfaces by Pickling. H. Psille. Feinwerk Technik, v. 65, Jan. 1961, p. 1-4.

Review of pickling and etching of metal surfaces as influenced by pretreatment of metal, grain size, concentration and temperature of acid and alkaline pickling solution and after-treatments such as rinsing and drying. Measurement and assessment of surface roughness. (L12g, L12k, S15)

507-L. Painting Structural Steel on Conveyor Line. Industrial Finishing, v. 37, Apr. 1961, p. 30, 34.

Huge structural steel assemblies and subassemblies are spray painted from above and below as the steel moves along on a large cross bar conveyor measuring 15 ft. wide and 400 ft. long. (L26n; ST, 4-57)

508-L. Cleaning and Painting Steel and Aluminum Strip. Nathan Becker. Industrial Finishing, v. 37, Apr. 1961, p. 40-42, 44, 46, 48.

Steel and Al coiled strip is coated with baking enamel on both sides before shearing and forming operations are performed. Unwinding, splicing, cleaning and surface preparation. Paint is applied by roller coaters in a clean pressurized room and baked in an eight zone convection oven. Application of the strip for awnings, patio covers, boat shelters, carports and small airplane hangers. (L26n; Al, ST, 4-53)

509-L. Hardfacing Now With Flame-Sprayed Rod. Metalworking Production, v. 105, Apr. 19, 1961, p. 61-63.

A three stage spray flow process including preparation of steel workpieces by cleaning and machining, spraying of Stellite alloy in rod form by a spray pistol and fusing of the deposit by an oxy-acetylene torch, furnace or induction heating. Control of deposit thickness in the range 0.010-0.060 in. and of metallurgical structure. (L24; ST, Co-b)

510-L. Vapor Degreasing. H. E. Linsley. American Machinist/Metalworking Manufacturing, v. 105, Apr. 17, 1961, p. 127-140.

Trichlor and perchlor used in degreaser for metals. Description of various setups for installation, operation and maintenance of portable and vibratory degreasers. Vapor cycles, cleaning processes, toxicity and health hazards discussed. (L12j)

511-L. Vibratory Finishing. A. A. Poluchka. American Machinist/Metalworking Manufacturing, v. 105, Apr. 17, 1961, p. 141-142.

Rotation and vibration combine to produce a spiral orbital motion which reduces deburring and polishing time on cast iron, hardened steel and other metal parts. (L10d; CI, ST)

512-L. The Adhesion of Sprayed Molybdenum. R. T. Allsop, T. J. Pitt and J. V. Hardy. Metallurgia, v. 63, Mar. 1961, p. 125-131.

Study of the interfaces between Mo and mild steel, Co and brightray bases. Examination of the interfaces using both optical and electron microscopy reveals that interfacial layers are present. X-ray microanalysis indicates that the layer between the Mo deposit and the steel base is probably an alloy of Mo and Fe. (L23; CN, Co, Mo)

513-L. (French.) Electrolytic Polishing, a Process for Many Purposes. H. W. Bredin. Machine Moderne, v. 55, Mar. 1961, p. 48-50.

Adaptability of electrolytic polishing. Its effect on surface defects and surface brilliance. Lack of orientation of deposits. (L13p)

514-L. The Carbonyl Nickel Story. Union Carbide Metals Review, v. 4, Winter-Spring, 1961, p. 10-12.

Thermal decomposition of nickel carbonyl to electroform patterns and dies of pure Ni with speed, versatility, economy and accuracy. (L18; Ni)

515-L. A Note on Flame Spraying Developments. Lloyd Manuel. British Welding Journal, v. 8, Apr. 1961, p. 121-122.

Review of applications and advantages of wire powder and plasma flame metal spraying processes. Spraying material analyses and melting points are tabulated. (L23)

516-L. (German.) Cleaning and Passivation of Stainless Steels. Hans H. Reinsch. Metall-Reinigung+Vorbehandlung, v. 10, Mar. 1961, p. 33-34.

Cleaning of steel surface from oil, flux, scale, welding slag and metallic lubricants (Cu, Pb, Cd). Results of passivation tests using HNO_3 and HNO_3 + HF pickles and of anodic oxidation tests. Special treatment for passivation against H_2O_2. (L12g, R10c; SS)

517-L. (German.) Bright or "Lapidary" Polishing of Metal Goods. Thomas H. Curti. Metall-Reinigung+Vorbehandlung, v. 10, Mar. 1961, p. 35.

Bright polishing with and without after treatments (bright chromizing) of hard metals such as stainless steel, Pt alloys, Ni and Ni alloys, bronze, Au and Au alloys, using high-speed paper-covered steel polishing wheels. (L10b; Au-b, Cu-s, Ni-b, Pt-b, SS)

518-L. Zinc-Coated Steel. Southern Power & Industry, v. 79, May 1961, p. 74-75.

Application of Zn coatings to structural steel by hot dip galvanizing, electrogalvanizing, metallizing or spraying, sherardizing and painting. Zn coatings protect iron and steel by forming a mechanical barrier to exclude the corrosive attack of various atmospheres and by galvanic action. (L-general; Fe, ST, Zn)

519-L. Ultrasonics, the Sound You Cannot Hear. R. B. Allured. Detroit Engineer, v. 25, May 1961, p. 10-12.

Generation of ultrasonic energy and its use in cleaning, cutting, machining, welding and inspection. (L-general, G17, K-general, S13, 1-74)

520-L. (French.) Present State of Brass Plating and Some Applications. C. B. Hiott. Galvano, v. 30, Mar. 1961, p. 169-172.

Composition of the bath, current density, temperature and properties of the brass deposit on a Zn base metal. (L17; Zn, Cu-n)

521-L. Chromium Blanket Protects Missile Probe. Machine and Tool Bluebook, v. 56, May 1961, p. 106-107.

Diffusion alloy process using W-2 Cr surface alloy for the protection of Mo missile probes against oxidation and metal erosion caused by exposure to airstream temperatures of 1400° F. (L15, T24e; Mo, Cr)

522-L. Successful Joining of Aluminum With Stainless Steel. Light Metal Age, v. 19, Apr. 1961, p. 10.

Description of molecular bonding of Al sheet to stainless steel to produce stainless clad Al or Al clad stainless. Metallurgical characteristics and applications of the material. (L22; Al, SS, 4-53)

523-L. Recent Development in the Electrodeposition of Zinc and Cadmium. T. E. Such. Electroplating and Metal Finishing, v. 14, Apr. 1961, p. 115-118, 122.

Electrodeposition of Cd alloy. Preplating and postplating treatments to prevent corrosion, rust, galling, delayed fracture and hydrogen embrittlement in Zn and Cd plated parts. 24 ref. (L17; Cd, Sn, Zn)

524-L. The Effects of Some Addition Agents in Bright Nickel Plating. T. Shimuzu and K. Azada. Electroplating and Metal Finishing, v. 14, Apr. 1961, p. 126-128.

Testing of certain organic agents such as saccharin, butyne diol, naphthalene sodium sulphonate, gelatin and ethylene cyanhydrin in Ni plating solutions to determine their effects on brightness, leveling and stresses in the Ni deposit. 5 ref. (L17a; Ni)

525-L. Theory and Practice in Chromium Plating. J. Nugent. Electroplating and Metal Finishing, v. 14, Apr. 1961, p. 131-132.

Measurement of solution efficiency and throwing power in the electroplating of Cu, Ni and steel articles of varied size and shape with Cr. Determination of the optimum solution concentration. Use of air agitation to prevent gas pockets and deposit porosity. Reprocessing of rejects. (L17; Cu, Ni, ST, Cr)

526-L. Before Hardfacing...Analyze the Job. Welding Engineer, v. 46, May 1961, p. 70, 72, 74.

Factors of size and location of the area to be hardfaced, hardness of base material and wear, abrasion and corrosion resistance requirements as they affect choice of material for deposition and deposition techniques. (L24)

527-L. Heat Fused Ceramic Coatings for Aluminum Components of Rocket Launchers. T. Rice and T. Turner. Rock Island Arsenal Laboratory. U. S. Office of Technical Services, PB 171047, Oct. 1960, 15 p. $.50.

Ceramic coatings containing Pb-bearing and Pb-free frits, addition agents and pigments are applied to Al test panels. Coatings show excellent heat resistance but are deficient in abrasion resistance. (L27, T2p; Al)

528-L. Protective Coatings for Refractory Metals. C. G. Bergeron. Department of Ceramic Engineering (Wright Air Development Division). U. S. Office of Technical Services, PB 171193, Aug. 1960, 45 p. $1.50.

Evaluation of various ceramic coating systems for tungsten metal. These include silicide coatings, ceramic crystals in a glass matrix, zirconia clad coatings, vapor-deposited SiO and recrystallizing glasses. The most effective coating, which is effective for tungsten at temperatures of 3000° F., or higher, is a coating consisting of 35% glass and 65% zircon. (L27; W)

529-L. Factory Color Coating for Prefab Buildings. Haviland F. Reves. Metal Finishing, v. 59, May 1961, p. 61-65.

Description of forming, bonding, finishing and baking operations involved in color coating of galvanized steel panels. (L14; ST, 8-65)

530-L. Chrome Plating High-Loaded Components. Larissa Domnikov. Metal Finishing, v. 59, May 1961, p. 66, 73.

45 and 45 CrNi steels plated with Cr are tested to determine the effect of strengthening the parts by use of

rollers on the corrosion-fatigue resistance of the plated part. 4 ref. (L17; ST, Cr)

531-L. Science for Electroplaters. Pt. 65. Variables in the Watts Bath. L. Serota. Metal Finishing, v. 59, May 1961, p. 76-78.

Review of studies on the effects of bath current, pH and composition on physical properties of the Ni deposit. Causes and prevention of stress in deposits. (L17a; Ni)

532-L. Some Recent Advances in Anodizing Practice and Knowledge. F. C. Porter. Metal Finishing Journal, v. 7, Apr. 1961, p. 145-151.

Data are given for anodizing characteristics of wrought and cast Al. Compositions for chromic, sulphuric and oxalic acid baths. Brightening processes. Continuous anodizing. (L19)

533-L. (German.) Electroplating Processes Used in Screw Manufacturing. J. Garnier. Draht, v. 12, Mar. 1961, p. 95-101.

Review of processes for bolts and screws of carbon steel; Cr, Ni, Mo alloyed steel and nonferrous metals such as Al and Cu and their alloys. Topics include pretreatments such as pickling, descaling and degreasing; and plating operations and electrolytes for Cd, Cr, Ni, Zn, Cu and brass electrocoating. (L17, L-general, T7f; ST, Al-b, Cu-b, Cd, Cr, Ni, Zn, 17-57)

534-L. (German.) Duplex Electrocoating. Karl Muller. Draht, v. 12, Mar. 1961, p. 103-108.

Review of properties and production of duplex Ni, Cr and combined Ni and Cr electrocoatings in terms of corrosion mechanisms (current-potential curves), corrosion resistance (results of surface corrosion tests) and duplex electrocoating processes (Harshaw Chemical process; DeWeKa-Doniplat process). (L17, R-general; Ni-b, Cr-b)

535-L. (German.) New Method of Deburring, Punching and Drawing Die Forgings. Werner Funke. Fertigungstechnik und Betrieb, v. 11, Feb. 1961, p. 95-99.

Tool and method for simultaneous deburring, punching and drawing of steel die forgings. Tool design and mode of operation. Savings of ball bearing steel in manufacture of ball bearing rings. (L10, F27, F22k; ST)

536-L. Recent Developments in Nickel/Chromium Plating. G. Fitzgerald Lee. Product Finishing, v. 14, May 1961, p. 83-84, 148.

Brief review of the technical implications of the British Standards applicable to Ni/Cr plating. Improvement of the resistance of Ni/Cr coatings to atmospheric conditions. (L17; Cr, Ni)

537-L. Tin-Nickel Plating for Railway Signal Relays. Tin and Its Uses, no. 51, 1961, p. 6.

Effect of electroplating brass railway signal relays with a Ni-Sn alloy on their dust, fume, moisture and corrosion resistance. (L17; Cu-n, Ni, Sn)

538-L. Choice of Surface Treatment Method. D. G. Cox. Corrosion Prevention and Control, v. 8, Apr. 1961, p. vi-vii.

Surface preparation of steel for coatings using hand or power brushing and scraping, chemical cleaning and polishing, flame descaling and blasting with flint, iron and steel shot, sand or Si free abrasives. (L-general; ST)

539-L. Electrodeposition of Iron-Zinc and Nickel-Zinc Alloys: Cathode Potential and Structure. Vasanta Sree, S. K. Panikkar and T. L. Rama Char. Electrochemical Society, India Section, Bulletin, v. 10, Jan. 1961, p. 8-10.

Deposit composition and structures and related cathode potential curves as a function of current density are studied for alloys in the systems deposited from chloride-pyrophosphate baths. 23 ref. (L17; Fe-b, Ni-b, Zn)

540-L. Metal Finishing for the Electronics Industry. J. Dawson. Metal Industry, v. 98, Apr. 28, 1961, p. 331-334.

Techniques and problems involved in finishing electronic components with Cd, Au, Cu, Ni, Pt, Rd, Ag, Pd, Co and alloys of Sn-Zn and Sn-Cd. (To be continued.) (L-general, T1)

541-L. Vibratory Finishing the Key to Smoother Surfaces. W. E. Brandt. Iron Age, v. 187, May 18, 1961, p. 135-137.

Finishing of airfoil parts to strict tolerances by vibratory process to increase efficiency and blade life. Profilometer readings given as a function of time. (L10, T24b)

542-L. Large Wind Nozzles Made by Electroforming Nickel. G. E. Sutila and J. F. Goodwin. Materials in Design Engineering, v. 53, May 1961, p. 145.

Large, one-piece Ni nozzles are produced by electrolytically depositing Ni on a conductive pattern. (L18; Ni)

543-L. High-Temperature Nickel Aluminum Coatings. Products Finishing, v. 25, May 1961, p. 82-87.

Formation of an oxidation resistant coating capable of protection to 1000° C. on steel panels by electrodeposition of Ni from a Watts bath and plating Al onto the Ni from a fused salt bath at 700° C. (L17, R1h, 2-62; ST, Ni-b, Al-b)

544-L. Plastic Coatings for Electrical Insulation. W. R. Pascoe. Electrical Engineering, v. 80, May 1961, p. 360-363.

Application of the fluidized bed process to coating of electrical components with cellulosic, vinyl, epoxy, nylon, polyethylene and chlorinated polyether. System produces a coating of uniform thickness that closely follows the contour of the part. (L26p, T1)

545-L. Getting the Most From Chlorinated Solvents. Metalworking Production, v. 105, Apr. 26, 1961, p. 61-62.

Automatic and semi-automatic solvent degreasing methods and machinery using tri and perchloroethylene as solvents. (L12h, 1-52)

546-L. What's New in Metal Cleaning. G. A. Cairns. Industrial Finishing, v. 37, May 1961, p. 39-40, 42, 44.

Development of cleaning solutions utilizing glassy phosphates as sequestering agents. Classification of wetting agents according to their most effective pH range. Cleaning of ferrous and nonferrous materials using soaps made from resinous fatty acids. (L12)

547-L. (German.) New Corrosion Protection of Aluminum Sheathed Cables. Wilhelm Birnthaler and Georg Falk. ETZ Elektrotechnische Zeitschrift, v. 13, Mar. 6, 1961, p. 112-114.

Corrosion protection by coating with a thin wash primer film followed by a bitumen base adhesive layer and sheathing with PVC. Comparative corrosion testing at 50° C. in NaCl solution of cables with and without wash primer coating. (L26, R-general, T1b; Al, 17-57)

548-L. Dry Drawing Compounds. William D. Wilson. Paper from "Porcelain Enamel Institute Forum, Proceedings". v. 22. Porcelain Enamel Institute, Inc., Washington 6, D. C., 1960, p. 24-25.

Description of spray and roller coat methods used to apply dry lubricants composed of soap, borax and other chemical additives when drawing steel, Cu, Al and brass. Lubricants reduce cost, increase die life and improve drawn material. (L26c, 18-73; Al, Cu-b, ST)

549-L. Nickel Reduction. J. P. Finley, Jr. Paper from "Porcelain Enamel Institute Forum, Proceedings". v. 22. Porcelain Enamel Institute, Inc., Washington 6, D. C., 1960, p. 88-90.

Deposition of electroless nickel on steel by reducing $NiSO_4$ using NaH_2PO_4. The amount of Ni deposition per sq. ft. increases with temperature. (L28)

550-L. (English.) Note on the Field-Emission Microscopic Observation of Nickel Deposited on Tungsten. Katuhiko Azuma. Hokkaido University, Research Institute for Catalysis, Journal, v. 8, Dec. 1960, p. 264-267.

Effect of temperature on field emission patterns of Ni deposited onW as observed by microscopic examination of Ni clusterings. Phase formation of resulting alloys. (L17; W, Ni)

551-L. End White-Layer Problems on Nitrided Parts. R. F. Erxleben. Iron Age, v. 187, May 25, 1961, p. 106-107.

Grinding of the white layer from nitrided steel parts is eliminated by electroplating with Cu or bronze or coating with a tin base paint and heating at 975-1100° F. (L17; ST, Cu, Sn)

552-L. Electrolytic Polishing of Bismuth. G. A. Hare and H. D. Mallon. Metallurgia, v. 63, Apr. 1961, p. 208-209.

Because of the depth of the effect of surface deformation during grinding, the production of metallographic specimens of Bi is very difficult. Technique suggested involves alternate grinding and

etching, followed by electrolytic polishing. (L13p; Bi)

553-L. Chemical Polishing of Lead and Its Alloys. R. C. Gifkins. Metallurgia, v. 63, Apr. 1961, p. 209-210.

Technique for obtaining a satisfactory chemical polish using the Worner and Worner reagent, comprising a mixture of glacial acetic acid and hydrogen peroxide. (L12; Pb-b)

554-L. Roll-Coating Line Primes, Paints, Embosses in One Pass. Modern Metals, v. 17, May 1961, p. 43, 46.

New finishing line at Hunter Engineering, Riverside, Calif., applies epoxy primer to one or both sides of Al strip before finish coating and can also emboss it before re-coiling. (L26p; Al, 4-53)

555-L. Mechanization Is Keynote of Today's Finishing. Metalworking Production, v. 105, May 10, 1961, p. 11-12.

Sheet, strip, wire and tube of Cu, Ni, steel, brass, Sn, Al and Cr are finished by a variety of automatic, mechanized processes including degreasing, chemical polishing, electroplating, pickling, etching anodizing, vitreous enamelling and coating with organic finishings. (L-general, 18-74; Cu-b, ST, Ni, Sn, Al, Cr)

556-L. To Cut Deburring Costs, Mechanize! V. C. Spears and D. E. Keener. Metalworking, v. 17, May 1961, p. 15-16, 24.

Comparison of four deburring methods (barrel and vibratory finishing and airless and liquid blast) in terms of selection factors. (L10; 5)

557-L. The Relative Reactivity of Various Nickel Electrodeposits. V. Hospadaruk and J. V. Petrocelli. Plating, v. 48, May 1961, p. 479-487.

Potentiostatic and galvanostatic techniques are used to determine the reactivities and relative pitting intensities of Watts-type, semibright and bright Ni deposits as a function of sulphur content. 27 ref. (L17; Ni)

558-L. Electroplating Onto Zinc-Titanium-Copper Alloy. R. Scott Modjeska and Simon P. Gary. Plating, v. 48, May 1961, p. 488-490.

Polishing, buffing, cleaning and plating techniques for plating onto a newly developed Zn rich alloy which is easily fabricated. (L17; Zn-b)

559-L. The Nature, Cause and Effect of the Porosity in Electrodeposits. Pt. 7. Microscopic Examination of Nickel-Chromium Coatings After Atmospheric Corrosion. Donald W. Ernst and Fielding Ogburn. Plating, v. 48, May 1961, p. 491-497.

Ni-Cr coatings on steel are examined for pitting and cracking after exposure to sea coast and industrial atmospheres. Laboratory examinations of galvanic cells, in which polarity of the Ni-steel couple changes with variations in the electrolyte, are used to explain differences in pit shapes and rust exudation. (L17, 9-68; ST, Cr, Ni)

560-L. (Translation-ConBur.) Overvoltage in the Electrodeposition and Solution of Metals. A. T. Vagramyan and A. P. Popkov. Academy of Sciences of the USSR, Bulletin, Division of Chemical Science, May 1960, p. 765-770.

Study of the rate of reduction and rate of anode solution during electrodeposition of Ni, Co, Fe, Cu, Zn, Cd, Tl and Sn from 1 N sulphate solutions to obtain quantitative data with respect to overvoltage. 12 ref. (L17, P15; Cd, Co, Cu, Fe, Ni, Sn, Tl)

561-L. A New Production Method of Metal Preparation for Special Steels and Conventional Enameling. Jason M. Zander and Richard Delott. Porcelain Enamel Institute Forum, Proceedings, v. 22, 1960, p. 98-102.

Surface preparation prior to the enameling of steel by pickling in a ferric sulphate-sulphuric acid bath. The firing range over which satisfactory adherence is obtained may be lowered by 30-60° F. by this method of preparation. (L12g; ST)

562-L. Molten Salt Jet-Sprayed for Cleaning Steel. Machinery, v. 67, May 1961, p. 140.

Annealing scale is removed from continuously moving stainless steel strip by jet-spraying with molten salt, followed by acid-pickle bath and hot water rinse. (L12n, L10; ST)

563-L. Precision Finishing by Vibration. Australasian Manufacturer, v. 46, Apr. 15, 1961, p. 76-78.

Burnishing and deburring of phosphor bronze bearing cages, zinc die castings

and steel stampings, circlips and screw inserts with vibrator machine results in much faster processing time then with barrelling machine. (L10; Cu-s, ST, Zn)

564-L. Many Electronic Equipment Problems Solved by Magnesium With Electroplated Finish. Magnesium Products, May 1961, p. 9-10.

Electronic equipment made of AZ31B or HM21A alloys is electroplated with Cd, Cu, Zn, Au, Ag or Ni to increase the weldability of the equipment. Thin vapor-deposited films of Cr, SiO and Al are formed on the electroplated coatings. (L17, L25; Mg)

565-L. Electrolytic Etching of Dense Tantalum. A. L. Jenny and R. A. Ruscetta. Electrochemical Society, Journal, v. 108, May 1961, p. 442-445.

A method of etching for the purpose of increasing effective surface area and thereby increasing capacitance. The increase is related to electrolyte composition (especially the amount of water present), current density, temperature and hardness of the Ta. The decrease in surface area following post-etch anodizing gives a clue to the size of the etch pits. 4 ref. (L13q; Ta)

566-L. Mass and Heat Transfer During the Chemical Vapor Deposition of Metals. J. H. Oxley and J. M. Blocher, Jr. Electrochemical Society, Journal, v. 108, May 1961, p. 460-464.

A general mathematical treatment of mass and heat transfer rates in a deBoer-Van Arkel refining cell is presented. On the basis of this, it is possible to correlate yield, time of run, rate of deposition and power losses. 14 ref. (L25)

567-L. The Production of the SIMCA Aronde. P. A. Sidders. Machinery (London), v. 98, May 17, 1961, p. 1104-1113.

Painting automobile body-shells and other components by flow coating and spraying. The coatings are oven-dried at 180° C. (L26n, T21a)

568-L. Aluminum Finishing Progress. Norman I. Gaynes. Metal Finishing, v. 59, June 1961, p. 75-78, 80.

Evaluation of surface and mechanical properties of organic films on Al alloys with attention to corrosion, abrasion and impact resistance and reflectance. Comparison with anodizing in terms of applicability and production costs in the automotive industry. (L26, L19, 10-54; Al-b)

569-L. Analysis of Rhodium Baths. Volumetric Metal Determination. Harold G. Rackett. Metal Finishing, v. 59, June 1961, p. 79-80.

Determination of Rh content of phosphate-type Rh plating baths by an oxidation-reduction reaction, using NaOH and by titration in 0.05 N sodium thiosulphate solution. 3 ref. (L17a, S11j; Rh)

570-L. Control of Alkaline Tin Plating Baths. Larissa Domnikov. Metal Finishing, v. 59, June 1961, p. 90-91.

The luminescence spectrum of bivalent Sn in solutions determined by photoelectric methods after excitation by ultraviolet light. Application of the method to composition control in Sn plating systems. 5 ref. (L17a; Sn)

571-L. Science for Electroplaters. L. Serota. Metal Finishing, v. 59, June 1961, p. 94-95.

Stress values as a function of deposit thickness are obtained for Ni deposited on stainless steel and Cu specimens from a Watt's bath. Mechanisms are considered for grain boundary inclusion and Co-deposited impurities as stress causing factors. (L17c, Q25h; Ni)

572-L. Need Precision? Don't Overlook Electroforming. W. H. Safranek. Product Engineering, v. 32, June 5, 1961, p. 44-49.

Review of electroforming methods and applications with emphasis on selection of mandrel systems and plating alloys. Design considerations for depositing Ni, Ag, Cu, Fe, Co and composite materials using stainless steel and plated steel, nylon, glass and plastic mandrels with data given for tolerances, shape, finish and mechanical properties. (L18, 10-54; Ni, Ag, Cu, Fe, Co, SS, NM, 17-57)

573-L. (German.) Carbon Content of Steel Sheet, Enamel and Enamelling Temperature During Vitreous Enamelling. Dietrich Horstmann. Stahl und Eisen, v. 81, May 11, 1961, p. 629-640.

Investigation of influence of carbon content of sheet, type of enamel and

enamelling temperature on enamel defects, adhesion to steel, impact strength of enamel and deformation during enamelling of 1 and 2 mm. thick rimming and killed basic Bessemer steel, air refined special steels and openhearth steel of 0.015-0.29% carbon. (L27; ST)

574-L. (German.) Anodic Treatment Forms Oxide Layers on Platinum. K. Nagel and H. Dietz. Electrochimica Acta, v. 4, May 1961, p. 1-11.

Study of formation of PtO_2 and other oxides on Pt electrode by anodic treatment with direct or superposed a-c. Effect of charge magnitude and rest values on establishment of Galvani and equilibrium tensions. 28 ref. (L19; Pt)

575-L. (English.) An X-Ray Diffraction Study of the Anodic Oxidation of Ag in H_2SO_4 Solution. G. W. D. Briggs, I. Dugdale and W. F. K. Wynne-Jones. Electrochimica Acta, v. 4, May 1961, p. 55-61.

X-ray diffraction patterns of the anodic oxide layer on Ag are obtained from oscillating Ag electrodes during polarization in H_2SO_4 solution and are compared with those obtained from Ag in KOH and from an inert electrode in acid Ag_2SO_4 solution. 12 ref. (L19, M22g; Ag)

576-L. (French.) Electrolytic Deposit of Zinc Ion on a Mercury Jet Electrode. A. Rius, I. M. Tordesillas and A. Sacristan. Electrochimica Acta, v. 4, May 1961, p. 62-71.

Study of Zn ion reduction at the mercury jet electrode in KCl and KNO_3 solution as related to influence of temperature and concentration of electrolyte. 19 ref. (L17, 2-61; Zn, Hg)

577-L. Automatic Immersion and Degreasing Plant. Corrosion Technology, v. 8, May 1961, p. 149-150.

Degreasing of metal parts by suspension in perchlorethylene or trichlorethylene solvent vapor or by immersion in boiling solvent. For superfine immersion cleaning, ultrasonic vibrations are produced in the solvent by a transducer unit. (L12h)

578-L. (English.) Refractory Coatings for Tungsten. C. G. Goetzel and P. Landler. Planseeberichte fur Pulvermetallurgie, v. 9, Apr. 1961, p. 36-38.

Production of WSi_2 coatings to protect tungsten against oxidation at temperatures up to 1815° C. by vapor plating, dipping into Cu-Si alloy and by a pack method, using halide compounds melting near siliconizing temperature (900° C.), such as NaF and NaCl, and Si powder as packing material. Fusion of coating with ZrO_2 to increase melting temperature of coating. (L15, L16, L25p; W, Si)

579-L. (German.) Surface Protection of Molybdenum at High Temperatures. K. Sedlatschek and H. J. Stadler. Planseeberichte fur Pulvermetallurgie, v. 9, Apr. 1961, p. 39-43.

Method for silicide-coating of Mo to prevent oxidation of the metal up to 1600° C. by dipping Mo into a Cu-Si melt at 1000-1500° C. Investigation of formation of $MoSi_2$ layer as influenced by dipping temperature and concentration of dipping alloy. Microstructure and surface structure of MoSi coating. (L16; Mo, Si)

580-L. (English.) Oxidation Protection of Columbium Alloys Through Coating by Pack Diffusion Technique. H. Blumenthal. Planseeberichte fur Pulvermetallurgie, v. 9, Apr. 1961, p. 44-46.

Coating of Cb metal, Cb-8% Ti, Cb-0.75% Zr, Cb-10% Mo-10% Ti and Cb-33% Ta-0.75% Zr alloys by the "W-2" coating process, a pack method consisting of embedding parts in a powder mixture containing coating agent, inert substance to prevent baking and an energizer. Testing of ductility by 180° bending and of oxidation resistance by 2000° F. heating in air. (L15; Cb-b, Mo, Ta, Ti, Zr)

581-L. Chromium Fluoride Used for Diffusion Coatings. Corrosion Prevention & Control, v. 8, May 1961, p. iii.

Diffusion coating of Ni, Cd and Mo base alloys, Ti, Ta and W carbides and Zr, Cr and Ti borides with Cr, using Cr powder and a substance such as NH_4F which generates a gaseous halogen that helps to transfer the Cr. 4 ref. (L15; Cd-b, Mo-b, Ni-b, 14-68)

582-L. Diffusion--Alloy Process Protects Guided Missile Probes. Corrosion Prevention & Control, v. 8, May 1961, p. i-iii.

Chromallizing of a 0.5 Ti Mo alloy missile probe with Chromalloy W-2 surface alloy reduces heat transfer rate and protects the alloy from oxidation at temperatures as high as 3850° F. (L15, T24e; Mo-b, Ti)

583-L. Adhesion Problems With Plastic Coatings. Corrosion Prevention & Control, v. 8, May 1961, p. viii.

Adhesion of polyfluoroethylene to steel, Inconel, Monel, Cd, Zn, Al, Mg, asbestos, glass and temperature resistant plastics can be improved by using a primer consisting of perfluorochloroolefine and cobalt oxide. The cobalt oxide reduces the corrosion resistance of the plastic. 6 ref. (L26p; Al, Cd, Mg, Ni-b, ST, Zn)

584-L. Sprayed Steel Engine Liners. Light Metals, v. 24, May 1961, p. 137.

Flame spraying of Mo (Sprabond wire) and steel (Sprasteel LS) on Al cylinder walls utilized in the fabrication of light-weight internal combustion engines. Advantages include reduced weight and improved piston lubrication. (L23; Al, Mo, ST)

585-L. Surface Coatings Protect Parts During Heat Treatment. Etric L. Stone and Leopold Albertin. Metal Progress, v. 79, June 1961, p. 103-106, 124, 128, 131-A, 131-B.

Protective coatings applied to steel and superalloy parts before heat treating have proved effective in facilitating scale removal or preventing oxidation. Their use can result in economies in heat treating where production quantities are low but surface protection of parts is needed. (L-general, J-general; ST, SGA-h)

586-L. New Shot-Blasting Unit Yields Low Cleaning Costs. Metal Progress, v. 79, June 1961, p. 112.

Use of a single 15 cu. ft. unit instead of two 7 cu. ft. shot-blasting barrels to cut costs and improve cleaning. (L10c, 1-53)

587-L. Protective Coatings in Petroleum Production. Corrosion, v. 17, May 1961, p. 251t-266t.

Recommendations for surface preparation and pretreatment, coating application and inspection. Properties and suggested uses of oil, alkyd, chlorinated rubber, epoxy, vinyl, silicone, coumarone-indene, acrylic, cement, galvanized and metallized coatings. (L-general, T28)

588-L. Scale on Wire Rod and Its Removal by Mechanical Means. Pt. 3. S. Garber and G. M. Sturgeon. Wire Industry, v. 28, May 1961, p. 467-470.

Wire rods are descaled by deformation and shot blasting. Deformation involves flexing, twisting or stretching of the rod and must be supplemented with some secondary treatment to completely remove the scales. Brushing, tumbling, vibration and magnetostriction are secondary scale removal processes. 44 ref. (L10c, L10h; 4-61)

589-L. Continuous Hot Dip Galvanizing of Hot-Water Tanks at American-Standard Plant. Industrial Heating, v. 28, May 1961, p. 904, 906, 908, 910.

Galvanizing of 20-50 gal. capacity tanks in a Zn bath. Effect of bath temperature and immersion time. Construction of galvanizing kettle to prevent corrosion of refractory material by Zn and to minimize heat loss. (L16, 1-66, 1-52, T26q)

590-L. Finishing Steel Slip Covers for Air Conditioning Units. Industrial Heating, v. 28, May 1961, p. 953-954.

Steel sheet cabinets are electro-Zn-coated and painted to resist corrosion, vibration, banging, condensation, scuffing and chipping. (L17, L26n, R10b, W10d; ST, 4-53, 17-57, Zn)

591-L. Widest Aluminum Strip Coating Line Installed by Kaiser Aluminum & Chemical Corp. Industrial Heating, v. 28, May 1961, p. 958, 960, 962, 964, 966, 968, 970, 972.

Al strip up to 66 in. wide is coated at a rate of 100 ft. per min. Equipment and finishing operations, including cleaning and preparation, coating and baking. (L-general, L26n, 1-52; Al, 4-53)

592-L. Oxidation of Molybdenum. I. Sprinz and R. L. Wachtell. Metal Industry, v. 98, May 19, 1961, p. 396.

Missile probes of Mo are chromallized with W-2 alloy by a diffusion process to provide oxidation resistance at 2120° C. (L15, R1h; Mo, Cr)

593-L. Acid Cutting and Acid Polishing of Copper Crystals. F. W. Young, Jr., and T. R. Wilson. Review of Scientific Instruments, v. 32, May 1961, p. 559-562.

Acid saw and polish are used to prepare Cu crystals without introducing dislocations. Cu with a dislocation density of 5×10^3 per cm. sq. has been prepared. (L12g; Cu, 14-61)

594-L. Non-Embrittling Plating for Prop-Jet Spheres. Western Metalworking, v. 19, May 1961, p. 39.

Vacuum Cd plating technique eliminates the potential for inducing hydrogen embrittlement during coating of 8630 steel starter bottles for pro-jet aircraft. (L17, T24b; ST, Cd)

595-L. How to Porcelain Enamel Magnesium. H. K. DeLong. Metal Products Manufacturing, v. 18, June 1961, p. 60-61, 100.

Development of a surface preparation treatment for Mg alloys which permits application of low-temperature porcelain enamels to them. Surfaces are cleaned in alkali, rinsed, prepickled and chromate treated prior to ground coating. (L27; Mg-b)

596-L. (German.) Current Status in Precipitation of Crack-Free Chromium Coatings in Decorative Corrosion Protection. A. Strauch. Elektrie, v. 15, Mar. 1961, p. 71-74.

Investigation of crack formation and porosity in electrodeposition of Cr on smooth Fe strip from a conventional bright Cr electrolyte (CrO_3 in 1% H_2SO_4) and from self-controlling electrolyte (CrO_3, K_2SiF_6 and $SrSO_4$) from 40-45° C. and 15 amp. per diameter sq. current density. Surface examination by the "Dubpernell" testing method. 15 ref. (L17c; ST, Cr)

597-L. (German.) Measurement of Thickness of Composite Copper-Nickel Films by the "Liquid Jet Method". W. Zimmer. Elektrie, v. 15, Mar. 1961, p. 78-81.

Measurement of Cu and Ni film thickness on 0.2 mm. thick steel sheet specimens plated by various baths, including Cu electrolytes on NH_4SCN and tartrate bases, cyanidic standard Cu electrolyte and acid Cu plastic electrolyte using a microscopic method (DIN 50950) by the DIN 50951 liquid jet method and by the GOST 3003 liquid jet method. Comparative evaluation of testing methods and results. (L17c; Ni, Cu)

598-L. Heat-Resistant Coverings for Iron. A. A. Appen, E. A. Antonova and L. A. Kuznetsova. Glass and Ceramics, v. 17, Apr. 1961, p. 467-471.

High temperature gaseous corrosion of Fe is reduced by applying a heat resistant glass-metal covering by enameling. The covering is obtained from a mixture of finely dispersed metallic powder and a silicate bond. (L27; Fe)

599-L. (Translation-ConBur.) Improved Deposition of Uranium and Thorium Layers by the Method of Atomization in an Electric Field. Yu. A. Selitskii. Soviet Journal of Atomic Energy, v. 7, Apr. 1961, p. 1019-1020.

Deposition of thin layers of U and Th on collodion or celluloid films and on metal foils by atomizing a solution of the substance from a capillary under the action of an electric field. Th or U can be dissolved in a small volume and atomization can be performed with relatively small loss of the substance. 4 ref. (L25k; Th, U)

600-L. New Process for Ti-Clad Steel Plate. Roy V. Hughson. Chemical Engineering, v. 68, May 15, 1961, p. 194, 196, 198.

Production of Ti-clad A-204 steel plate by bonding the Ti directly to the steel backing using an argon flush to prevent the formation of oxides or nitrides on the Ti-steel interface. The clad steel may be cut by abrasive methods or by machining and may be welded using Ag to prevent contact between Ti and the steel. (L22; ST, Ti, 4-53)

601-L. Galvanized Panels Improved by Magnesium Additions. Iron Age, v. 187, June 8, 1961, p. 100-102.

Mg ingot reacts with Zn in a hot galvanizing bath forming a new bath alloy, 50% Mg and 50% Zn. Corrosion testing of the resulting galvanized steel panels by exposure to salt spray and humidity indicates Mg improves corrosion resistance of coating. (L16; ST)

602-L. New Technique Buffs Beauty on Stainless Strip. Steel, v. 148, June 19, 1961, p. 92.

Bright, corrosion resistant finish is achieved on stainless strip on a five-station buffing line on which metal is

removed from the strip surface in the process. (L10a; SS, 4-53)

603-L. The Structure of Some Electrodeposited Tin Alloy Coatings. R. F. Smart, R. M. Angles and D. A. Robins. Institute of Metals, Journal, v. 89, May 1961, p. 349-353.

Microstructure and crystal structure of deposits containing 6-95% Sn in various combinations with Pb, Zn, Cd and Cu are examined metallographically and by X-ray diffraction. Phase dispersion is determined as a function of surface atom migration. 16 ref. (L17c, M-general, N-general; Sn-b, Pb, Zn, Cd, Cu)

604-L. (German.) Investigation of the Use of Inhibitors Used in the Textile Industry in the Pickling of Steel, Copper and Brass Sheet. H. Gunther. Elektrie, v. 15, Mar. 1961, p. 86-89.

Measurement of metal weight loss during pickling with and without addition of various proprietary substances used in the textile industry as inhibitors. 8 ref. (L12g; CN, Cu, Cu-n, 4-53)

605-L. Rhodium Plating to Specification. Australasian Manufacturer, v. 46, Apr. 29, 1961, p. 33-34.

Electroplating of steel, Al and other metals to produce coatings of Rh with thickness from 0.00001 to over 0.001 in. following a protective deposition of Ag, Ni or Cu. (L17; Rh)

606-L. Internal Roller Burnishing. Australasian Manufacturer, v. 46, Apr. 29, 1961, p. 68-69.

Burnishing and sizing of holes drilled in medium carbon steel, cast iron, bronze and Al with an internal roller that displaces peaks into valleys to produce bores with close tolerances and good surface finishes. (L10; CN, CI, Cu-s, Al)

607-L. (Russian.) Preparation of the Surface of Silver Alloys for Enamelling. R. B. Laskovaya. Isvestiya VUZ-Tsvetnaya Metallurgiya, Feb. 1961, p. 123-130.

Preparation by etching with nitric acid. Change of surface relief and surface composition of Cu alloyed Ag etching time. Their effect on wettability in liquid enamel. (L12g; Ag-b, Cu)

608-L. Metallurgical Bonding in Cylinder Construction. M. G. Whitfield. SAE Paper no. 369A, 1961, p. 7 p.

Bonding of Al and Mg and their alloys to cores of cast irons, steels, high-temperature alloys and refractory metals by immersion of the core material in molten Al to form the alloy bond with subsequent casting of light metal alloys against the prepared surface to make engine parts. Data are given for bond strength, thermal expansion, harndness and shear and tension properties. (L22, E-general, T21b; CI, ST, SGA-h, EG-d37, Ab-b, Mg-b, 17-57)

609-L. The Development of Tibon Hard Chrome Plated Cylinder. L. W. Raymond and A. K. Wood. SAE Paper no. 369B, 1961, p. 9 p.

Review of Al alloy and Cr plating developments for application in internal combustion engines. Technology of Cr electrodeposition on Al. Evaluation of mechanical and physical properties, particularly wear and corrosion resistance, heat transfer and adherence of coatings. (L17c, T21b, Q-general, 10-54; Al, Cr, 17-57)

610-L. Transplant Coated Aluminum Cylinder Bores-Physical Properties of This New Protective Coating in Comparison to Known Processes. A. F. Bauer. SAE Paper no. 369C, 1961, p. 10 p.

Ferrous wear-resistant protective coatings are produced on bores of die cast Al cylinder barrels and liners by spraying the coating onto the die and transferring the coating to the molten Al during casting. Wear resistance, shear strenght of bond, tensile strength and thermal coefficient of expansion of Al cylinders with various thicknesses of the coating are compared with cylinders coated by spraybond (Mo), Bimetallic Interlock Bond and Cr plating processes. (L23, T21b; Al-b, Fe-b, Mo, Cr, 5-61, 17-57)

611-L. Polishing Stainless Steel Made Easier. J. P. Dewar. Engineering, v. 191, Apr. 28, 1961, p. 586.

Preliminary bright and final polishing or coloring of stainless steels using sisal buffs and fast cutting abrasives. (L10a, L10b; SS)

612-L. The Preparation of Nickel-Coated Powders. B. Meddings, W. Kunda and V.

N. Mackiw. Paper from "Powder Metallurgy". Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 775-798.

Description of the Sherritt process for the reduction of Ni from solution by hydrogen indicates how this technique has been extended to the Ni coating of powders. Surface activation required for noncatalytic powders. 12 ref. (L25k, N15; Ni, 6)

613-L. Alloy Improves Service of Galvanized Products. Steel, v. 148, June 12, 1961, p. 154, 157.

Small additions of Mg to Zn baths for galvanizing improve the corrosion resistance of the product. The appearance of the coating is improved; mechanical properties are not harmed; the addition and replenishment of the Mg are not difficult. The combination of Al and Mg gives smooth, more attractive coatings than either does alone. (L16)

614-L. (German.) Pickling of Iron and Steel by Phosphoric Acid. M. Apperloo and H. Benninghoff. Metall-Reinigung + Vorbehandlung, v. 10, Apr. 1961, p. 49-57.

Pickling of Fe and steel with HCl, H_2SO_4 and H_3PO_4 with emphasis on the latter is discussed in terms of reaction mechanism and equipment requirements. Regeneration of H_3PO_4 by ion exchanger. Cost analysis. (L12g; Fe, ST)

615-L. (French.) Electrolytic Polishing of Aluminum and Its Alloys at Room Temperature. M. Wrzecian. Galvano, v. 30, Apr. 1961, p. 231-233.

Polishing in an electrolyte containing 350 g. NaOH per l. of H_2O at a terminal voltage of 15. Current density as a function of time. (L13p; Al)

616-L. (French.) Tin Plating by Chemical Displacement. H. Richter. Galvano, v. 30, Apr. 1961, p. 243-249.

Metal parts to be plated are descaled in HNO_3 in a mixture of H_2CrO_4 and H_2SO_4 and depassivated by immersion in HCl and in a solution of NaCN. The parts are then brought into contact with Al and immersed in a solution containing $SnCl_2$, $P_2O_7Na_4$ and NaCN from 30-35° C. (L17; Sn)

617-L. Chemicals in Metallurgy--Vapor-Phase Deposition. H. W. Schultze. I/EC (Industrial and Engineering Chemistry, v. 53, June 1961, p. 48 A-51 A.

High purity metals, refractory metal compounds and coatings on a variety of substrates are produced by vapor-phase deposition or gas plating using chemicals. Commercial applications and potential of the process. (L25)

618-L. Preparation of Some Metals for Painting. J. Glossop. Oil and Colour Chemists' Assoc., Journal, v. 44, Apr. 1961, p. 269-278.

Variety of methods for pretreatment of metals, particularly Fe, steel, Al and Zn. Mechanical or chemical degreasing. Removal of corrosion products by shot blasting or by acid or alkaline treatment. Phosphating, metal spraying or electroplating to improve corrosion resistance. (L-general; Fe, ST, Al, Zn)

619-L. The Sprayflow Stellite Hardfacing Process. Machinery (London), v. 98, May 24, 1961, p. 1180-1181.

Stellite is deposited on 18/8 stainless steel, Nitralloy steel and free-cutting steels by flame spraying. Deposits are alloyed to the base metal by heat treatment after application. (L23; ST, Co-b)

620-L. (Translation-ConBur.) Changes of Cathode Potential on Connection and Disconnection of Polarizing Current in Chromium Plating. M. A. Shluger. Journal of Applied Chemistry of the USSR, v. 33, June 1960, p. 1337-1341.

Influence of temperature, current density and sulphate concentration on the formation and adsorption of the cathodic film and the value of the cathode potential when current is applied. 10 ref. (L17; Cr)

621-L. Zinc Coatings for Protection of Columbium From Oxidation at Elevated Temperatures. W. D. Klopp and C. A. Krier. Defense Metals Information Center, Battelle Memorial Institute, DMIC Memo. 88, Mar. 3, 1961, 19 p. (Available as PB 161238 from U. S. Office of Technical Services, Washington 25, D. C.)

Zn coating of Cb by vacuum distillation (at 1450° F.), hot dipping (from 1000-1300° F.), aqueous electroplating or cladding eliminates contamination hardening of Cb substrate by forming intermetallic layers. 8 ref. (L25j, L16, L17, L22; Cb, Zn)

622-L. Low Pressure Spray Application of Vitreous Enamel. J. Muirhead. Institute

of Vitreous Enamellers, Bulletin, v. 11, May 1961, p. 97-101.

Review of past spraying technique and the introduction of low-pressure spraying. Proper equipment selection and spraying technique. Effect of supervision and enamel slip control. Material, labor and equipment savings. (L26n)

623-L. Better Bores Seen for Aluminium Cylinders. SAE Journal, v. 69, July 1961, p. 40-43.

Plating, bonding and coating techniques for finishing Al engine cylinder bores. (L-general, T21b; Al, 17-57)

624-L. Electrostatic Setup for Painting Refrigerators. Industrial Finishing, v. 37, June 1961, p. 29-30, 34.

Electrostatic painting of mixed sizes of refrigerator doors and cabinets by reciprocating electrospray bell atomizers. Limit switches control the repositioning of the atomizers and electric eyes control paint flow. (L26n, T10c)

625-L. Coating Small Metal Items. P. C. Bardin. Industrial Finishing, v. 37, June 1961, p. 39-40, 42, 44, 46.

Methods of coating buttons, buckles, screws and various hardware pieces. Open-end barrel tumble coating, combination dip-whirl coating, manual and automatic spray coating and multiple dip-coating. (L-general, T6)

626-L. Boat Trailers Get Corrosion Resistant Paint Job. Industrial Finishing, v. 37, June 1961, p. 62-64, 66.

Cleaning, phosphating, painting and drying of boat trailers on an automatic conveyor line. (L-general, R10g, T22m)

627-L. Electrodeposition of Aluminum on Magnesium. E. W. Cooke and S. Kritzer. North American Aviation, Inc. (Wright Air Development Center). U. S. Office of Technical Services, PB 161892, Nov. 1959, 26 p. $.75.

Tests to develop a method of plating Al on Mg without the use of intermediate coatings to fill the need for a protective system for Mg with good mechanical properties, both at elevated temperatures and when in contact with more noble metals. The major problem in electrodepositing adherent Al directly on Mg and Mg alloys is the necessity to clean all Mg surfaces and keep them clean until the substrate is plated. (L17; Mg, Al)

628-L. Electroplating Chromium Directly on Aluminum. Charles L. Faust, Glenn R. Schaer and Donald E. Semones. Plating, v. 48, June 1961, p. 605-612.

A Cr plating process using d-c. is described. The electrodepositing current is related to the Cr hydride mechanism of deposition, providing a relatively soft Cr coating of low stress for direct deposition on 3003 Al alloy. The Cr plating has a lustrous sheen and is free from porosity and cracks at thicknesses offering a significant increase in corrosion protection. 8 ref. (L17; Al, Cr)

629-L. The Present Status of Decorative Nickel-Chromium Coatings. William Blum. Plating, v. 48, June 1961, p. 613-624.

A survey and analysis of all available information on the behavior of decorative Ni-Cr platings. Topics include methods of corrosion testing and of rating and correlating the data from such tests, variables in plating schedules and the effect of a Cu layer. Comparison of Watts, semi-bright, bright and duplex Li platings and of regular, microcracked, crack-free and sandwich Cr platings. 62 ref. (L17; Cr, Ni)

630-L. Recent Developments in Nickel/Chromium Plating. Pt. 2. G. FitzGerald Lee. Product Finishing (London), v. 14, June 1961, p. 77-80.

Review of articles covering electrodeposition of coatings on steel samples and Zn-base die castings. Measurement of coating thickness by an electron probe. Assessing adhesion and tendency to blister. (L17; ST, Zn, Cr, Ni)

631-L. Vacuum Coating Deposition Process on Metal and Plastics. C. Blitz. Product Finishing (London), v. 14, June 1961, p. 91-92; 97.

Cleaning, degreasing, base coating, deposition and top coating procedures for deposition of tarnish resistant coatings on dials, reflectors and jewelry. (L25)

632-L. Theoretical Aspects of the Pickle Lag Phenomenon. W. G. Hines. Paper from "Physical Chemistry of Process Metallurgy". Pt. 2. v. 8. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1959, p. 1291-1311.

Concepts of "pickle lag" and "lag layer" are re-examined in the light of experimental results with annealed black plate steel

with interpretation in terms of a nonuniform layer theory based on reaction rates. Cathodic polarization is suggested as the controlling factor in the production of pickle lag. (L12g; ST)

633-L. Forming and Finishing Aluminum Auto Trim. Metal Progress, v. 80, July 1961, p. 67-72.

Though simple in concept, the bright anodizing process--electrolytic oxidation of Al--requires close control of all operations from incoming inspection through final sealing to produce trim that will stand up in the severe service environment encountered by most automobiles. (L19, G4, T21c; Al)

634-L. Tankless Plating Gets a New Job. Cloyd A. Snavely. American Machinist/Metalworking Manufacturing, v. 105, June 26, 1961, p. 86-88.

Description of the Dalic process for tankless plating, especially with precious metals. Surface preparation. Production applications including use of Cu for carburizing stopoff, plating to size and plating of electrical components. (L17; Cu, EG-c31)

635-L. Metallizing Protects Conduit, Boosts Sales. Henry Lefer. Welding Design & Fabrication, v. 33, Dec. 1960, p. 50, 54.

Metallizing threaded end of galvanized pipe gives uniformity, rustproofing and good appearance. (L23; 8-65, 4-60, Zn)

636-L. Measurement of the Thickness of Electroplates by Electrolytic Stripping Method: Stripping Solution for Copper Plate Over Mild Steel. Prem Behari Mathur and N. Karuppannan. Current Engineering Practice, v. 3, Apr. 1961, p. 24-26.

Effect of temperature and current density on time required for removal of measured amounts of Cu, using a 10% $NaNO_3$ + 0.5N HNO_3 solution. 7 ref. (L17c; CN, Cu)

637-L. PH Change in Nickel Plating. R. G. Maling. Electroplating and Metal Finishing, v. 14, June 1961, p. 191-196.

Effect of small quantities of alkali or acid additions on rate of pH change in Ni solutions with high chloride and high sulphate content is measured at 60° C. (L17a; Ni)

638-L. Institute of Metal Finishing Annual Conference, 1961 (Llandudno, Wales). Electroplating and Metal Finishing, v. 14, June 1961, p. 198-199.

Review of papers on electrodeposition covering influence of addition agents on the composition of Ni deposits, levelling action during electrodeposition in Ni and acid-Cu solutions. Corrosion of decorative Ni plus Cr coatings, a metallographic and potential study and electrodeposition of Ru. (L17, 10-54; Ni, Cu, Cr, Ru)

639-L. Fixture Barrelling Diecast Aluminum Plates. Electroplating and Metal Finishing, v. 14, June 1961, p. 213-214.

New barrel finishing operation for diecast Al alloy bottom plates. Deflashing and polishing are completed in one operation in a rubber-lined welded steel barrel. Barrelling medium comprises 1 1/2-ton of 1/8 in. to 7/32 in. mixed steel balls in H_2O plus ball cleaning compound. (L10d, 17-57; Al-b)

640-L. Chemical Polishing. P. F. Walmsley. Metal Industry, v. 98, May 12, 1961, p. 371-374.

Procedure for polishing Al and Cu alloys with Phosbrite 155, 156, 159 and 184. Plant layout and equipment for adapting process to polishing of automobile components. (L12g, 1-52, T21; Al-b, Cu-b)

641-L. Protective Properties of Vacuum Coatings--Present and Future Techniques. N. A. Lockington and I. J. Toth. Corrosion Technology, v. 8, June 1961, p. 168-171.

Description and operation of basic equipment in the vacuum coating process. Techniques for producing thicker protective coatings. Properties and applications of commercially produced Al and Cd coatings. 15 ref. (L25g, 1-52, R10; Al, Cd)

642-L. Scale on Wire Rod and Its Removal by Mechanical Means. Pt. 4. S. Garber and G. M. Sturgeon. Wire Industry, v. 28, June 1961, p. 571, 573, 596.

Review of mechanical descaling methods including mounting and polishing. Description of operation of various commercially available descaling machines. (L10, 1-52; 4-55)

643-L. Internal Mechanism of an Electrolytic Cell. A. Alexander. Metal Finishing Journal, v. 7, May 1961, p. 176-180.

Mechanism of a cell relative to plating a metal part with Ni, Cr, Cu and Al. Anodic oxidation of Al. Electro and chemical polishing. (To be continued.) (L17, L19, L13p, L12; Ni, Cr, Al, Cu)

644-L. Some Advantages of Automatic Plant Using Solvents for Degreasing. J. Pickup. Metal Finishing Journal, v. 7, May 1961, p. 187-191.

Fully automatic double-immersion machine used for degreasing and cleaning metal parts in quantity. Machine utilizes hot or boiling trichlorethylene as a solvent. (L12h, 1-52)

645-L. (German.) Recent Advances in Plating Practice in the U. S. A. W. H. Safranek and Ch. L. Faust. Metall, v. 15, June 1961, p. 539-542.

Review of electrodeposition technology including properties and usefulness of duplex Ni deposits on exterior steel car parts and Zn pressure castings and of crack-free and microcracked Cr platings of increased thickness, corrosion and wear resistance of deposits, electroplating using Co-Ni alloys for magnetic tapes and Au alloys for electrical contacts and switches and brightening and polishing techniques. 30 ref. (L17, L-general, 10-54)

646-L. (German.) Geometry of Microscattering and Leveling by Electroprecipitated Metal Deposits. J. Elze. Metall, v. 15, June 1961, p. 542-550.

Investigation of deposit profiles and leveling rates in electroplating with Ni (Watts type), acid (sulphate) Cu and two commercial leveling electrolytes using Ni-Ag cathodes with scratches of defined profile. (L17; Ni, Cu)

647-L. (German.) Modern Techniques for Surface Treatments of Magnesium and Its Alloys. W. H. Gross. Metall, v. 15, June 1961, p. 551-555.

Review of anodic oxidation techniques for corrosion protection and primer purposes with emphasis on the "Dow no. 17 Anodize" method, bright pickling using $Fe(NO_3)_3$ ("Dow Chemical Treatment no. 17"), enameling, currentless Ni plating and touch up treatments in surface treatment of Mg alloy parts. (L-general, 10-54; Mg-b)

648-L. (German.) Wear Reduction by Hard Chromium Plating on Rail Vehicles. W. Schmitt. Metall, v. 15, June 1961, p. 555-559.

Application of hard Cr deposits, obtained by anodic plating, on mechanically or chemically stressed steel locomotive and rail coach parts to improve wear resistance. 11 ref. (L17c, Q9, Q29n, T23; ST, 17-57)

649-L. (German.) Modern Developments in the Field of Chromium Plating. H. W. Dettner. Metall, v. 15, June 1961, p. 560-561.

Review of electrodeposition technology with emphasis on use of self-controlling electrolytes, precipitating bivalent and trivalent Cr to improve electrical efficiency, cold and porous Cr plating, crack-free and microcracked Cr coatings and duplex Cr plating. 25 ref. (L17, 10-54; Cr)

650-L. (German.) Dyeing of Chromated Zinc Surfaces. G. Woldt. Metall, v. 15, June 1961, p. 562-565.

Dyeing of chromated electrodeposited Zn films or Zn pressure die castings by organic salt solutions and testing of colored surfaces for stability in light and against water attack and wear. 11 ref. (L14; Zn)

651-L. (German.) Metal Degreasing and Phosphating Plants. R. Reichle. Metall, v. 15, June 1961, p. 578-581.

Survey of processes and plant design of plants for continuous gas degreasing by vaporized organic solvents, alkaline dip, drum and spray degreasing in chamber and belt plants and automatic and continuous washing, phosphating and drying in dip processes. (L12, L14b, 1-52)

652-L. Printed-Circuit Plating. J. E. Philpott. Electronic Technology, v. 38, June 1961, p. 221-223.

Electrodeposition of Rh, Pd, Au and Pt on printed Cu circuits, plugs and switches to form hard, inert contact points. (L17; Cu, Rh, Pd, Au, Pt)

653-L. (German.) Experiences in Surface Treating of Semifinished Products

of Alloy Steel by Flame Scarfing and Grinding. Hans Geipel. Stahl und Eisen, v. 81, June 8, 1961, p. 787-794.

Automatic hot flame scarfing of ingots, cold flame scarfing with powder additions of slabs and semi-automatic grinding of slabs in the production of alloy steel broad strip. Characteristic operational data of the three processes with cost comparison. (L10g, G18; AY, 4-52)

654-L. Functional Coatings by Vacuum Metallizing. Philip J. Clough. Society of Vacuum Coaters, New York, Jan. 26-27, 1960, p. 1-3.

Review of vacuum metallizing of Al and Cd on panels of 1030 mild steel, H-11 alloy, 1000 Vascojet and AISI 8740 alloy. Evaluation of thick film Al coatings for reproducibility, salt spray corrosion resistance, adherence and ductility. (L25g, 1-73, R11j, Q23p, Q10c; Al, Cd, 8-74, ST)

655-L. Lacquer Automation and Vacuum Metallizing. R. J. Perkel. Society of Vacuum Coaters, New York, Jan. 26-27, 1960, p. 6-10.

Automation in racking, cleaning or degreasing, flow coating, flow-out and rotation and curing processes. Description of a cross-bar conveyorized immersion degreaser, an automatic flow coater and an automatic rotator and drier. (L-general, 1-52, 18-74)

656-L. Vacuum Chamber Problems in Decorative Metallizing. Pt. 1. Discoloration. Leslie Winters. Society of Vacuum Coaters, New York, Jan. 26-27, 1960, p. 11-14.

Chamber pressure, outgassing rate, firing speed and tolerance of the plastic as factors which cause visual discoloration of Al metallized coatings on plastic parts. Selection of size and shape and method of cost evaluation of filaments in decorative metallizing. (L25g; Al, 8-74)

657-L. Vacuum Deposited Protective Films. Richard A. Denton. Society of Vacuum Coaters, New York, Jan. 26-27, 1960, p. 31-35.

Protective and insulating films of SiO, MgF_2, Al_2O_3, Cr and Au are vacuum deposited on mirrors and glass articles. Influence of films on reflectivity, electrical conductivity and radiation susceptibility. (L25g, P15g, P17a; Cr, Au, NM-f42)

658-L. Vacuum Chamber Problems in Decorative Metallizing--Discoloration, Filaments and Techniques. Morton B. Gilbert. Society of Vacuum Coaters, New York, Jan. 26-27, 1960, p. 36-38.

Firing pressure and technique, chamber cleanness, number of filaments, racking method and filament design and condition as factors which affect discoloration and work coverage. Corrective measures. (L25g)

659-L. Multicolored Effects on Anodized Aluminum. A. Jogarao, B. A. Shenoi and K. S. Indira. Metal Finishing, v. 59, July 1961, p. 42-45.

Suitability of films for dyeing, optimum anodizing conditions, coloring with organic dyes, inorganic pigmentation, multicolor processes (photographic and resist processes), superimposition techniques, bleaching process, relief designs, mottled effects, sprayed effects, silk screen printing and printing processes. 14 ref. (L26; Al, 8-73)

660-L. Automating a Paint Line for Discontinuous Operation. Donald J. Fumagalli. Metal Finishing, v. 59, July 1961, p. 61.

Automation of precleaning, painting and baking operations on equipment and components for telephone systems and related electrical apparatus. Use of electrostatic booths and photoelectric eyes. Paint thickness and uniformity control. (L-general, 18-74, X15r)

661-L. Control of a Copper Fluoborate Plating Bath. Larissa Domnikov. Metal Finishing, v. 59, July 1961, p. 62.

Method of rapid deposition of Ca from a bath containing copper fluoborate and free boric and fluoboric acids based on electrolytic deposition of Cu from the solution sample and subsequent hydrolytic decomposition of fluoboric acid by boiling in the presence of magnesium sulphate. Method of analysis of the electrolyte. Conversion coefficients. (L17a; Cu)

662-L. Institute of Metal Finishing Conference, Llandudno, 1961. Nathaniel Hall. Metal Finishing, v. 59, July 1961, p. 63-66.

Abstracts of 16 papers presented at the 1961 Annual Conference of the

British Institute of Metal Finishing, held at Llandudno, Wales, from May 2-6. (L-general)

663-L. (English.) Repairing the Surfaces of Calender Rolls. Paul Metschke. Werkstatt und Betrieb, v. 94, May 1961, p. 111-112.

Imperfections in steel calender rolls caused by wear and foreign bodies in the mixture are eliminated by a metal spraying method using Sprabond adhesive without dismantling. Treated spots have a Brinell hardness of about 500. (L23, T29q, 18-72)

664-L. Principles of Electrostatic Spraying of Vacuum Metallizing Coatings. John Scharnberg and T. E. Hayden. Society of Vacuum Coaters, New York, Jan. 26-27, 1960, p. 22-27.

Theory and process of electrostatic spraying. Description of essential components of electrostatic spray equipment including the reciprocating disk unit and the atomizer. Advantages and disadvantages of electrostatic application. (L26n, W4)

665-L. Design and Plan to Metallize. Fred Borries. Paper from Winter Meeting, New York, Jan. 26-27, 1960, Society of Vacuum Coaters, p. 28-30.

Evaluation of premetallizing operations. Location of equipment for clean operations, selection of correct coating and effect of surface area on coating smoothness. (L25g, 1-52)

666-L. Mechanized Metal-Finishing Operation. S. C. Poulsen. Machinery (London), v. 98, June 28, 1961, p. 1452-1460.

Machines and auxialary equipment used for automatic polishing of electric iron cowls and toaster bodies. Layout and methods used in related Ni and Cr plating plant. (L10, L17, 1-52, T10c; Ni, Cr)

667-L. (Translation-Brutcher no. 5011.) Spray Coating on Gray Iron Castings With Aluminum. F. L. Al'ter-Petsotskii. Metallovedenie i Termicheskaya Obrabotka Metallov, Dec. 1959, p. 51-52.

Previously abstracted from original. See item 139-L, 1960. (L15; CI-n, Al)

668-L. (Translation-Brutcher no. 5164.) Electrolytes for the Polishing and Etching of Austenitic Chromium-Nickel and Manganese Steels. G. Bassi. Metalloberflache, v. 52, Feb. 1961, p. 141-142.

Previously abstracted from original. See item 441-L, 1961. (L13; SS-e)

669-L. Dyed Zinc Coatings. Heinz W. Dettner. Electroplating and Metal Finishing, v. 14, July 1961, p. 233-234.

Operations for chromate treatment of Zn castings and coatings. Selection of colors to suit application. Light fastness. (L14c, P17; Zn, 5, 8-62)

670-L. Painting Metal Sprayed Surfaces. L. Valentine. Electroplating and Metal Finishing, v. 14, July 1961, p. 236.

Paint and substrate parameters relative to durability and protection efficiency of the coating. Evaluation of several coating systems. Weathering tests. (L26, R3; 8-67)

671-L. Protecting Steel by Sprayed Metal Coatings. J. F. Stanners. Electroplating and Metal Finishing, v. 14, July 1961, p. 237-238.

Protection of steel by unpainted and unsealed sprayed coatings of Zn and Al. Comparison of corrosion resistance of coatings in industrial atmospheres. Effect of coating thickness and surface roughness. (L23, R3n; ST, Zn, Al)

672-L. Institute of Metal Finishing Annual Conference, 1961. Electroplating and Metal Finishing, v. 14, July 1961, p. 239-242.

Summaries of nine papers covering the influence of composition and heat treatment of carbon and low-alloy steels upon their response to the A. R. D. E. smoothing process, influence of preplating processes on the porosity of electrodeposits on steel, selection and testing of coatings and painting car bodies. (L-general)

673-L. How to Exploit New Technology in Surface Preparation. Steel, v. 149, July 10, 1961, p, 70-73.

Grinding, blast cleaning, brushing, tumbling, vapor honing, galvanizing and phosphatizing of metal surfaces for plating, painting, or other finishing operations. Finishing defects are

minimized by adequate knowledge of metal surface characteristics. Effect of grinding variables on surface preparation. (L-general, G18)

674-L. Pneumatic Controls Automate Enamelstrip Line. Steel, v. 149, July 10, 1961, p. 82-83.

Pneumatic, variable speed controls are used to automate continuous processing lines of a drying oven. Strips are given smooth, uniform coatings. Output from the line is determined by the time-temperature curing cycle required for each product. Individual drive speeds can be regulated to correct for roll wear. (L26n, 18-74; 4-53)

675-L. Chromate Coatings--Aircraft and Missiles. Products Finishing, v. 25, July 1961, p. 40-45.

Process details and controls, acceptance tests, equipment, adhesion and recoating of damaged areas of 6061, 7075, 2024, 5052 and 5056 Al alloys. (L14c, Q10c, T24; Al-b, 17-57)

676-L. Hot Spray Speeds Production, Improves Quality. Products Finishing, v. 25, July 1961, p. 54-55, 57.

Vending machine parts are sprayed with acrylic lacquer which is kept at 160° F. Cleaning, painting and baking procedures. Advantages include reduction of orange peel, runs and sags. (L26n, 1-66, L12)

677-L. Gold Coating Fights Heat in Scout Research Rocket. Products Finishing, v. 25, July 1961, p. 58, 60.

Inner skin of a research rocket (NASA's "Scout") is Au coated to a thickness of 0.00001 in. by spraying a Au resinate on the part and then baking in an oven at 375° F. for 15 min. The coating turns to pure Au in a second bake at 700° F. for 1 hr. (L23, T2p; Au)

678-L. Improved Nickel Plating With Ball Anodes. Charles T. Walker. Products Finishing, v. 25, July 1961, p. 70-71.

Simplification of replacement, elimination or production of scrap anodes, remelt and recovery of metal and more uniform deposition are achieved by using ball Ni anodes in a Ti basket instead of solid Ni anodes. Balls are fed into basket as balls in solution corrode. (L17, W3h; Ni)

679-L. How Small Castings, Big Sheets Are Painted Quickly, Efficiently, Inexpensively. K. B. Rhodie. Modern Metals, v. 17, June 1961, p. 68, 70, 72, 74.

Electrostatic painting of Al and steel castings, stampings and sheets. Paint is pumped onto a spinning disk and forced to the edge by centrifugal force. The electrostatic field atomizes the paint and conducts the mist to the oppositely-charged workpiece. (L26n, 1-52; Al, ST, 5, 4-53, 4-59)

680-L. Nickel-Ball Anodes Aid Plating. Iron Age, v. 187, July 13, 1961, p. 97.

Anode consists of 2-in. diameter Ni balls in a perforated Ti basket. As the anode corrodes at the bottom, the supply of Ni balls is replenished through the top. (L17, W3h; Ni, 17-57)

681-L. (German.) Recent Investigation of Flame-Spraying of Steel Wire. W. Pungel, H. Krautmacher and W. Knebelkamp. Draht, v. 12, May 1961, p. 215-219.

Autogeneous spray tests for shot blasted 5 mm. thick St 37 steel plates using steel spray wires containing 0.07-0.77% C, 0.02-0.28% Si, 0.23-0.89% Mn, 0.015-0.024% P, 0.015-0.03% S. Investigation of microstructure, surface quality, composition changes, hardness, adhesion, machinability, porosity and slag inclusions of coatings. (L29n; ST)

682-L. (German.) Electrocoatings on Welded Parts. J. Ruge and P. Hildebrandt. Schweissen und Schneiden, v. 13, May 1961, p. 195-199.

Salt water (3% NaCl) spray testing of arc, autogeneous, thermit powder and Mig welded steel sheet specimens (thickness 6 mm.) after electroplating with Cu, Ni and Cr. Corrosion resistance is influenced by coating material and layer thickness. (L17c, R11j, 2-60, 3-73; ST, Cu, Ni, Cr)

683-L. (Translation-ConBur.) Simultaneous Liberation of Metal and Hydrogen. B. I. Skirstymonskaya and M. F. Lantratov. Journal of Applied Chemistry of the USSR, v. 33, May 1960, p. 1119-1123.

A study of the kinetics of simultaneous cathodic discharge of Zn and H_2 during electrodeposition from solutions of low and high acidity. Determination of the effect of cathode potential on the rates of simultaneous liberation and on current efficiency for Zn with H_2. Liberation of Zn is complicated by concentrational effects. 15 ref. (L17b, N16, 2-60; Zn, H)

684-L. (Translation-ConBur.) Deep Anodizing of Aluminum at Room Temperature. N. P. Fedot'ev, S. Ya. Grilikhes and B. Ya. Zil'berman. Journal of Applied Chemistry of the USSR, v. 33, May 1960, p. 1124-1130.

Al specimens are anodized in an electrolyte containing 170 grams per liter of H_2SO_4 at -2 to 20° C. with investigation of variations of cell voltage and anode temperature in anodizing. The influence of current strength on the quality of oxide films and the effect of stirring of the electrolyte on the anode temperature. 5 ref. (L19, 2-61; Al)

685-L. (Translation-ConBur.) Production of Galvanic Coatings on Titanium. S. M. Burdina and A. G. Samartsev. Journal of Applied Chemistry of the USSR, v. 33, May 1960, p. 1131-1135.

A method for producing firmly bonded Cr, Cu and Ni coatings on Ti. The Ti specimens are prepared for electrodeposition by chemical etching and anodic treatment in ethylene glycol, HF, HNO_3, CH_3COOH, HCl and ZnF_2 from 18-90° C. for current density of 1-10 amp./dm.^{2} Plating is done in two stages with a vacuum heat treatment following the first stage to improve adhesion. 7 ref. (L17; Ti, Cr, Cu, Ni)

686-L. (Translation-ConBur.) Copper Plating of Steel in an Ammoniacal Electrolyte Containing Cuprous Ions. V. D. Kamkin and M. L. Pertsovskii. Journal of Applied Chemistry of the USSR, v. 33, May 1960, p. 1204-1206.

Electrodeposition of Cu on steel at 25° C. from an electrolyte with a cuprous ammine complex. Typical bath composition is Cu_2Cl_2(106 g/l), NH_4Cl(132 g/l) and NH_3(52 g/l). The bath is cyanide free and gives a high rate of Cu deposition with good adhesion. 11 ref. (L17; ST, Cu)

687-L. (Translation-ConBur.) Internal Stresses in Chromium Coatings Deposited From a Tetrachromate Electrolyte. M. A. Shluger, A. Ya. Ryaboi and V. A. Kazakov. Journal of Applied Chemistry of the USSR, v. 33, May 1960, p. 1206-1208.

Internal stresses in Cr deposits formed in a tetrachromate electrolyte investigated by the flexible-cathode method in which steel cathodes are coated with Cr from 15-30° C. from an electrolyte containing CrO_3(400 g/l), NaOH(20-100 g/l), H_2SO_4-sugar(3-5 g/l). Effects of temperature, current density and caustic soda concentration. 8 ref. (L17c, 3-66; ST, Cr)

688-L. (German.) A More Exact Bath Phosphate Coating Process for the Application of Slide Lacquer Films. Hans H. Reinsch. Metall-Reinigung + Vorbehandlung, v. 10, May 1961, p. 73-75.

Production methods for wear and corrosion resistant slide-lacquer to metal parts including preparation of phosphate coating bath, phosphate dip coating at 95-98° C. with subsequent alternating hot and cold water rinsing and spray application of a MoS_2 containing slide-lacquer (temperature resistant from -70 to 260° C.) (L16, L26n)

689-L. Functional Finishes for Metals. Herbert L. Kee. Product Engineering, v. 32, July 17, 1961, p. 39-50.

Use of organic and inorganic coatings for corrosion, abrasion, wear, heat and oxidation resistant finishes. Specification of paint coatings to suit applications. Comparison of painting costs and paint, coatings in terms of physical properties, resistance to environment and chemicals and ease of application. Mechanical finishes including strengthening and surface treatment. Electrical and solderable finishes, lubricating films and coatings for thermal radiation. (L-general, Q9, R-general; NM-a, NM-b)

690-L. (Japanese.) Types of Chromium Plating Baths and Their Corrosion Protection. Pt. 3. Corrosion Protection of Decorative Chromium Plating. Mamoru Saito and Minoru Nakamura. Metal Finishing Society of Japan, Journal, v. 12, May 1961, p. 169-172.

An acetic acid salt spray test is made on Cu-Ni-Cr plated steel panels having Cr layers of varying thicknesses and differing in cracking tendency as obtained from baths of different composition. Thicker Cr coatings deposited from highly concentrated crack-free baths show higher corrosion resistance but have higher residual stress and cracking tendency. 5 ref. (L17c, R11j, 2-60, 3-73; Cr)

691-L. (Japanese.) Determination of Thickness of the Alloyed Layer in Aluminum Diffusion Coated Steel. Hiroshi Ichikawa and Shigetomo Ueda. Metal Finishing Society of Japan, Journal, v. 12, May 1961, p. 181-185.

Microscopy, electromagnetic and electrolytic methods are used with microhardness measurements to determine thickness of alloy layers in specimens diffusion coated with Al by the packing method. 4 ref. (L15, S14, 1-54; ST, Al)

692-L. (Japanese.) Elongation and Stress in Nickel Deposits. Saburo Konishi. Metal Finishing Society of Japan, Journal, v. 12, May 1961, p. 185-190.

The effect of bath constituents such as brightening, leveling and surface active agents on hardness, stress and elongation and resultant cracking susceptibility is determined for Ni specimen coatings on Cu by tensile testing. 12 ref. (L17a, L17c, 2-60, 3-66, 9-72; Ni)

693-L. Circumferentially Uniform Electroplating of Tube Bores. John P. Young and Harry I. Salmon. Plating, v. 48, July 1961, p. 783-784, 787-788.

Procedures for plating the internal surface of gun tubes having an inside diameter of 0.3 in. and a bore length of 20 in. Data are given for the degree of circumferential uniformity of thickness of deposits of Cr obtained with newly designed fixtures. Methods are applicable to commercial tubes. 5 ref. (L17; Cr)

694-L. Mechanical Finishing of Metal Surfaces. Pt. 1. Zinc Base Die Castings. William C. Geissman, R. Scott Modjeska and Kenneth Gatchel. Plating, v. 48, July 1961, p. 794-798.

Equipment and procedures for buffing and polishing of Zn die castings using bar compounds. (L10a, L10b, 1-52; Zn, 5-61)

695-L. Sixth International Galvanizing Conference. Metal Industry, v. 99, July 7, 1961, p. 9-11.

Summaries of four papers presented at the conference on the effects of alloy additions, bath temperature, immersion time, Al concentration, agitation and cooling on properties of hot galvanized coatings. Various systems of bath heating are discussed. (L16, 1-66, 2-61, 3-67; 8-65)

696-L. Recent Developments in Tin-Nickel Plating. G. FitzGerald-Lee. Product Finishing, v. 14, July 1961, p. 65-67, 91.

Review of papers covering process parameters and applications, including codeposition from organic and mixed aqueous organic solutions, corrodibility and solderability as influenced by storage. (L17, 10-54; Ni-b, Sn-b)

697-L. I. M. F. Conference. Product Finishing, v. 14, July 1961, p. 75-76, 90-91.

Review of papers discussing the electrodeposition of Ni, Cu, Cr, Ag and Ru, the mechanism of levelling, corrosion of decorative Ni-Cr coatings, an ion exchange process for the recovery of waste water, techniques for measuring cathodic overpotential and coating thickness and the influence of preplating processes on porosity of deposits. Selection of finishes for communications equipment, for autos and for domestic appliances. (L-general, 10-54)

698-L. Coating Before Coiling. Copper, no. 12, Summer 1961, p. 10-11.

Automatic plant for Cu dip coating of ferrous wire before coiling. Process is continuous and deposit thickness is controlled only by travel speed. (L16, 1-52; Fe, 4-61, Cu)

699-L. This Barrel Spins and Vibrates. A. A. Polucha. Metalworking Production, v. 105, July 5, 1961, p. 83.

A combination of rotary and vibratory motions producing a "waterfall" effect is used to polish and deburr metal parts. Description of vibratory finishing machines. (L10, 1-52)

700-L. The Influence of Addition Agents on the Composition of Nickel Deposits. A. H. DeRose. Metal Finishing Journal, v. 7, June 1961, p. 210-215.

Effect of carbon, sulphur and nitrogen additions to organic-type bright Ni solutions on the crystal structure of deposits. Polarization studies. (L17a, M26, 2-60; Ni)

701-L. Levelling Action During Electrodeposition in Nickel and Acid-Copper Solutions. S. A. Watson. Metal Finishing Journal, v. 7, June 1961, p. 215-218.

Effects of variations in agitation, pH and temperature on leveling. Cathode-potential measurements are made with 60 addition agents in Ni solutions and with 30 in acid-Cu solutions. (L17b; Ni, Cu)

702-L. (Translation-ConBur.) Determination of the Surface State of Metals Before Electroplating. A. M. Yampol'skii. Journal of Applied Chemistry of the USSR, v. 33, July 1960, p. 1551-1555.

Rectangular Al plates are subjected to surface treatments including natural oxide film formation; anodic treatment in an H_2SO_4 electrolyte; etching in NaOH solution; treatment with zincate solution and treatment in zincate followed by electroplating with Zn. Surfaces are then compared by an oscillographic method to determine electrode capacity and suitability of the surface for electroplating. 7 ref. (L-general, S15; Al-b)

703-L. (Translation-ConBur.) Bright Cadmium Plating From Acid Baths. A. V. Pamfilov, V. S. Kuzub and L. P. Tovmach. Journal of Applied Chemistry of the USSR, v. 33, July 1960, p. 1649-1651.

Mirror-bright deposits obtained in the electrodeposition of Cd from acid baths using naphthalene mono or disulphuric acids and gelatin as additives and with the aid of periodic current reversal. Deposits are harder and less porous. 5 ref. (L17; Cd)

704-L. Sixth International Galvanizing Conference. Metal Industry, v. 98, June 30, 1961, p. 511-514.

Summaries of nine papers presented at the conference on the effect of hot galvanizing on the mechanical properties of steel sections, the adhesion of galvanized coatings, weldability of hot galvanized steel, assembly of galvanized steel by welding, reconditioning of damaged galvanized surfaces, tests on wet storage stain, corrosion of Zn in dilute aqueous solutions, painting of hot galvanized steel and chromating. (L16, 1-66, K-general, L-general, Q-general, R4; ST, 8-65)

705-L. (Russian.) Manufacture of Bimetals Composed of an Antifriction Aluminum Alloy and Steel. A. D. Kuritsyna, F. V. Korolev, K. N. Korsunskaya and N. M. Rudnitskii. Tsvetnye Metally, Feb. 1961, p. 66-68.

Semicontinuous casting of ingots from pure AV000 Al alloys with 20-30% Sn, and Moren 400 AMK and ASS6-5 alloys. Cladding of a 10 mm. thick alloy sheet containing 30% Sn with a 2 mm. AMK sheet. Manufacture of the bimetal by cold and hot rolling together with a 6 mm. clean steel sheet. (L22; Al-b, ST)

706-L. Immersion Plating of the Platinum Group Metals. R. W. Johnson. Electrochemical Society, Journal, v. 108 July 1961, p. 632-635.

Bright, adherent, replacement deposits of Pd, Rh, Ru and Pd are obtained in thicknesses of 50, 30, 100 and 65 millionths inch, respectively, on Cu, brass, Cu-Be, phosphor bronze and nickel silver. The coatings are sealed by immersion in NH_4OH or boiling distilled water or by replacement deposits of Au. (L17; Cu-b, Ni-b, EG-c)

707-L. Barrel Plating by Means of Electroless Palladium. R. N. Rhoda. Electrochemical Society, Journal, v. 108, July 1961, p. 707-708.

Deposition of Pd from various bath formulations and under different operating conditions on substrates of Al, C, Au, graphite, Mo, Ni, Kovar, Pd, Ag, Ta and Ti in sheet, rod, wire and plate form. (L17; Pd)

708-L. (German.) Compounding of Metal and Ceramics. Technica, v. 10, June 9, 1961, p. 797-798.

Application of Mo-Mn coatings on ceramic parts by spraying as an emulsion of metal powder in amylacetate and subsequent sintering from 1300-1600° C. Coating of ceramics by Ti and Zr by decomposition of metalhydride at 900° C. (L23, L29, K11b; NM-f40, Mo-b, Ti, Zr)

709-L. Bluckets for Aft-Fan Jet Engines Plasma-Metalized. L. W. Collins. Machinery, v. 67, July 1961, p. 92-95.

Flame spraying a modified A286 superalloy jet engine turbine at 30,000° F. with a water cooled plasma gun to prevent galling and seizing. Determination of adhesion, thickness and uniformity of coating. (L23, Q10c, T24b; SGA-h)

710-L. (German.) Preparation of Metals for Application of Paints. W. Wiederholt. Fette-Seifen-Anstreichmittel, v. 63, Apr. 1961, p. 364-372.

Review of treatments for cleaning and roughening metal surfaces including

brushing and sand blasting; thermal techniques such as flame blasting with subsequent mechanical treatment and flame priming; and chemical and electrochemical procedures. Classification of surface quality of metals. (L10, L12, L13, 10-54)

711-L. Lubrication at High Temperatures With Vapor-Deposited Surface Coatings. D. J. Baldwin and G. W. Rowe. Journal of Basic Engineering (ASME Transactions), Series D, v. 83, June 1961, p. 133-138.

Inorganic films with lubricating properties are formed on clean surfaces of Cr, Ti, Cb, WC, B, Zr, Mo, U and stainless steel by heating the metal in a reactive vapor atmosphere of I_2, H_2S, Cl_2 or CCl_2F_2 from 200-850° C. Lubrication properties and thermal stability of film are tested using loads of up to 12 tons. 6 ref. (L25, 2-62, 18-73; Cr, Ti, Cb, B, Zr, Mo, U, SS, W, 14-68, NM-a, 17-57)

712-L. Efficient Degreasing Essential for Quality Finishing. W. B. Hanley. Industrial Finishing (London), v. 13, June 1961, p. 46-47.

Alkaline, solvent and emulsion cleaning. Agitation by air, by solution circulation, by an impeller and by mechanical movement of the parts being processed. Ultrasonic and steam cleaning. (L12, L10f)

713-L. Pretreatment for Aluminum. J. Edwards. Industrial Finishing (London), v. 13, June 1961, p. 54.

Oil removal, etching, smutting and precipitation elimination, cleaning, coating and deoxidation with various types of cleaners and etchants. (L-general; Al)

714-L. New Mechanized Enameling Line for Pressed Steel Bath Tubs. Nat Wood. Western Metalworking, v. 19, July 1961, p. 36-38.

Dry enameling of cast iron products; wet enameling of steel tubs. (L27, 1-52, T10; CI, ST, 17-57)

715-L. Hard Surfacing Cam Shafts Hikes Wear Life. Western Metalworking, v. 19, July 1961, p. 41.

Reclamation hard surfacing with Colmonoy no. 4 Sprayweld powder. From the spray pistol nozzle the powder is propelled through an oxy-acetylene flame in a narrow cone pattern. The powder is then welded to the shaft by application of a conventional oxy-acetylene torch. (L24, T7, 18-72; ST, Cr, 17-57)

716-L. New Chemicals Speed Cleaning, Plating; Cuts Costs. Austin Porter. Western Metalworking, v. 19, July 1961, p. 42-43.

Electrolytic cleaning of steel parts; use of Burnek 452, a steel and ferrous metal burnishing compound and Dubrite, a bright dip sealing compound in the finishing of chain saw parts. (L12p, L13; ST)

717-L. (German.) Processes in Nonferrous Semi-Finished Products Industry. Pt. 6. Newer Pickling Processes in Nonferrous Industry. Peter Petri. Zeitschrift fur Metallkunde, v. 52, June 1961, p. 437-439.

Plant design and mode of operation for automatic and nonautomatic pickling of nonferrous products including small brass parts and tubes, and Cu sheet and wire. (L12g, 1-52; Cu-b)

718-L. Hardsurfaced OEM Parts and Products: A Big Market Getting Bigger. Welding Design & Fabrication, v. 34, July 1961, p. 45-46.

Advantages and limitations of hardsurfacing; applications in the chemical, aircraft and missile and steel industries. List of surfaced original equipment manufacture parts and products. (L24)

719-L. Creative Applications of OEM Hardsurfacing. Welding Design & Fabrication, v. 34, July 1961, p. 49-57.

Case histories of original equipment manufacture hardsurfacing applications in mining equipment, cutting machines, oil refining equipment, automobile parts and fittings, extrusion screws, drill heads and other parts and products. (L24, T-general)

720-L. Broad Plating Economies Demonstrated by Huge Plating Operation. Asarco Digest, v. 3, no. 1, p. 2-4.

Operations and equipment for plating metal products of various sizes and shapes. Zn plating using the Zimax brightener process. Conversion coating. (L-general, 1-52)

721-L. Tips for Better Electroplating. Steel, v. 149, July 31, 1961, p. 56.

Factors to be considered in electroplating quality control including surface and other properties of the base metal, properties of the diffusion alloy of the base metal and properties of the deposited coating to suit particular applications. (L17)

722-L. (German-French.) Anodic Oxidation of Aluminum and Its Alloys. Aluminium Suisse, v. 11, May 1961, p. 113-120.

Measurement of the thickness of surface layers obtained by anodic oxidation using microscopes or electrical instruments generating eddy currents in the base metal by determining the spark voltage necessary for puncturing the oxide film or by resistivity measurements. (L19, S14; Al-b)

723-L. Powder Diffusion Coating. Australasian Manufacturer, v. 46, June 17, 1961, p. 52-55.

Heat, corrosion, abrasion and wear resistance are imparted by chromallizing, a process for surface alloying by diffusing Cr and/or other elements into a base metal. Examples are given for steel. (L15. P11h, Q9n; ST, Cr)

724-L. (Translation-ConBur.) Determination of the Strength of Adhesion of Nickel Coatings to Aluminum and Its Alloys. N. P. Fedot'ev and A. M. Yampol'skii. Journal of Applied Chemistry of the USSR, v. 33, Aug. 1960, p. 1823-1828.

Method based on determination of the force required for progressive removal of the coating is used to determine the composition and treatment of the Al surface in zincate solutions for giving the highest adhesion strength. 5 ref. (L17c, Q10c; Al-b, Ni)

725-L. (German.) Combined Hot Dip Galvanizing and Lacquering--An Ideal Corrosion Protection. K. A. van Oeteren. Seifen-Ole-Fette-Wachse, v. 87, May 10, 1961, p. 278-281.

Application of protective paint coatings on galvanized Fe and steel surfaces. Mechanical and chemical preparation of galvanized surface to improve adherence of paint, galvannealing (diffusion annealing at 600° C.) and selection of paint and primer are reviewed in terms of corrosion resistance. (L-general, L16, L26n; Fe, ST)

726-L. (Russian.) Effect of the Mechanical Properties of Solid Metals and Alloys on Rate of Their Ultrasonic Treatment. N. M. Rostovtsev and G. I. Epifanoz. Doklady Akademii Nauk SSSR, v. 136, Apr. 1961, p. 807-809.

Agitation of Pb, Al, Fe, Cu, Zn, Sb, glass and Pb-Sb alloys in boron carbide solution to determine speed of ultrasonic cleaning as a function of plasticity and brittleness. 4 ref. (L10f)

727-L. Metal Finishing Conference. F. H. Reid, J. C. Blake, P. G. Forrester, A. A. Pearson and G. G. Parker. Metal Finishing Journal, v. 7, July 1961, p. 269-277.

Summaries of three papers presented at the Annual Conference of the Institute of Metal Finishing at Llandudno, May 2-6, 1961. Included are Electrodeposition of Ru; Electrodeposition in Plain Bearing Manufacture; Experience With an Ion-Exchange Process for the Recovery of Water Polluted in Metal Finishing Operations. (L17, A8b, T7d; Ru)

728-L. Interfacial Reactions. S. E. A. Ryder, A. Biddulph, H. H. Johnson, N. S. C. Millar and B. K. Niklewski. Metal Finishing Journal, v. 7, July 1961, p. 257-260.

Experiments are carried out on specially produced titanium steel to assess the possibility of its use for direct-application cover-coat enameling. (L27; AY, Ti)

729-L. The Scope for Further Study of Anodic Oxide Films on Aluminum. G. C. Wood. Metallurgia, v. 63, May 1961, p. 221-222.

Review of recent studies on the anodizing of Al including the mechanism of porous film formation, aging, dye absorption, sealing and adequate pore closure. 15 ref. (L19, 10-54; Al)

730-L. How to Deposit Hardfacing Alloys. Pt. 2. Welding Engineer, v. 46, July 1961, p. 40-41.

Preparation of mild, medium, high carbon and manganese steel parts by cleaning, grinding, depression filling and build-up for hardfacing. Selection of electrodes to suit desired resistance. (L24, K9p)

731-L. Small Plater Handles Odd Jobs. Iron Age, v. 188, Aug. 3, 1961, p. 77.

Application of selective Au and Rh plating using a power pack, stylus with graphite anode and a small amount of electrolyte, to preparation of electrical switch components. (L17, 1-52, T1; Au, Rh)

732-L. (Russian.) Hard Facing of Steel With Nichrome. E. I. Leinachuk and A. T. Gabchak. Avtomaticheskaya Svarka, Apr. 1961, p. 71-77.

Effect of electrode composition and flux on the composition of filler metal, its microstructure, tensile and yield strengths, elongation and area reduction determined at 20-800° C. Oxidation resistance of Nichrome faced carbon steel held at 900-1100° C. for 8-48 hr. 4 ref. (L24, 2-60, M27, Q-general, R-general; CN, Ni-b)

733-L. (German.) Important Factors in Enameling of Welded Products. Ian Wachtmeister. Glas-Email-Keramo-Technik, v. 12, June 1961, p. 189-193.

Poor enamel quality (porosity) caused by gases, particularly hydrogen, dissolved in the weld. Control of defects by proper solution and drying of electrodes and by pickling and degassing at 200-250° C. (L27, L12, 9-68; 7-51)

734-L. The Protective Treatment of Metals Against Corrosion. Pt. 1. H. Silman. Wire Industry, v. 28, July 1961, p. 679, 681-682.

Electroplating of metals with subsidiary processes including cleaning and pickling and degreasing for increasing corrosion resistance. Survey of Ni-Cr and Cr plating processes and solutions and pickling baths and solvents. (To be continued.) (L-general, L17, R-general 10-54)

735-L. Plated Wire for Bolt, Nut and Screw Production. Wire Industry, v. 28, July 1961, p. 692.

Procedure for electroplating stainless steel wire with Cu to provide a lubricant in cold heading operation. Wire is preplated with Ni, Cu-plated and cold headed into bolts, nuts and screws from which the Cu is removed with HNO prior to marketing. (L17, G10, 18-73; ST, Cu, 4-61)

736-L. (Czech.) Removal of Grinding and Polishing Pastes by Electrolytic Methods, Previous to Electroplating. J. Klicka and O. Mudroch. Strojirenstvi, v. 11, Feb. 1961, p. 119-125.

Cathodic degreasing and anodic finish cleaning at a current density of 10 amp. per sq.dm. and a temperature of at least 90° C. for 40 sec. Both operations are carried out in pH 10 electrolytes containing NaOH, Na_2CO_3, Na_3PO_4 and Na_2SiO_3. 4 ref. (L13n)

737-L. (German.) Currentless Nickel Plating Using Nickel Sulphate. C. Kalauch. Maschinenbau, v. 10, Apr. 1961, p. 150-153.

Currentless electrolytic deposition of Ni layers of various thickness on metal surfaces at 90° C. using an aqueous $NiSO_4$ and NaH_2PO_2 solution at 4-4.5 pH. Study of reaction mechanism and properties of the Ni coatings. 5 ref. (L17; Ni)

738-L. Chemical Cleaning of Metal Parts. Lester F. Spencer. Machine Design, v. 33, July 20, 1961, p. 134-141.

Review of methods for removing contaminants from surfaces of brass, Al, Zn, stainless steel, W, Mo, Zr and Ti alloys. Processes discussed include vapor degreasing and solvent, alkaline, emulsion, electrolytic and ultrasonic cleaning. (L12, L13, 10-54)

739-L. (German.) Smoking (Smoke Pickling) of Steel Wire. Paul Rump. Stahl und Eisen, v. 81, July 6, 1961, p. 939-942.

Reaction mechanism and mode of operation of the 19th century technique of "smoking" of annealed steel wire over charring wood (pickling by acetic acid contained in smoke) in preparation for drawing. (L12g; ST, 4-61)

740-L. Use of Electron Beams in Vacuum Coating. M. H. Hablanian. Paper from "Society of Vacuum Coaters. Fourth Annual Technical Conference and Meeting". Society of Vacuum Coaters, Chicago, Ill., p. 22-33.

Evaporating difficult materials such as W, Ta, Pt, Ir, Si and aluminum oxide in ultra high vacuum electron beam evaporator. Thermal conductivity, melting point, melting power and evaporation rate are given for 17 metals. (L25g, N16m, P11h, P12n; W, Ta, Pt, Zr, Si, 17-57)

741-L. The Protective Treatment of Metals Against Corrosion. H. Silman. Production Engineer, v. 40, July 1961, p. 433-453.

Review of electroplating and chemical conversion processes including cleaning, pickling, degreasing, plating with Ni, Cr, Zn and Cd, polishing, electrogalvanizing and electrotinning of brass, steel and Zn alloy and anodizing of Al to prevent corrosion. 13 ref. (L-general; SGA-g, Cu-b, ST, Al, Ni, Cr, Zn, Cd)

742-L. Painting and Plating Steel Furniture. Ezra A. Blount. Products Finishing, v. 25, Aug. 1961, p. 50-58.

Zn-coated tubular steel and plain carbon steel is finished by automatic processes which obviate the need for preparatory buffing and polishing; electrostatic painting or plating with bright nickel and chrome. (L26n, L17, T10b; ST, 1-52, 4-60, 18-74)

743-L. Recent Reports on Plating and Anodizing Aluminum and Magnesium. Gerard H. Poll, Jr. Products Finishing, v. 25, Aug. 1961, p. 64-78.

Talks presented at the 48th Annual Convention, American Electroplaters' Society. Review of techniques for protecting and decorating these nonferrous metals including a process for depositing Ni directly over an anodic coating. (L17, L19; Al, Mn, 1-52, 10-54, 17-57)

744-L. (German.) Electrolytic Deburring and Polishing of Metals. C. Striegler. Maschinenbau, v. 10, Apr. 1961, p. 140-148.

Review and theoretical analysis of anodic erosion with comparison of properties of mechanically and anodically polished surfaces. Survey of polishing and deburring techniques and equipment; process technology such as electrical data, temperature conditions, course of operation and efficiency and reconditioning of electrolytes. (L13, 10-54)

745-L. Extrusion Cladding With Aluminum. R. J. Fiorentino, C. J. Slunder and H. J. Wagner. Modern Metals, v. 17, July 1961, p. 38, 40.

Extrusion cladding of a uranium core. Effect of pressure of the cladding material on the core in the space between the die and mandrel. Photomicrography is used to illustrate diffusion layers between an Al cladding and a Ni plated uranium core. (L22, Ni; U, Al)

746-L. Brushing Gear Burrs and Radii. Edward P. Fisher. Grinding and Finishing, v. 7, Aug. 1961, p. 28-30.

Use of power-driver wire brushes with finishing machines to remove burrs and produce adequate blends and radii in automotive gear and component parts after hobbing and broaching. (L10e, 1-52, T7a)

747-L. The Anodic Surface Oxidation of Gold. H. A. Latinen and M. S. Chao. Electrochemical Society, Journal, v. 108, Aug. 1961, p. 726-731.

Au is anodized at constant potential and cathodically charged at constant current in perchloric acid. 18 ref. (L19, L21; Au)

748-L. Mechanism of Addition Agent Reaction in Bright and Leveling Nickel Deposition. Pt. 1. Studies With Radioactive Sodium Allyl Sulfonate. Seward E. Beacom and Bernard J. Riley. Electrochemical Society, Journal, v. 108, Aug. 1961, p. 758-763.

Sodium allyl sulphonate containing C^{14} and S^{35} is used with N-allyl quinaldinium bromide as a leveling agent in the bright plating of Ni on steel. Analysis of deposits and gaseous products indicates a mechanism which may account for the synergistic effect on leveling by various combinations of addition agents. 23 ref. (L17a; ST, Ni)

749-L. Electroless Deposition of Gold From Aqueous Solution on Base Metals of Nickel and Iron-Nickel-Cobalt Alloys. Robert F. Walton. Electrochemical Society, Journal, v. 108, Aug. 1961, p. 767-774.

Main constituents of the solution are potassium gold cyanide, citric or tartaric acid, tungstic acid and sodium N, N-diethylglycine. Deposition rate and deposit thickness, adherence and quality are dependent upon concentration, pH, temperature and immersion time. 4 ref. (L28, 2-60, 2-61, 2-67; Ni, Fe-b, Co, Au)

750-L. Porosity Measurements on Gold Plated Copper. Martin S. Frant. Electrochemical Society, Journal, v. 108, Aug. 1961, p. 774-778.

Porosity of the plate from seven types of bath is determined in an ammonia-ammonium persulfate solution which attacks only Cu so that amount of Cu dissolved is a measure of coating porosity. 17 ref. (L17a, 1-5; Cu, Au)

751-L. Influence of Thiourea on the Deposition Reactions of Iron and Nickel. Richard D. DeMars. Electrochemical Society, Journal, v. 108, Aug. 1961, p. 779-782.

Effects of thiourea on the deposition rates and reactions from mixed and unmixed chloride solutions are studied polarographically. 14 ref. (L17a, S11m; Fe, Ni)

752-L. Some Factors Affecting the Surface Chromium Content of Electrochemically Treated Tin Plate. P. R. Carter. Electrochemical Society, Journal, v. 108, Aug. 1961, p. 782-787.

The surface Cr content of cathodic-dichromate treated tin plate depends upon temperature, pH, Coulomb level and current density. Higher Cr content usually imparts greater oxidation resistance. 6 ref. (L17b, R10d; Sn, Cr)

753-L. Photoetching and Plating of Gallium Arsenide. R. W. Haisty. Electrochemical Society, Journal, v. 108, Aug. 1961, p. 790-794.

Plating (by Cu) occurs at the dark and etching at the lighted sections of n-type material; the reverse is true for p-type. 8 ref. (L17, P15g; EG-j, Ga, As, Au)

754-L. (French.) Some Advice for Electrodepositing. Guy Bacquias. Galvano, v. 30, June 1961, p. 391-393.

The amount of metal deposited on the cathode is calculated as a function of immersion time, current intensity, the molecular weight of metal to be deposited and its valence within its salt, forming the main component of the electrolyte. Experiments performed with the Hull cell. Addition of sodium cyanide or potassium cyanide to alkaline baths weakened by use. (L17c)

755-L. (French.) Print and Photographs on Aluminum. H. Richter. Galvano, v. 30, June 1961, p. 403-409.

Anodic oxidation and subsequent printing on the surface of Al or its alloys. Impregnation of the porous oxide film with substances sensitive to light prepares it for use as a photographic medium. (L19, L26b; Al)

756-L. (French.) Vacuum Evaporation. Pierre Arnold. Galvano, v. 30, June 1961, p. 411-416.

Equipment used in the vacuum evaporization of metals and their deposition on metals and non-metals. Applications in the manufacture of anti-reflection coatings in optical apparatus, mirrors, reflecting coatings on reflectors, catadioptric instruments, metallized plastics, piezoelectric quartz crystals and Se rectifiers. (L25g, 17-57)

757-L. How to Get the Most From Phosphating Systems. Pt. 1. George H. Pimbley. Metal Progress, v. 80, Aug. 1961, p. 103-107, 116, 118, 120, 122.

Recommended practices for Zn phosphate dip baths. (L14b)

758-L. Electrostatic Painting of Refrigerators. Metal Progress, v. 80, Aug. 1961, p. 112.

Automatic system for painting refrigerator cabinets and doors at the Kelvinator Div. of American Motors, Grand Rapids, Mich. The installation employs 33 Ransburg electrostatic painting units and replaces a battery of hand spray and automatic air guns. (L26n, T10a)

759-L. (German.) When to Use Metal Spray? F. Nagel. Maschinenbau, v. 10, Apr. 1961, p. 154-156.

Review of spraying of liquid metals including steel, Mo, Zn, Al, Cu-base metals, on cold (20-100° C.) metal or nonmetallic (ceramic, glass, wood) surfaces to improve wear resistance, corrosion resistance and surface quality. (L23, 10-54; ST, Mo, Zn, Al, Cu, 14-60)

760-L. Recommended Practices for Shop Cleaning and Priming. Corrosion, Aug. 1961, p. 119-120.

Methods of surface preparation of steel including solvent cleaning, flame cleaning and sand blasting. Methods of primer application including brush, spray and roller painting. (L10, L12, L26n; ST)

761-L. (Italian.) Diffusion Processes of Solid State. L. Matteoli. Metallurgia Italiana, v. 53, June 1961, (Atti-Notizie, v. 16, May-June 1961, p. 99-103.)

Parameters for the coating of metallic materials by lattice and interstitial diffusion using metallic halides. Various exchange reactions are described and the kinetics and thermodynamics of the diffusion processes are examined. (L15)

762-L. (Italian.) Siliconizing of Steel. L. Matteoli. Metallurgia Italiana, v. 53, June 1961, (Atti Notizie, v. 16, May-June 1961, p. 104-108.)

Survey of the siliconizing processes (from gas, fused and solid phase, and by electrolysis) on steel, U, Mo and Fe. Characteristics of the material before and after the process, and its application in industry are examined. 11 ref. (L15, L17; ST, U, Mo, Si)

763-L. (Italian.) Calorizing and Aluminizing Processes of Iron and Steel. D. Gualandi. Metallurgia Italiana, v. 53, June 1961, (Atti Notizie, v. 16, May-June 1961, p. 109-112.)

Classification and characteristics of various methods used in Al coating of Fe and steel in order to achieve a corrosion and heat resistant surface. (L15, L17; ST, Al)

764-L. (Italian.) The Sherard Process of Diffusion Galvanizing for Protective Coating of Iron. A. Bianchini. Metallurgia Italiana, v. 53, June 1961, (Atti-Notizie, v. 16, May-June 1961, p. 113-125.)

Apparatus, control, cost and application of the Sherardizing process of galvanizing-hot dipping used in coating Fe material with Zn. Structure of the Sherardized strata is examined. 18 ref. (L16; Fe, Zn)

765-L. Wire Insulating by the Fluidized Bed Process. C. A. Brown. Wire and Wire Products, v. 36, June 1961, p. 750-752.

Method of coating Cu wire by heating to a temperature above the melt and flow points of the plastic, immersing in a bed of air-suspended plastic powder, removing and subjecting the coating to more heat and then introducing it into the fluidized bed to form a coating. Investigation of effect of powder composition and size on the quality of the coatings. (L29; Cu, 4-61)

766-L. Some Fundamentals in the Preparation and Usage of Sheet Iron Ground Coats. A.I. Blackburn. Institute of Vitreous Enamellers, Bulletin, v. 11, July 1961, p. 117-120.

Method of enamelling Fe sheet or steel pressings. Preparation of enamel and pressings. Techniques and equipment used for dipping, drying and firing the ware to prevent ground coat contamination and to control coating thickness. (L26n, S14; Fe, 4-53, ST, 4-57)

767-L. Galvanized Strip Production. Metal Industry, v. 99, July 28, 1961, p. 69-70.

Methods of bath analysis, coating thickness control and cooling treatments in the production of hot dip galvanized sheet and strip. (L16, J2, S11, S14; ST, 8-65)

768-L. (German.) Roll-Polishing Surface Improvement by Working. Arthur Neischner and Horst Neumann. Fertigungstechnik und Betrieb, v. 11, June 1961, p. 371-376.

Review of roll polishing of steel, cast iron, Al, brass, bronze and other alloys having a tensile strength below 140 kp. per mm.^{2}. Descriptions of equipment and operating procedures including possible problems of application. (L10, 1-52; ST, CI, Al, Cu-b)

769-L. (Book.) Industrial Finishing Year Book 1961. 1961. 415 p. Arrow Press Ltd., Stamford House, 65-66 Turnmill St., London, S. E. 1, England.

Annual reference book on workshop practice, materials and processes including plastic coating, anodizing, electroplating, painting, dyeing, finishing, cleaning and polishing of metals and nonmetals. (L-general, 11-68)

770-L. Vacuum Plating of Metals and Plastics. Australasian Manufacturer, v. 46, June 24, 1961, p. 44-46.

Vacuum plating with Al by an automatic process which provides a glass base and a bright chrome-like finished surface which can be altered to any color. (L25q, 1-52; Al)

771-L. (English.) A Design Guide for Specifying Mechanical Finishes for Metal Parts. Lester F. Spencer. Machine Design, v. 33, Aug. 17, 1961, p. 164-172.

Review of mechanical finishing. Types of finishes and finishing methods including abrasive blasting, grinding, polishing, buffing and barrel finishing. Abrasive belts and contact wheels. Surface finishing characteristics of Al, Mg, Cu, Ni and their alloys, Zn alloys, Ag, steel and stainless steel. Mechanical finish specifications for stainless steel, Cu and Al parts. (L10, 1-52; Al, Mg, Cu, Ni, Zn-b, Ag, ST, SS)

772-L. Mechanical Plating--New Method Kneads Coating Material to Surface. Canadian Machinery and Metalworking, v. 72, Aug. 1961, p. 76-78.

Steel parts are covered with a protective metal coating of Zn, Cd, Sn or Pb of predetermined thickness (0.0001-0.003 in.) by mechanical plating in a cold welding process requiring no heat or electricity. A weighted amount of plating metal in powdered form is tumbled with promoter chemical additives and water causing metal dust to migrate to the surface of the steel part. (L17; ST, Zn, Cd, Sn, Pb)

773-L. Cold Galvanizing Comparable to Hot Dip. Canadian Machinery and Metalworking, v. 72, Aug. 1961, p. 84, 86.

Protection of Fe and steel by application of a Zn-rich paint coating through "cold galvanizing" which produces tough, adhering films containing 92% metallic Zn. Better corrosion protection is obtained by covering the galvafroid coating with a micacious Fe ore paint. (L16, L26n; ST, Fe, Zn)

774-L. Watch for More Automatic Cleaning. Canadian Machinery and Metalworking, v. 72, Aug. 1961, p. 85-86.

Application of multistage cleaning processes incorporating alkaline washing, degreasing, rinsing and phosphatizing operations on metal products and consumer goods. (L-general, 18-74)

775-L. Ultrasonics Clean Molds Quickly and Efficiently. Canadian Machinery and Metalworking, v. 72, Aug. 1961, p. 87.

Flat plate and book type molds made of low-carbon and chrome-plated steel are cleaned ultrasonically in alkaline-base cleaner at 160° F. Thoroughly cleaned surfaces without change in the shape of the molds are attributed to the high frequency ultrasonic energy used during cleaning. (L10f)

776-L. Discover Vibratory Finishing. William E. Brandt. Machinery, v. 67, Aug. 1961, p. 81-89.

Vibratory finishing with loose abrasives is used for cleaning, descaling, deburring, radius forming, coloring and burnishing of ferrous and nonferrous, cast, forged, stamped, pressed or machined metal parts. The workpieces are embedded in a mixture of fused Al_2O_3, SiC, ceramic triangles and H_2O and are subjected to controlled gyratory vibration in specially designed equipment. (L10h)

777-L. Three Steps Vital in Cleaning Steel for Electroplating. Canadian Machinery and Metalworking, v. 72, Aug. 1961, p. 119-120.

Precleaning procedure using alkaline or emulsifiable solvents and anodic electrocleaning with reverse current for producing a high degree of cleanliness on steel surfaces. The unplating tendency of reverse current cleaning is assisted by the wetting, emulsifying and suspending action of suitable cleaning solutions. (L12, L13; ST)

778-L. Recent Developments in Wire and Strip Anodising of Aluminum. B. A. Shenoi and P. V. S. Subramanian. Current Engineering Practice, v. 3, June 1961, p. 15-17.

Methods of producing satisfactory inert and insulating coatings for use in transformer windings, contactor coils, cycle dynamos, relay coils, wattmeters, electric magnets, laboratory gages, wire cloth, brake coils, anodes and cans. 8 ref. (L19, T1; Al, 17-57)

779-L. Alloy Plating in Metal Finishing. S. Venkatachalam and T. L. Rama Char. Current Engineering Practice, v. 3, June 1961, p. 18-21.

Review of developments in electrodeposition of Sn, Fe, Cr, W, Mo, Ni, Zn, Cu-Pb, Sn-Zn-Cu, Pb-Sn, Sb,

Fe-Cr-Ni alloys and In. (L17; Sn, Fe, Cr, W, Mo, Ni, Zn, Cu, Pb, Sb, In)

780-L. Plastic Coated Pipe Shows Strong Growth Potential. Steel, v. 149, Aug. 21, 1961, p. 86.

Steel pipe is degreased, blasted, undercoated with adhesive and coated with polythylene plastic which forms a corrosion resistant, tough covering which remains flexible in all kinds of weather. (L26p; ST, 4-60)

781-L. Hardsurfacing, With Alloy Flux, Extends Life of Shaker Screens. Machine Production, v. 20, Aug. 1961, p. 35-37.

Wear areas are hardsurfaced to resist abrasion and increase toughness. Application to manufacture of screen decks from heavy steel plates. (L24, 17-57; ST, 4-53)

782-L. (German.) Directions for Designing Electroplating Plants. K. Elkner. Maschinenbau, v. 10, June 1961, p. 148-149.

Plant capacity, purpose and thickness of electrocoatings, technological requirements and part applications are considered in designing a plant used for Cu, Ni, Cr, Zn, Sn, Ag and P coating. (L17, 18-67, 17-51; Cu, Ni, Cr, Zn, Sn, Ag, P)

783-L. Electrodeposition of Nickel-Iron Alloys From the Pyrophosphate Bath. Vasanta Sree and T. Rama Char. Metal Finishing, v. 59, Aug. 1961, p. 49-55.

Determination of deposit composition, current efficiency and electrode efficiencies as a function of current density (6.9-2.6%), agitation, temperature (40-60° C.), and Fe-Ni concentration and pH (7.2-9.2%) of the plating solution, for codeposition of alloys from nickel chloride-ferric chloride-pyrosphosphate baths using soluble and insoluble anodes. 33 ref. (L17; Ni-b, Fe-b)

784-L. Finishing to Government Specifications. Boris B. Joffe. Metal Finishing, v. 59, Aug. 1961, p. 61-64.

Bath compositions, plating variables and standards and testing for adhesion, color, thickness, corrosion and abrasion resistance, gloss structural continuity and residual stresses are specified for black and gray Cr, black Ni, Cu and Au electroplating and for Sn electroplating and dip coating, on various substrates including steel, brass, bronze, Zn, Cd, Al, Ni and Cu. (L17, 15-74; Cr, Ni, Cu, Au)

785-L. Science for Electroplaters, Pt. 66. Nickel-Hardness Tensile Strength. L. Serota. Metal Finishing, v. 59, Aug. 1961, p. 70-74.

Review of data for tensile strength, elongation and hardness measurements on electrodeposits obtained from Ni sulphate and Watts type baths. Relation between hardness and tensile properties. Effect of solution composition, pH, temperature and current density on mechanical properties. Influence of 1000° C. annealing on recrystallization microstructure and embrittlement. (L17b, L17c, 2-60, 2-61, 2-64; Ni)

786-L. (Japanese.) Experimental Method for Studying Leveling Power of Plating Baths. Minoru Nakamura and Mamoru Saito. Metal Finishing Society of Japan, Journal, v. 12, June 1961, p. 215-218.

The depths of surface scratches in electrodeposits of Cu and Ni, obtained from cyanide and chloride baths, respectively, are compared to data for leveling power curves obtained by conventional methods to derive a numerical method for ascertaining leveling power of baths with more reproducible results. 6 ref. (L17a, 1-54; Ni, Cu)

787-L. (Japanese.) Leveling Power of Copper Cyanide Plating Baths. Minoru Nakamura and Mamoru Saito. Metal Finishing Society of Japan, Journal, v. 12, June 1961, p. 218-222.

Effect of cathodic concentration polarization on the leveling power of Cu cyanide baths is determined by numerical analysis of scratch test leveling power curves. 5 ref. (L17a, 1-54; Cu)

788-L. (Japanese.) Reducing Agents in Electroless Nickel Plating Solutions. Satoru Ishibashi, Hiroharu Yokoyama and Yasutoshi Nagase. Metal Finishing Society of Japan, Journal, v. 12, June 1961, p. 222-225.

Various reducing agents selected on the basis of chemical equilibrium in Ni reduction reactions are tested in electroless plating solutions with formic acid being compared favorably with sodium hypophosphite for reducing action. 8 ref. (L28; Ni)

789-L. Oxidation Resistance of Aluminum Dip Coated (Aldico) Columbium Alloys. Robert G. Carlson. Paper from "Columbium Metallurgy". v. 10. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 119-137.

Effectiveness of a 15% Si-Al dip coating on F-48, F-50, Fansteel 82, 7.5% Ti-5% Mo and 8% Ti alloys is studied by varying the time (1-13 min.) and temperature (815-1150° C.) of dip and the post treatment. Results indicate an optimum dip time and temperature and post treatment to be, respectively, 3 min. at 925° C. and a treatment in vacuum for 1 hr. at 1040° C. (L16; Cb-b, Al)

790-L. Preclean Metals and Plastics for Adhesive Bonding. J. N. Kempf. Product Engineering, v. 32, Aug. 14, 1961, p. 44-46.

Cleaning techniques including degreasing, descaling, pickling, etching, rinsing, drying and gloss removed for steels, stainless steels, Al, Mg, Ti, Cu and their alloys, brass, Zn, galvanized metal, cured polyester, linear and medium density, rigid or flexible vinyl and natural and synthetic rubber. (L12; ST, Al, Mg, Ti, Cu, Zn, 8-65, NM-d)

791-L. (Italian.) Surface Treatment of Stainless Steels. Giampiero Colombo. Acciaio Inossidabile, v. 28, Mar.-Apr. 1961, p. 37-40.

Mechanical and physical properties of carbon and stainless steels. Grinding, tumbling, polishing and degreasing stainless steel without changing its properties. (L10, L12g, G18k, P-general, Q-general; SS, CN)

792-L. Electrodeposition of Nickel-Iron-Tungsten Ternary Alloys From the Pyrophosphate Bath. K. I. Vasu and T. L. Rama Char. Journal of Scientific & Industrial Research, v. 20D, June 1961, p. 241-242.

Deposit composition and cathode efficiency and potential relations are examined for obtaining bright deposits of Ni-Fe-W alloys as a function of bath concentration and voltage, current density, temperature and agitation time. (L17; Ni-b, Fe-b, W-b)

793-L. The Reaction Between Anodic Aluminum Oxide and Water. Walter J. Bernard and John J. Randall, Jr. Electrochemical Society, Journal, v. 108, Sept. 1961, p. 822-825.

The action of water at 100° C. on barrier anodic oxide is studied for reaction time up to 30 min. The hydrated product is the same as that formed when Al metal reacts with water and the rate of hydration of anodic oxide is similar to the rate of aqueous oxidation of the metal, suggesting that the same mechanism produces the hydrated film in each case. 8 ref. (L19, R1h; Al)

794-L. A Study of the Formation of Anodic Oxide Films on Titanium. W. Mizushima. Electrochemical Society, Journal, v. 108, Sept. 1961, p. 825-829.

The relation between current and electrostatic field during formation of anodic oxide films on KS-50 Ti sheet at high potentials is studied using a nonaqueous electrolyte at 12-85° C. An equation is derived for the rate determining mode at high and low temperatures in terms of a Cabrera-Mott model and the effects of space charge. 9 ref. (L19; Ti)

795-L. Some Observations of Copper Deposits on Single Crystals of Copper. Isaac Giron and Fielding Ogburn. Electrochemical Society, Journal, v. 108, Sept. 1961, p. 842-846.

Isolated faces of Cu single crystals are plated with Cu from Cu sulphate-sulphuric acid solutions. Deposits on (100) and (110) faces, despite the presence of grain boundaries, give X-ray diffraction patterns showing uniform lattice orientation. The grain boundaries are associated with topographic features of the deposits. 5 ref. (L17, M26, M22g, 3-72; Cu, 14-61)

796-L. Oxidation-Resistant Silicide Coatings for Columbium and Tantalum Alloys by Vapor Phase Reaction. R. H. Lorenz and A. B. Michael. Electrochemical Society, Journal, v. 108, Sept. 1961, p. 885-893.

Substrates of Cb, Ta, Tantaloy, 82 alloy (Cb-Ta-Zr) and a Cb-Ta-W-Zr alloy are coated by conversion of a thin layer of the surface to its silicides or by depositing a Mo-rich layer on the substrate and converting this to Mo disilicide. The silicides are formed by vapor phase reaction with $SiCl_4$ and H at 1450° C. Coating techniques are discussed, with the structures, oxidation mechanisms and mechanical properties

of the coatings. 8 ref. (L25, N15g, R1h, 2-62; Ta-b, Cb-b, Si, 17-57)

797-L. Variation of Composition With Thickness in Thin Electrodeposited Films of Nickel-Iron Alloys. G. H. Cockett and E. S. Spencer-Timms. Electrochemical Society, Journal, v. 108, Sept. 1961, p. 906-908.

Composition gradients of 15-40% Fe-Ni films, deposited from sulphate baths at pH 2.3 and constant current density at room temperature, are examined by X-ray diffraction after annealing and related to thickness as a function of plating variables. 5 ref. (L17c, M22g, 2-60; Ni-b, Fe, 14-62)

798-L. Single Coat Porcelain Enameling of Steel Sheets. Industrial Heating, v. 28, Aug. 1961, p. 1522, 1524.

Bonding enamel to steel by techniques which eliminate fish scaling and prevent primary boiling. Etching, control of composition and decarburization during box annealing are discussed in various applications. (L27, 1-52, 2-60; ST, 8-71, NM-g34)

799-L. Coating Metal Parts With Polyvinyl Chloride Requires Uniform Heating. F. A. Pyecroft. Industrial Heating, v. 28, Aug. 1961, p. 1531-1532, 1534, 1536, 1538.

Dip coating of large metal parts with PVC for protection against corrosion and abrasion in various applications. Importance of preheating and post-heating stages in the production of quality coatings is reflected in a system of temperature control for gas-fired preheating and curing ovens. (L26p, 1-52; NM-g33)

800-L. Continuous Processing of Transmission Castings Aided by Special Washer With External Conveyor. Industrial Heating, v. 28, Aug. 1961, p. 1542, 1544.

Description of a two-stage washer having a capacity of 2800 lb. (133 sets of castings) per hr. and a monorail conveyor whose external arrangement protects it from corrosion while the washer performs multiple functions. Hangers of the conveyor simultaneously carry unmachined castings above the washer and machined castings through the washer. (L12e, 1-52)

801-L. Functional Surfaces by Vacuum Metallizing. Philip J. Clough. Metals Engineering Quarterly, v. 1, Aug. 1961, p. 7-14.

The vacuum deposition of thick films of Al on various metallic bases is demonstrated as practical. Properties obtained from vacuum metallized parts are superior in that hydrogen embrittlement is completely eliminated, the strength of the base is not affected and no brittle interface is developed. (L25, 1-73; Al)

802-L. How to Get the Most From Phosphating Systems. Pt. 2. George H. Pimbley. Metal Progress, v. 80, Sept. 1961, p. 108-111, 128-134.

Principles governing spray systems for Zn phosphating are similar to those of dip baths. One difference is that the reactions must be accelerated to make up for the short processing time. In contrast, Mn phosphating can only be done in dip baths because of the large amounts of sludge which is always present. (L14b; Mg, Zn)

803-L. Flow-Coat Line Boosts Quality, Speed on Jet Parts. Western Metalworking, v. 19, Aug. 1961, p. 41-42.

Corrosion protective epoxy-resin paint and Zn chromate coatings are applied to fuselage components and structural materials for jet transport planes on a flow coating line, which also provides for cleaning, deoxidizing, alodizing and drying. (L14c, L26n, L-general, 1-52, T24a)

804-L. Vacuum Metallizing. Stokes Bulletin no. 584, F. J. Stokes Corp., 5500 Tabor Rd., Philadelphia 20, Pa., 1961, 15 p.

Deposition of metallic coatings or films of Ag, Se, Au, Sn, Al, Cd, other nonferrous metals and metallic compounds, on prepared surfaces of steel, coated metals, nonferrous metals, plastics, glass and other materials by vaporization of the plating material in a vacuum chamber at high temperatures. Properties of the coatings and efficiency of the process are compared to other plating methods for producing functional and decorative coatings. Process parameters are reviewed with design and operation of equipment. (L25k, 1-73)

805-L. The Protective Treatment of Metals Against Corrosion. Pt. 2. H. Silman. Wire Industry, v. 28, Aug. 1961, p. 783-784, 800.

Review of Zn and Cd plating, conversion coating and anodizing for protecting metals such as steel and Al alloys; and development of automatic plating methods and problems of mechanization. (L17, L14, L19; Al-b, ST, 10-54)

806-L. (German.) Zinc-Dust Paints. K. Ruttewit. Metall, v. 15, Aug. 1961, p. 753-756.

Use of fine Zn dust (0.002-0.006 mm. particle size) as pigment in paints for corrosion protection of Fe and steel is discussed in terms of production and composition of paint, mechanism of corrosion protection and examples of application including paint for ship bodies, steel structures and railroad coaches. (L26n; ST, Zn, 17-57)

807-L. (German.) The "Hansson-Robertson" Press for Continuous Cable Sheathing With Lead Alloys. Sch. Radtke. Metall, v. 15, Aug. 1961, p. 790-796.

Design, mode of operation and technological features of plant for continuous cable sheathing using pure Pb or Pb alloy containing As, Te and Sb. Mechanical properties and microstructure of cable sheaths. (L22, Q-general, T1b; Pb-b, 17-57)

808-L. Rinsing Effectiveness in Metal Finishing. John A. Tallmadege, Jr., and Bryan A. Buffham. Journal of Water Pollution Control Federation, v. 33, Sept. 7, 1961, p. 817-828.

Effect of mixing procedure, contaminants, contact time and flow rate on the rinsing effectiveness of an aqueous bath used in rinsing Cu plate. 4 ref. (L12e; Cu, 8-62)

809-L. Coextrusion Comes to Nonmetals. Iron Age, v. 188, Sept. 7, 1961, p. 99-101.

Techniques and equipment for cladding into tubing, rod, flat, hexagon and channel form with a metallurgical bond. Materials bonded include stainless steel, Zr, U, refractory metals, powder metals and ceramics. (L22, K11; SS, Zr, U, EG-d37, 6, NM-f, 8-66)

810-L. Precoated Metal Gets New Line. Iron Age, v. 188, Sept. 7, 1961, p.112.

Description of a metalcoating line that single or double coats stainless and cold rolled steel, Al, Mg, Zn, phosphor bronze and brass with alkyds, vinyls, epoxies, acrylics, organsols and plastisols. (L26, 1-52; ST, Al, Mg, Zn, Cu-s, Cu-n)

811-L. (Italian.) Department of Surface Treatments. Istituto Sperimentale dei Metalli Leggeri--Rapporto Annuale 1960, 1961, p. 108-114

Anodizing, galvanizing and chemical polishing of Al alloy castings. Effect of anodizing on corrosion of AC-63 alloy after exposure to HCl vapor. (L12, L16, L19, R6g; Al-b, 5)

812-L. Barrel Finishing Operations on Bearing Rollers. Machinery (London), v. 99, Aug. 2, 1961, p. 252-253.

Finishing of heat treated bearing rollers using two machines for descaling with compound plus water, polishing, rinsing and dewatering prior to grinding. (L10d, 1-52)

813-L. (Translation-ConBur.) Anode Processes in Electrochemical Polishing of Aluminum. N. P. Fedot'ev, S. Ya. Grilikhes and N. L. Foroponova. Journal of Applied Chemistry of the USSR, v. 33, Sept. 1960, p. 2050-2053.

Anode potential during polishing is measured as a function of electrolyte temperature and composition. In all cases the polishing effect occurs under conditions favoring the formation of an oxide film on the anode. 7 ref. (L13p, L19, 2-60, 2-61; Al)

814-L. Low Stress Rhodium Plating. Metal Industry, v. 99, Aug. 18, 1961, p. 128.

Base metal preparation and plating techniques using an electrolyte which permits heavy Rh deposits of low stress with a hardness of 700-800 d-p-n. (L17, Q25, Q29n; Rh)

815-L. Review of Recent Developments on Oxidation-Resistant Coatings for Refractory Metals. W. D. Klopp. Defense Metals Information Center, Battelle Memorial Institute, DMIC Memo. 120, July 31, 1961, 5 p.

Survey of silicide-base coatings for forming protective glasses on oxidation of Co, Ta, Mo and W. Review of vacuum pack, fluidized bed, pack cementation and duplex coating processes with data presented for coating life, thickness and temperature effects. 11 ref. (L-general, R1h; EG-d37, Si-b, 14-68, 17-57)

816-L. (German.) Production of Thick Films of Thorium, Uranium, Neptunium, Plutonium and Americum. G. I. Chlebnikov and E. P. Dergunov. Kernenergie, v. 4, June 1961, p. 512-514.

Investigation of deposition of thick layers of oxides of heavy metals by electrolysis (Th, Np), by mechanical methods with organic additions such as lacquer (U, Th, Np, Pu, Am), by precipitation (of Th) from alcohol-acetone suspension. (L17, L26n, L28; EG-h, Am, Np, Pu, Th, U)

817-L. The Structure and Hardness of Electrodeposited Chromium. C. P. Brittain and G. C. Smith. Institute of Metals, Journal, v. 5, July 1961, p. 407-416.

Optical and electron microscopy and microhardness measurements or Cr specimens electrodeposited at 45-85° C. and annealed at 1050° C. Effect of deposition and annealing temperature on grain size and of resultant grain size on hardness. (L17c, M-general, M27c, Q29n, 2-61, 2-64; Cr)

818-L. For Steel Finishes, These Low-Firing Porcelain Enamels. Product Engineering (Design Digest Issue), v. 32, Sept. 4, 1961, p. 108-109.

Two major classes of low temperature frits are those firing from 1250-1350° F. and those that fire at 1000-1100° F. Low cost furnace construction and maintenance yield the greatest savings from the use of the extra low temperature frits. (L27, 2-61; ST, NM-f, 17-57)

819-L. Metallizing Symbols. Product Engineering (Design Digest Issue), v. 32, Sept. 4, 1961, p. 162-163.

Standard symbols used to indicate undercutting, threading and grooving, blasting, bonding and coating thickness. (L-general, L23, 11-62)

820-L. Finishes for Aluminum. Product Engineering (Design Digest Issue), v. 32, Sept. 4, 1961, p. 111-113.

Survey of 19 types--applied coatings, electrochemical, mechanical and chemical finishes--with the surface preparation needed, method of production and applications for each. (L-general; Al)

821-L. Don't Overlook Electroforming. W. A. Safranek. Metalworking Production, v. 105, Aug. 9, 1961, p. 48-53.

Electrodeposition on a mandrel which is subsequently separated or removed, to reproduce detail with dimensional precision in the production of photo-engravings, radar waveguides, dies and other products requiring high finished accuracy. Design factors, process steps and mandrel selection guides. (L18, 1-52, 17-57)

822-L. Automatic Plants Apply Paint Finishes. E. C. Hall. Metalworking Production, v. 105, Aug. 9, 1961, p. 54-56.

Metal washing machine components are pretreated and then coated with acrylic paint or Ni-plated and porcelain enameled, depending on their intended use. (L26q, L27, T10c, 1-52)

823-L. Improved Corrosion Resistance for Cars Using Galvanized Strip. Corrosion Technology, v. 8, Aug. 1961, p. 246-248.

Use of hot dip galvanized and electrogalvanized strip, galvannealed sheet and Zn-rich paints to prevent corrosion in motor car bodies as depended on choice of steel, the coating width and finish desired and durability for spot welding. Galvanized, Cu-bearing and cold rolled steel are compared with plastics and primer coated materials for corrosion resistance in terms of humidity cycles and hours of salt spray exposure. (L16, L26n, T21a; ST, Zn, 17-57)

824-L. New Plant for Continuous Aluminising. Corrosion Technology, v. 8, Aug. 1961, p. 248-249.

Continuous dip coating production of corrosion resistant Aludip steel sheet on automatic line incorporating uncoiling, shearing, oxidizing, reduction and pickling operations. (L16, L-general, 1-52; ST, Al, 4-53)

825-L. What's New in Surface Finishing? Precesion Metal Molding, v. 19, Sept. 1961, p. 76-112.

Cr plating of Zn die castings; Zincate baths for the deposition of Zn on Al; anodizing of die castings; porcelain enameling on Al; paint and lacquer finishes. (L-general, 10-54; Al-b, Zn-b, 5-61)

826-L. New Porcelain Enamel for Steel Extrusions. Precision Metal Molding, v. 19, Sept. 1961, p. 91-94.

New extra low temperature frits that fire at 1000-1100° F. give excellent coverage of corners and sharp angles. Lower firing temperatures cause less distortion which means that only one side of a part needs to be coated. This can be a special benefit for hollow items such as sash and window frames. (L27, 2-61; ST, 4-58, NM-f40, 17-52)

827-L. Elastomeric Coatings for Aluminum Components of Rocket Launchers. T. Rice and T. A. Turner. Rock Island Arsenal Laboratory. U. S. Office of Technical Service, AD-255653, Jan. 1961, 23 p. $ 75.

Field tests to determine the best coating from among a group of fluoroelastomers, polyruethanes, fused epoxy coatings (fluidized) and epoxy-polysulphide blends. Al panels of 4 x 6 in. coated with test substances are fixed vertically 4 ft. from the blast end of 3.5 in. practice rockets in order to observe blast effects on coated Al components of launching frames and trails. (L26p, T2p; Al, NM-d, 17-57)

828-L. (English.) Radioisotope Tests for Determining the Cleanliness of Steel Surfaces. Hisashi Mori and Sadaichiro Taira. Yawata Technical Review, no. 231, June 1960, p. 109-112.

Electrolytic and chemical cleaning procedures for steel sheet are checked for efficiency by coating the sheet with stearic acid containing a C^{14} isotope and measuring the radioactivity after cleaning. (L12, L13n, 1-59; ST, C, 17-57)

829-L. (Translation-ConBur.) Influence of Manganese in Electrodeposition of Zinc. V. V. Stendor, G. Z. Kir'zakov and R. S. Vakhidov. Journal of Applied Chemistry of the USSR, v. 33, Oct. 1960, p. 2206-2213.

Effect of various Mn compounds (Mn^{2+}, MnO_2, MnO_4) on the corrosion of Zn in a standard Zn electrolyte and on the cathodic deposition of Zn from this electrolyte at current densities of 100-10,000 amp. per $m.^2$ and 20-70° C. 48 ref. (L17b, 3-69; Zn, Mn)

830-L. (Translation-ConBur.) Effects of the Surface State of the Cathode and Nature of the Electrolyte on the Quality and Properties of Zinc Coatings. P. F. Kallyuzhnoya. Journal of Applied Chemistry of the USSR, v. 33, Oct. 1960, p. 2221-2228.

Electrolytic deposits of Zn from pyrophosphate, zincate and acid electrolytes are studied by metallographic and microscopic means to determine grain size, dispersity and porosity. Cathodic polarization is measured during deposition. 14 ref. (L17b, L17c; Zn)

831-L. (Translation-ConBur.) Self-Regulating Tetrachromate Electrolyte. A. N. Sysoev and N. T. Drobantseva. Journal of Applied Chemistry of the USSR, v. 33, Oct. 1960, p. 2229-2235.

Development of a self-regulating electrode produced by joint additions of $CaSO_4$ and $CaCO_3$ to chromic anhydride solution. The high density of the deposits make possible direct Cr plating of steel without Cu or Ni undercoatings. 10 ref. (L17b; ST, Cr)

832-L. (Translation-ConBur.) Evaluation of Various Methods for Determining the Throwing Power of Electrolytes in the Light of the Similarity Theory. N. P. Gnusin. Journal of Applied Chemistry of the USSR, v. 33, Oct. 1960, p. 2236-2245.

Consideration of various methods for establishing relationships between the uniformity of current distribution and criteria of electrochemical similarity for various cells. The resulting formula determines the throwing power without requiring data on cell geometry. 4 ref. (L17b)

833-L. (Italian.) Sprayed Metal Coatings for Abrasion, Corrosion and Oxidation Resistance. G. R. Bell. Trattamenti Termici e Protettivi dei Metalli, v. 4, May-June 1961, p. 17-24.

Cleaning, thermal cycling, sand blasting, tapering and degreasing of metallic specimens (proton rods, cylinders and jackets) which are to be coated with Ni-Co-B-Si alloy. Techniques are described and specifications given for material to be deposited and steel and alloy bases to be used for spray welding. (L10, L23, L24, 1-52, 17-57; ST)

834-L. (Italian.) Recent Developments in Electrostatic Varnishing. M. R. Morel. Trattamenti Termici e Protettivi dei Metalli, v. 4, May-June 1961, p. 25-31.

Portable or fixed electrostatic spray guns are used to varnish various metallic shapes and surfaces. Surface tension, point of inflammability and electrical

resistance of paints. (L26n, 1-52, 17-57; NM-g30)

835-L. Repair of Kraft Digesters by Welded Overlay. Wayne L. Wilcox and Hallock C. Campbell. Welding Journal, v. 40, Aug. 1961, p. 839-844.

Technique for repairing kraft paper digesters (cylindrical batch-type pressure cookers) by manual or automatic weld deposition of stainless steel overlays. Emphasis on weld metal chemistry and its effect on corrosion properties and microstructure of the overlay. (L24, M27, T26q; SS)

836-L. Powder Metal Flame Spray Gives Fast, Efficient Cover. Hugh Canning. Canadian Machinery and Metalworking, v. 72, Sept. 1961, p. 100-101.

Base metals are plated with high-purity alloy powders following cleaning, roughening and precoating. Evaluation of resistance to wear, abrasion, erosion and corrosion for ferrous metals to which metal powder has been bonded. (L23, L10, Q-general)

837-L. New Developments in Wetting Agents. Carl Alex Fischer. Wire and Wire Products, v. 36, Sept. 1961, p. 1146-1148, 1187-1189.

Acid activators in pickling solutions as they influence the pickling rate, the H_2SO_4 consumption and the metal surface finish. Agents tested include HW 592 and Marlophene 89 and 810. Effect on foam formation, flotation additives and pickling bath temperature. (L12g, 17-57; AD-n42)

838-L. The Oxidation of Zirconium Alloys in Dry Oxygen. C. J. Kubit and E. Landerman. American Nuclear Society, Transactions, v. 4, June 1961, p. 91.

Processing Zircaloy-2 and Zircaloy-4 in dry oxygen gas at 750° F. to produce a nuclear core having a black, adherent, continuous oxide film without hydrogen pickup. (L14a, 1-66, T11; Zr-b)

839-L. Economising in Electroplating by the Use of High Grade Fully Automatic Equipment. Wire World International, v. 3, June 1961, p. 138-140.

Types and applications of automatic equipment for metal surface finishing including linear, reversing and circular machines and Zn-plating installation for Fe and steel strip and wire. (L17; Fe, ST, 4-53, 4-61, Zn)

840-L. Uptake of Hydrogen by Certain Organic Inhibitors During Pickling of Steel in Hydrochloric Acid. R. H. Anderson, E. R. Allen and P. A. van der Meulen. Corrosion, v. 17, Sept. 1961, p. 437t-440t.

Determination of the volume of hydrogen evolution and steel corroded by inhibited and uninhibited HCl as functions of apparatus design and the influence of variables including DHQ and hexamine. 10 ref. (L12q, Q26s, 1-53, 2-66; ST)

841-L. $15 Million Mill at Stelco Now in Full Production. William W. Craig. Canadian Metalworking, v. 24, Sept. 1961, p. 35-39.

New galvanizing line at the Steel Co. of Canada, Ltd., anneals, coats, chemically treats, coils or shears continuous low carbon steel strip. (L16, 1-52; CN-g, 4-53)

842-L. Acid Gold Plating. Metal Industry, v. 99, Aug. 4, 1961, p. 90-92.

Development of an electrolyte that does not attack adhesive used in printed circuits. Pure Au deposit has high hardness, low electrical resistance, low stress, freedom from porosity and good soldering qualities. (L17a, Q-general, T1c; Au, 1-64)

843-L. The Prevention of Exfoliation Corrosion of Aluminum Alloys by Sprayed Metal Coatings. V. E. Carter and Hector S. Campbell. Institute of Metals, Journal, v. 89, Aug. 1961, p. 472-475.

Atmospheric corrosion tests for up to 6 yr. on extruded D. T. D. 683 and HE15 Al alloy specimens sprayed with high purity Al or Al-1% Zn alloy or painted. Excellent protection is attributed to the metal coatings, provided they are not damaged. 8 ref. (L23, R2n, R11j; Al-b)

844-L. Plating of Precision Parts. Pt. 1-2. Robert D'Agostino. American Machinist/Metalworking Manufacturing, v. 105, Sept. 4, 1961, p. 127-129.

Formulas are derived for estimating the optimum amount and location of plating deposits to assure proper assembly

and performance of precision parts. Machining dimensions and tolerances are determined for noncritical, marginal, critical and supercritical parts. (L17, 1-52)

845-L. (German.) Problems in Electroplating. Technica, v. 10, Aug. 4, 1961, p. 1015-1016.

"Problem" area include pretreatment of parts by grinding, sand blasting, pickling and anodic cleaning; control of concentration and pH value of electrolyte; improvement of operation by the use of auxiliary electrodes. (L17a, L10, L12, 1-52)

846-L. (German.) Zinc as a Metallic Coating. Technica, v. 10, Aug. 18, 1961, p. 1093-1094.

Corrosion protection by Zn coating of steel sheet, tube, wire and steel constructions by galvanizing, electroplating and spray coating. Magnetic, microscopic and mechanical testing of thickness and mechanical strength of coatings. (L16, L17, L23, R10g, S14; ST, Zn)

847-L. Cleaner Beams Ease Fabrication. Iron Age, v. 188, Sept. 28, 1961, p. 88-89.

Mechanical cleaning system for descaling steel bridge structurals used in line with a light pickling on parts that require galvanizing. (L10, L12g; ST, 4-57)

848-L. Clear Plastic Protects Metal. Iron Age, v. 188, Sept. 28, 1961, p. 98.

Strong and ductile, a roll-on polymer film prevents marring or scratching of highly polished surfaces. It is sufficiently rough to stay in place during stamping, bending and drawing operations. (L26p)

849-L. (German.) Good Priming for Better Corrosion Protection. Hubert Strzelba. Chemische Technik, v. 13, June 1961, p. 350-352.

Mechanical and chemical surface pretreatment techniques including brushing, sand-blasting, flame descaling, degreasing and use of primers in corrosion protection by coating of steel and Fe parts. (L10, L12, L26n, R10; Fe, ST)

850-L. Growing Metal Parts by Electroforming. David Fishlock. New Scientist, v. 11, Aug. 31, 1961, p. 533.

Use of cathodic deposition to electroplate and electrorefine is related to electroforming where substrate is removable and/or expendable. Techniques and applications to forming of Cu, Ag and Ni. (L18, 1-52, 17-57; Cu, Ag, Ni)

851-L. Clean Parts. Milton Werner. Automatic Machining, v. 22, Sept. 1961, p. 41-42.

A solvent dripping and vapor degreasing system cleans metallic inserts for plastic molding. Small parts are carried through the cleaning cycle in a tumbling basket. (L12h, L12j, 1-52)

852-L. Agricultural Finishes. R. A. Fidler. Product Finishing, v. 14, Sept. 1961, p. 56-60, 63.

Priming and painting of sheet and cast steel for agricultural equipment with oxide primer and epoxy resins to protect against corrosion by weather and fuels. Pretreatment, priming and enameling in terms of service requirements. (L26, R10, T3; ST, 4-53, 5)

853-L. Electrodepositing Tin. Product Finishing, v. 14, Sept. 1961, p. 61-63.

Coating steel, brass, Cu and other metals with Sn and Sn alloys to obtain minimum porosity for a given thickness of deposit. Structure of the base alloy and of the deposit is examined. (L17, P10m, 3-73; ST, Cu-b, Sn)

854-L. Flow-Coating of Water Based Stoving Finishes. Herman Hayek and Johannes Eisenwiener. Product Finishing, v. 14, Sept. 1961, p. 64-66, 72.

Pretreatment involves degreasing, phosphating and rinsing. Parameters for application in the automobile industry including control of viscosity and of paint consumption. (L26n, T21, W4k, 1-52)

855-L. Acrylic One-Coat Finish. Product Finishing, v. 14, Sept. 1961, p. 67.

White enamel sprayed or dipped on bright steel and Al without pretreatment is tested at 300° F. for 5 hr. Results indicate resistance to heat, corrosion, impact and stain in various household appliance applications. (L26p, T10c, 1-52, 17-57; ST, Al)

856-L. Derusting. J. Q. Radcriffe. Product Finishing, v. 14, Sept. 1961, p. 68-72.

Chemical methods using hydrochloric, sulphuric and phosphoric acids and various other compounds for removal of corrosion products from ferrous components and oxide film from light alloys such as Al. (L12)

857-L. Tin Alloy Coatings. G. Fitzgerald-Lee. Product Finishing, v. 14, Sept. 1961, p. 89-92, 102.

Hot dip and hot barrel tinning in production of Sn plate and Sn alloy coatings. Studies of corrosion resistance of various metals to Sn indicate that Ti has good resistance at 300° C. Grain size of coating is examined as it affects Sn-Fe compound. (L16, R2, M26q; Ti, Sn)

858-L. Industrial Application of Abrasive Belt Polishing and Grinding. George Saxby. Electroplating and Metal Finishing, v. 14, Sept. 1961, p. 313-318, 329.

Survey of types of belts available, abrasives and adhesives and backstand polishing machinery of the platen, contact wheel and flexible belt types with emphasis on use of abrasive belts for finishing continuous strip including stainless steel strip, turbine blades, welds, tubes, rods, organic coatings and cutlery and for superfinishing crankshafts and journals. (To be continued.) (L10b, T-general, W25c; SS, 4-53, 4-55, 4-60, 7-51)

859-L. Recent Developments in Decorative Chromium Plating. S. W. Baier. Electroplating and Metal Finishing, v. 14, Sept. 1961, p. 330-335.

Comparison of conventional Cr coatings to H.T.H.R. Cr coatings on Duplex Ni and bright Ni. Self-regulating high speed solutions with mixed silicofluoride-sulphate catalyst are compared to straight chromic acid-sulphate solutions in terms of cathode efficiency. Spray suppressing agents, exposure tests, mechanism of protection and thickness limits. 26 ref. (L17; Ni, Co)

860-L. Low Friction Coatings With Good Bond Strength. J. E. Brophy, R. W. Ingraham and C. Pettus. Materials in Design Engineering, v. 54, Sept. 1961, p. 10-11.

Durable, self-lubricating disulphide films are produced by converting Mo or W electroplates at 400° F. (L17, Q10c; Mo, W)

861-L. Organic Conversion Coatings for Improved Paint and Adhesive Bonding to Aluminum Surfaces. R. J. Lipinski. Metal Finishing, v. 58, Sept. 1961, p. 44-51.

The composition and mechanism of coatings on Al as related to applications as bonding bases for paints and adhesives. Determination of lap shear tensile strength after bonding and peel strength and environmental resistance after painting. 14 ref. (L14d, L26; Al)

862-L. Finishing Procedures for Magnesium and Magnesium Base Alloys. Lester F. Spencer. Metal Finishing, v. 58, Sept. 1961, p. 56-59, 62.

First of a three-part series. Surface preparation, mechanical finishing and chemical treatment for Mg-base alloys. Operations include pickling and alkaline cleaning, polishing and buffing and chemical anticorrosion treatment. (L-general, R10, 1-52; Mg-b)

863-L. Abrasive Blast Cleaning. David E. Neustadt. Metal Finishing, v. 58, Sept. 1961, p. 60-62.

Use of shot and grit composed of Fe or steel for blast cleaning metal parts. Consideration of the required finish, abrasive consumption, production rate and equipment wear in determining choice of abrasive. (L10c)

864-L. Anti-Seize Coatings for Chrome Alloy Bolts of Elevated Temperatures. W. B. Stephenson, Jr. Metal Finishing, v. 58, Sept. 1961, p. 63-64.

Testing of nuts and bolts of chrome alloy A-286, used bare; plated with bronze, Ag, Rh, Pt or Ni; or coated with graphite preparations or Ag in penetrating oil. Measurement of the running torque, seating torque and release torque of various combinations of nuts and bolts which had been heated to 1000° F. (L17c, Q9q, 2-62, 18-73; SS, 8)

865-L. Science for Electroplaters. Pt. 67. Bright Nickel. L. Serota. Metal Finishing, v. 58, Sept. 1961, p. 70-74.

Electroplating of steel, brass and Zn-base die castings with bright Ni. Determination of the factors which affect the brightness of the Ni plating, especially plating conditions, grain size, hardness, atom orientation and cathode potential. (L17c; ST, Cu-n, Zn-b, Ni, 5-61)

866-L. Vibratory Finishing Equipment. William E. Brandt. American Machinist/ Metalworking Manufacturing, v. 105, Sept. 18, 1961, p. 118-121.

Applications and operation of machines which imbed the work in abrasive media and, by controlled vibration, deburr, descale and finish the work. Design of equipment as related to material to be finished and type of finish desired. (L10, 1-52, 17-51)

867-L. Yes! You Can Solder Magnesium. American Machinist/ Metalworking Manufacturing, v. 105, Sept. 18, 1961, p. 130.

Solderability of Mg is improved by a hot tinning technique which seals the pores of an electrodeposited Cu coating on the Mg workpiece and produces a bright, solderable, corrosion-resistant coating which prevents Mg sublimation. Electronic applications of tin-coated magnesium. (L16, L17, K7; Mg, Cu, Sb, 8)

868-L. (Russian.) Surface Structure of Gray Iron Die Castings. A. G. Kolesnichenko. Liteinoe Proizvodstvo, Feb. 1961, p. 20-21.

Prevention of structural changes in white iron die castings using insulating coatings. Relation of coatings to thermal conductivity, cooling rate and graphite flake structure of castings and to surface finish and machinability. 5 ref. (L-general, E25q, M28; CI-n, 5-61)

869-L. (German.) Brightening of Copper and Copper Alloys. Thomas H. Curti. Metall-Reinigung + Vorbehandlung, v. 10, July 1961, p. 119-120.

Removal of oxide films on the surface of Cu and Cu alloy parts (brass, bronze, nickel-silver) by prepickling in dilute H_2SO_4 with subsequent pickling in $H_2SO_4/HNO_3/HCl$ mixtures of various concentrations. (L12g; Cu-b)

870-L. A New Approach to the Protection of Refractories Against Erosion by Molten Glass. P. E. Gainsbury. Engelhard Industries, Inc. Technical Bulletin, v. 1, Mar. 1961, p. 136-138.

Applications and technique of Pt cladding, two-stage key and paste coating for protection of glassworking refractory materials. Testing results indicate that a coating thickness of 100-200 microns is adequate to resist erosion of molten glass at temperatures up to 1450° C. (L-general, R6r, T29a; Pt)

871-L. (Translation-ConBur.) Investigation of the Influence of Ultrasonic Vibrations on the Electrodeposition of Chromium. A. M. Smirnova and N. T. Kudryavtsev. Journal of Applied Chemistry of the USSR, v. 33, Nov. 1960, p. 2484-2489.

Influence of ultrasound during Cr plating on the current efficiency for Cr, deposit quality and the degree of cathodic polarization. 11 ref. (L17b, 1-74; Cr)

872-L. Sleek Finish Sells Luxury Cruisers. Modern Metals, v. 17, Sept. 1961, p. 31-32.

Sand-blasting, deoxidizing, conversion coating and antifouling methods of pretreatment for finishing of Al yacht hulls. (L10c, L14, L26, T22g, 1-52; Al)

873-L. Surface Preparation of Aluminum Alloys for Metal Spraying. Hector S. Campbell. Royal Aeronautical Society, Journal, v. 65, Sept. 1961, p. 633.

Specimens of D.T.D. 683 high-strength Al alloy are satisfactorily protected against stress corrosion by sprayed metal coatings of Al or Al alloy after previous grit blasting. (L10c, L23, R1d; Al-b, Al)

874-L. How to Control the Aluminum Bright Dipping Process. G. D. Nelson and C. J. Knapp. Modern Metals, v. 17, Sept. 1961, p. 46, 48, 50, 52-53.

Operating variables and control techniques for the reliable and economical operation of H_3PO_4, HNO_3 bright dippings baths for Al. Effect of bath composition on bath performance and the effect of operating variables on equilibrium levels of $AlPO_4$ and H_2O. Dipping is followed by anodizing and sealing. (L12f, L19n, 1-52; Al-b)

875-L. Current Coated Coil Boom Calls for Wide Paint Lines. Modern Metals, v. 17, Sept. 1961, p. 70, 72-73.

Pretreatment of coil stock in gages from 0.010-0.062 in. by phosphate conversion coating in an automated process adaptable to either Al or steel. (L14b; ST, Al, 17-57, 18-74)

876-L. Molybdenum Disulphide Dry Film Bonded Coatings. H. J. Winch and L. A. Hicks. Engineer, v. 212, Sept. 8, 1961, p. 392-394.

Use of MoS_2 dry film bonded coatings for lubrication of metal bearing surfaces. Physical and chemical properties of MoS_2 are considered with cleaning, abrasive pretreating, bonding and stoving stages of processes, attention being given to the bonding agents, heating temperature and curing time. (L-general, 18-73; Mo, 14-62, 14-68)

877-L. Coating Line for Aluminium Strip. Engineer, v. 212, Sept. 8, 1961, p. 423-424.

Application of epoxy resin primer and an enamel finish coat to coiled Al sheet on a continuous roll coating line, incorporating a curing oven, strip embossing station and shear and tandem rewinders with collapsible mandrels. Effect of coating on corrosion resistance, formability and glass and color control. (L26n, 1-52; Al, 14-53)

878-L. Terne Coated Strip. Metal Industry, v. 99, Sept. 1, 1961, p. 171.

Continuous terne plating of cold rolled Cu-bearing steel strip in 50 ft. seamless rolls for roofing applications. (L16, T26n; ST, Cu, 4-53, Pb-b, Sn)

879-L. (Japanese.) Deteroriation of Anodic Films and Chemical Films on Aluminum Alloys by Heating. Ryuzo Amano and Ryuhei Ito. Metal Finishing Society of Japan, Journal, v. 12, Aug. 1961, p. 299-303.

Protective films formed on 24S-T4 and 2S Al alloys by sulphuric and chromic acid anodizing and by chemical coating are subjected to 80-200° C. heating for 8-100 hr. Film breakdown as a function of temperature is examined by salt spray corrosion tests running continuously for 800 hr. (L19, L14, R11j, 2-61; Al-b)

880-L. (Japanese.) Effects of Nonionic Surface Active Agents and Halogen Ions on Electrodeposition of Tin in H_2SO_4-$SNSO_4$ Bath. Ariya Kozawa, Shunzo Mase and Takehiko Takahashi. Metal Finishing Society of Japan, Journal, v. 12, Aug. 1961, p. 303-307.

Deposition of semibright Sn deposits from stannous sulphate baths in the presence of Pluronics (nonionic surfactants) with the beneficial action of the surfactant being overshadowed by addition of a small amount of halogen. Polarization associated with the reaction is studied as a function of Pluronics concentration and the ratio of the hydrophobic and hydrophilic molecule, halogen content, bath temperature, current density and metal-solution interface absorption of halogen ions. 8 ref. (L17a; Sn)

881-L. (Japanese.) Hard Anodizing of Aluminum and Its Alloys. Hiromu Kanematsu and Junji Togashi. Metal Finishing Society of Japan, Journal, v. 12, Aug. 1961, p. 308-313.

Electrolytic conditions are analyzed for anodizing pure Al and 17S, 52S and 61S Al alloys in sulphuric acid. Voltage-amperage-time curves are derived for film growth rates with optimum parameters given for obtaining wear resistant films. 4 ref. (L19; Al-b)

882-L. Developmental Flame-Spray Powders. Space/Aeronautics R & D Technical Handbook, v. 4, 1961-1962, p. I24-I15.

Adhesion, porosity, texture, melting point and thermal expansion coefficient of flame sprayed coatings of Cr, Co, Mo, Ni, W, carbides (Cr, W), oxides (rare earth, Al, Zr, Ti, Ce), zirconium silicate, magnesium zirconate and calcium zirconate are listed with applications in environmental protection. (L23, Q10c, P10, P11, R-general)

883-L. Functional Aluminum Coatings by Vacuum Evaporation. Philip J. Clough. Paper from "Vacuum Metallurgy Conference, Transactions, 1960". Interscience Publishers, Inc., New York 1, 1961, p. 333-337.

Corrosion and heat resistant, protective and decorative coatings deposited on metal bases by vacuum metallizing with Al. Application to H11, Vascojet 1000, 5740 and mild steels, 7075 Al alloys and Mg. Physical and mechanical properties are compared for coated and uncoated specimens after heat treatment with corrosion resistance being determined by salt spray fog and oxidizing atmosphere tests. (L25g, R11, 2-62; ST, SGA-h, Mg, Al-b, Al, 17-57)

884-L. (French.) Corrosion Protection of Wet Surfaces. Germain Quiroga-

Galdo. Trempe, no. 37, May 1960, p. 15-21.

Corrosion protection by coating with Rust Veto Film 377, calculating surface tensions at the various liquid-solid-air contacts. Application, covering power, thickness and drying time of the coating. (L26, R10)

885-L. (Spanish.) Hard Chromium Plating of a 7.92 MM. Rifle. Luis Lobato Morales. Metalurgia y Electricidad, v. 25, May 1961, p. 152-158.

The bore is electrolytically polished, rinsed in water and Cr plated using a 2.5 mm. diameter Cu or steel electrode with Pb-Sn coating and an electrolyte containing 250 g. per liter H_2CrO_4 and 2.5 g. per liter H_2SO_4 which is circulated by pumping or by bubbling with hydrogen. (L17a, T2m; Cr)

886-L. (Italian.) Mercury and Its Alloys. Applications of Mercury in Corrosion Protection. M. Mazzoleni. Metallurgia Italiana, v. 53, July 1961, p. 349-352.

Coating of Fe, steel and cast iron with Pb, Pb alloys, Cd, Sn, Zr and Cu in order to increase Hg solubility of the metallic base surface. Specimens treated in this way are compared with Zn-coated specimens after immersion in sea water for 8 months. (L-general, R4b; Fe, ST, CI, Hg)

887-L. Composite Materials Offer Rust Resistance, Strength. Steel, v. 149, Oct. 2, 1961, p. 67.

Steel pipe sections are spray-coated with epoxy resin compound to combine corrosion resistance with weldability. (L26p, K9s, R-general, T26r; SS, 4-60)

888-L. Three Coating Processes Provide Properties "To Order". R. S. Zuchowski and R. L. Wolfe. Metalworking, v. 17, Oct. 1961, p. 14-16.

Plasma arc and flame plating and plasma arc welding surfacing processes used for depositing hard surfaces on base metals and for building up metal shapes and composites to precision tolerances. Application to steel, W, Ta, Cb, brass, Mo, Al, graphite and phenolic resins using refractory metals, oxides, carbides, nitrides, borides, cermets, stainless steels and Fe, Ni, Co and Cu alloys as deposits. Data are given for technological parameters of the processes and physical and mechanical properties of the coatings with emphasis on heat, abrasion, corrosion and oxidation, shock and wear resistance. (L29; EG-d37, SGA-h, SGA-g, SGB-q)

889-L. Selecting Media and Compounds for Barrel Finishing of Stampings. Metalworking, v. 17, Oct. 1961, p. 79, 81.

Natural stone, synthetic or artificial abrasives and metals are considered for cleaning, polishing and finishing of ferrous metals, brass, Ag, bronze, Zn, Mg, Al and Al alloys and stainless steel parts. Survey of chip, triangle, sphere and ball and special shapes of abrasive materials such as natural stone, Al_2O_3, SiC, granite, lime stone, agricultural products and metals. Effect of media size, composition and type; ratio of work to media, mass height in barrel, water level and barrel speed on process efficiency. (L10d; 4-59)

890-L. Can Molybdenum Be Protected From "Puff of Smoke" Ending? Gerald Geltman. Iron Age, v. 188, Oct. 5, 1961, p. 74-75.

A chrome diffusion technique with hydrogen flushing in batch-packed retorts produces oxygen-free diffusion coats on Mo, tested at 2200° F. for 10-12 hr. Other treatments include combinations of Cr and ceramic coatings. (L15, R3, 1-54, 2-62; Mo, Cr)

891-L. New Descaling Method Cuts Surface Attack on Super Alloys; Saves Costs, Manhours. Western Metalworking, v. 19, Sept. 1961, p. 39-40.

Sodium hydride RW 77 process minimizes or eliminates deleterious surface conditions by working the descale material itself. The method adequately descales precipitation hardening stainless steels and successfully descales superalloys such as Rene 41 and Hastelloy X. Comparative tests on descaled Rene 41 reveal loss of 0.001 in. thickness after processing 25 min. in RW 77 solution and 0.0002 in. after immersion in nitric-hydrofluoric acid. (L12g; SS, SGA-h, Ni-b)

892-L. Spray Metallizing Steel Hub Hikes Part Life. Western Metalworking, v. 19, Sept. 1961, p. 40.

Colmonoy C-290 metallizing powder is sprayed on bearing surface inner diameters using a hand-held Spraywelder pistol. The method replaces a bronze type gas rod build-up with service life improved 2 to 3 times compared with the bronze overlay. (L23, 1-52, T21e)

893-L. The Cleaning of Carbon Steel Wire as Affected by the Metallurgical Nature of the Scale. A. B. Dove. Paper from "Regional Technical Meetings, 1960". American Iron and Steel Institute, New York 17, 1961, p. 29-57.

Review of scale formation theory and mechanisms of scale layer growth during cooling. Speed of pickling and amount of scale loss as affected by cooling rate. Study of a batch rod pickling process with data given for $FeSO_4$ saturation values and operation temperatures. Scale growth mechanisms during patenting. 5 ref. (L-general, L12g, R1h, 9-52; CN, 4-61)

894-L. Continuous Spray Priming of Rolled Steel Strips. Norman C. McGregor. Industrial Finishing, v. 37, Sept. 1961, p. 30-32, 34, 39.

Automatic spraying of a prime coat on both sides of formed sheet steel as it travels by conveyor through a tunnel. The coating is baked as the stock goes through a tunnel of infrared electric heat lamps. (L26, 1-52; ST, 4-53)

895-L. Coating Long Propeller Shafts Automatically. Herbert Chase. Industrial Finishing, v. 37, Sept. 1961, p. 40-42, 44, 46.

Continuous spraying and baking of automobile parts to provide a uniform coating for corrosion protection. (L26, T21b)

896-L. Low Heat Cleaning and Phosphating. Industrial Finishing, v. 37, Sept. 1961, p. 66-67.

Temperatures in power washers and phosphatizing machines may be reduced from 135-180° F., at various stages to room temperature, without reducing effectiveness of process. (L12e, L14b, 1-52, 1-67)

897-L. Molten Salt Bath and Rinse Clean Metal. P. C. Bardin. Industrial Finishing, v. 37, Sept. 1961, p. 130-131.

Metal parts are immersed in caustic or salt melted by heating to 700-900° F., then in boiling water, in a conveyorized operation to prepare surfaces for painting. (L12, 1-52)

898-L. (French.) Cathodic Yield and Polarization of Cyanide Baths for Cadmium Plating. L. Ades. Corrosion et Anticorrosion, v. 9, June 1961, p. 185-194.

Cathodic yield curves as a function of Cd concentration, of the relation between cyanide and metal, of soda, Na carbonate and Na sulphate and Fe concentration and of temperature. Influence of density, time and voltage on anodic and cathodic polarization. (L17c, 2-60, 2-61, 3-67)

899-L. (French.) Galvanic Coating on Aluminum. H. Richaud. Corrosion et Anticorrosion, v. 9, June 1961, p. 195-202.

Surface preparation of Al by chemical Zn coating in alkaline bath. Electrolytic techniques for Ni-Cr, hard Cr, Sn, Ag and Pb plating. (L16, L17, 1-52; Al, Ag, Cr, Ni, Pb, Sn, Zn)

900-L. (French.) Development of Phosphatizing. R. Lagarde. Corrosion et Anticorrosion, v. 9, June 1961, p. 203-205.

Review of techniques of phosphatizing and of characteristics of phosphate coatings. Advantages of crystalline over amorphous phosphatization. (L14b, 10-54)

901-L. Review of Recent Developments on Oxidation-Resistant Coatings for Refractory Metals. W. D. Klopp. Defense Metals Information Center, Battelle Memorial Institute, DMIC Memo. 120, July 31, 1961, 5 p.

Study of silicide and silicide-base coatings for Cb, Ta, Mo and W and their alloys applied by vacuum pack, fluidized bed and pack cementation processes. Investigation of glass forming characteristics and oxidation resistance at 2700-2900° F. 11 ref. (L29, R1h, 2-62; EG-d37, Cb, Mo, Ta, W, Si, 17-57)

902-L. Reinforced, Refractory, Thermally Insulating Coatings. E. W. Blockel, C. Kallup, S. V. Castner and S. Sklarew. Society of Automotive Engineers, 417D, 1961, 6 p.

Development of a composite material system of metal reinforced, insulating ceramic that exhibits a high degree of thermal stability at 3000-4000° F. Low

thermal conductivity and thermal shock resistance measurements are made at 0-5000° F. Substrate materials for the ceramic coating consist of mild steel, 300 and 400 series stainless steel, N-155, 19-9 DL, L-605, Mo-base alloys, Ta and W. (L29, 2-62; ST, EG-d37, SGA-h, NM-f, 17-57)

903-L. Protective Coatings. Francis Scofield. I/EC (Industrial and Engineering Chemistry), v. 53, Oct. 1961, p. 846-847.

Review of new materials including polyesters, urethane, epoxy, vinyl resin, oxidized rubber, silicone and polysulphide for use as protective coatings of paints for steel and of developments in fire-retardant coatings and in fungicides for paints. Preparation of the surface to be painted and methods of coating. 59 ref. (L26, R1, 10-54, 17-57; ST, NM-q)

904-L. Measurement of Thickness of Electroplates by Electrolytic Stripping Method. Pt. 2. Stripping Solution for Zinc Electroplate Over Mild Steel and Copper. Prem Behari Mathur and A. S. Lakshmanan. Science and Culture, v. 27, June 1961, p. 300-302.

Current efficiency relation determined for stripping of Zn electrodeposits from Cu and steel for thickness measurements using a 10% NaCl solution. Effect of current variables on plating thickness is studied for Zn deposits on steel. 5 ref. (L17c; Cu, ST, Zn)

905-L. (Translation-ConBur.) Brass Plating of Titanium by a Combined Electrolytic and Diffusion Process. I. S. Anitov and A. G. Maksimova. Journal of Applied Chemistry of the USSR, v. 33, Dec. 1960, p. 2688-2691.

Process in which the surface of VT1 Ti is etched and then covered with a Cu layer of the required thickness deposited electrolytically in two stages with intermediate vacuum annealing. The Cu is subsequently converted into brass by diffusion annealing in a special mixture containing Zn. (L17, L16; Ti-b, Cu-n)

906-L. (Translation-ConBur.) Electrolysis of Acid Zinc Sulphate Solutions at Very Low Current Densities. G. N. Znamenskii and V. V. Stender. Journal of Applied Chemistry of the USSR, v. 33, Dec. 1960, p. 2692-2694.

Current efficiencies and cathode potentials determined as a function of current density and impurity content of the electrolyte during electrodeposition of Zn. Effect of current density on the H and Zn polarization curves. 12 ref. (L17b; Zn)

907-L. (Translation-ConBur.) Metal Distribution on the Cathode Surface in Electrodeposition of Nickel. N. T. Vagramyan and G. I. Kobosnidze. Journal of Applied Chemistry of the USSR, v. 33, Dec. 1960, p. 2695-2697.

Determination of the throwing power and coating uniformity of several electrolytes, taking into account the effect of the direction, of convection currents during electrolysis on the metal distribution over the electrode surface. 11 ref. (L17b; Ni)

908-L. (Translation-ConBur.) Cathodic Deposition of Rhenium-Nickel Alloy From Ammonium Perrhenate Electrolyte. N. V. Korovin and M. N. Ronzhin. Journal of Applied Chemistry of the USSR, v. 33, Dec. 1960, p. 2698-2702.

Electrodeposition of Re-Ni alloy using an electrolyte containing $KReO_4$, $NiSO_4$ and $(NH_4)_2SO_4$ at a pH above 2. Current efficiency is given as a function of hydrogen overvoltage, pH, current density and temperature. 11 ref. (L17a, L17b; Re-b, Ni-b)

909-L. (Translation-ConBur.) Bright Nickel Plating of Small Parts and Articles in the Presence of Cd Salts. S. V. Trubman, P. M. Mel'nik and B. E. Shreiber. Journal of Applied Chemistry of the USSR, v. 33, Dec. 1960, p. 2763-2765.

Bright Ni coating at 18-25° C. using an electrolyte composed of $NiSO_4$, Na_2SO_4, H_3BO_3, NaCl, NaF and either $CdSO_4$ or $CdCl_2$. The deposits obtained are not brittle and have a satisfactory color with no yellowish tinge. 4 ref. (L17, 3-69; Ni)

910-L. (Translation-ConBur.) Electrochemical Deposition of Metals on Glass and Porcelain. B. P. Kryzhanovskii, A. YA. Kuznetsov and D. N. Tret'yakov. Journal of Applied Chemistry of the USSR, v. 33, Dec. 1960, p. 2766-2767.

Deposition of Cu, Cr, Cd and Ag coatings on glass and porcelain electrodes covered with SnO_2 films to provide electrical conductivity. 4 ref. (L17; NM-f40, Cu, Cr, Cd, Ag)

911-L. Bronze Coated Rod. Machine Production, v. 20, Sept. 1961, p. 50.

High quality bronze is sprayed and fused to the surface of a steel rod, giving lubricating qualities for bearings applications. (L23, T7d, 17-51; ST, Cu-s)

912-L. The Anodic Oxidation of Building Component. E. Zurbrugg. Light Metals, v. 24, Sept. 1961, p. 248-249.

Temperature and time variables in the anodizing and dyeing of Al alloy building components are considered as they affect porosity, thickness and opacity of the film. Color and light-fastness are studied as a function of the composition of both alloy and dye. Techniques for sealing the film pores and the prevention of film damage by heat during anodizing. (L19, 2-60, 3-67; Al-b)

913-L. (Dutch.) Penetration of Hydrogen Into Steel, During Enameling. C. L. Bij. Metalen, v. 16, Jan. 31, 1961, p. 24-28.

Stainless, carbon and Al-alloyed steel are coated with Ca-Na glass or B-Si glass. Effect of H_2O in the coating material, temperature, furnace atmosphere humidity and steel composition on hydrogen absorption and formation of fish scales. 15 ref. (L27, 1-52, 2-60, 2-66, 3-69; SS, CN, ST, Al)

914-L. Electrodeposition of Molten Metals and Alloys From Glycerine Solutions. George L. Schnable. Electrochemical Society, Journal, v. 108, Oct. 1961, p. 964-969.

Various metal solders and alloys including In, In-Cd, In-Sn, In-Ga, Sn-Cd, Sn-Zn, Sn, Sn-Pb, Pb-Cd, Pb-Sb and Cd-Zn are electrodeposited in molten form on small wires and strips from glycerine solutions of metal halides. In contrast to conventional processes for electrodeposition of solid metals, deposition of molten metals can be very rapid since high current densities can be employed. 21 ref. (L17; In-b, Pb-b, Cd-b, Sn-b, Ga, Zn, Sb, 14-60)

915-L. Effects of Saccharin on the Structural and Magnetic Properties of Iron-Nickel Films. R. S. Smith, L. E. Godycki and J. C. Lloyd. Electrochemical Society, Journal, v. 108, Oct. 1961, p. 996-998.

Influence of saccharin content of plating bath on surface roughness, crystal size, strain and gas content, with consequent effects on coercive force, is determined for 20% Fe-Ni films by polarographic and magnetic measurements and electron microscopy. Saccharin reduces the decomposition potential of hydrogen and decreases the plating efficiency. 8 ref. (L17, P16; Ni-b, Fe)

916-L. What Precoated Metal Shall I Use? Metal Progress, v. 80, Oct. 1961, p. 128.

Preplated, prepainted and vinyl-laminated metals offer product designers an unlimited choice of colors, textures, patterns and finishes. (L-general, 17-57)

917-L. Brass Plating of Titanium. Engineering Materials and Design, v. 4, Oct. 1961, p. 698.

HCl is used as pick ing for surface preparation and for Cu electroplating. Cu is then converted tc brass by high-temperature (to 800° C.) diffusion with powders of fire clay and Zn, ferrosilicon and ammonium chloride. (L15, L17, 1-53; Ti, Cu-n)

918-L. Flame Sprayed Metals and Ceramics. Engineering, v. 192, Sept. 22, 1961, p. 382.

Journals, rollers, press cranks and babbit-bearing shells are built up by flame spraying with Al, Cu, Ni, Zn and chromium-nickel stainless steel alloys. Binding is obtained using alumina, tungsten carbide, Co and Mo. Coatings are then machined to desired finish and heated to 1050° C. with O_2 and acetylene. (L23, 1-52, 17-57; SS, Al, Cr, Cu, Ni, Zn)

919-L. (German.) Investigation of Hot Dip Aluminizing of Steel With and Without Subsequent Annealing. ("Aluminizing" and "Alitizing"). K. Wellinger and A. Schweizer. Werkstattstechnik, v. 51, Jan. 1961, p. 23-29.

Production of wear, scale and corrosion resistant steel and cast iron parts by hot dip Al coating ("alitizing") at 700-900° C. using a flux of 15% KCl, 39% NaCl, 10% AlF_6Na_3 ("Vibral" process). Investigation of bonding characteristics and of corrosion and wear resistance of aluminized and alitized parts. (L16; ST, Al)

920-L. (German.) Pretreatment of Aluminum for Welding. Hans H. Reinsch. Metall-Reinigung + Vorbehandlung, v. 10, Aug. 1961, p. 129-131.

Mechanical cleaning by brushing, filing and sand or Al blasting; chemical cleaning and degreasing by pickling using H_2SiF_6, HNO_3 and H_3PO_4; and degreasing by using volatile hydrocarbons and washing suds. (L10, L12, K9p; Al)

921-L. (German.) Direct Chromizing of Zinc Pressure Die Casting. Pt. 1. A. M. Shams El Din. Metalloberflache, v. 15, July 1961, p. 198-201.

Cr electrocoating of Zn pressure die castings and measurement of cathode potential versus current density curves using various electrolytes. Comparative corrosion testing (by salt spray test) of uncoated, Cr, Cu and Ni-coated specimens. (L17, R11j; Zn, 5-61, Cr, Cu, Ni)

922-L. (German.) Direct Chromizing of Zinc Pressure Die Castings. Pt. 2. A. M. Shams El Din. Metalloberflache, v. 15, Aug. 1961, p. 241-242.

Measurement of hardness and scratch hardness of Zn, Cu, Ni and Cr electrocoatings obtained by precipitation from four different electrolytes. Comparison of hardness and corrosion resistance of coatings obtained from various electrolytes. (L17c, Q29d, Q29n, R-general, 1-54; Zn, 5-61, Cr, Cu, Ni)

923-L. (German.) New Metal Pigment for Production of Electrically Conductive Coatings. Chemische Rundschau, v. 14, Sept. 1, 1961, p. 466-469.

Review of metal coating of plastics by precipitation from salt solution, by evaporation, metal spraying, lacquering with metal-pigment lacquers and electrodeposition. Properties and use of a new metal pigment, Kontaktargan. (L-general, 10-54; NM-d)

924-L. (German.) Platal--A New Steel-Plastic Compound Material. Werner Sieckmann. Chemische Rundschau, v. 14, Sept. 1, 1961, p. 471-474.

Plastic (PVC) coating of cold rolled steel strip (0.3-1.5 mm. thickness) to achieve properties including workability, conductivity and resistance to high and low temperatures, chemicals, corrosion and wear. (L26, Q9n, Q23q, P15g, R-general, 2-61; ST, 4-53)

925-L. Study of Coatings Formed by Cathodic Protection. Technical News Bulletin (National Bureau of Standards), v. 46, Sept. 1961, p. 156-157.

Coatings on cold rolled steel rods are measured for corrosion resistance by polarization technique indicating usefulness of anodic data in the logarithmic relation. (L21, R10, 1-54; ST, 4-55)

926-L. (German.) Effect of Manganese and Sulphur Content of Steel on Fish-Scale Formation in Enamel. Friedrich Erdmann-Jesnitzer and A. Petzold. Bergakademie, v. 13, May 1961, p. 303-307.

Measurement of hydrogen permeability of cold rolled 1 mm. thick low-carbon steel sheet with varying S (0.03-0.07%) and Mn (0.3-0.9%) content by cathodic hydrogen charging and subsequent investigation of defects after coating with fish-scale sensitive enamel. (L27, P10m, 1-53, 2-60, 9-71; CN-g, 4-53, Mn, S)

927-L. Planned Expansion of Die Casting Facilities. Machinery (London), v. 99, Sept. 27, 1961, p. 735-747.

Finishing, polishing, electroplating, galvanizing, paint spraying and radiographic examination of Al and Zn alloy die cast cylinder blocks, crankcases, wheels, shoe heels, housings, hinges and lock barrels. (L-general, E13, S13, 1-52, 17-57; Al-b, Zn-b, 5-61)

928-L. Automobile Bright-Work Gets a New Lease. Precision Metal Molding, v. 19, Oct. 1961, p. 73-74.

Comparison of wear and corrosion resistance of Zn die castings Cr plated by several methods. (L17, Q9n, R-general, T21c; Zn, 5-61, 8-62, Cr)

929-L. Horizontal Barrel and Vibratory Finishing. Gene Olson. Precision Metal Molding, v. 19, Oct. 1961, p. 77-79.

A comparison of the two finishing processes on the basis of the type of finish and the size of the parts processed. (L10, 1-52)

930-L. High-Purity Vacuum Evaporation of Silver Nickel and Nichrome Thin Films. J. I. Amato and C. M. Herbert. Report of NRL (Naval Research Laboratory) Progress, Sept. 1961, p. 58-59. (Available as PB 171322 from U. S. Office of Technical Services, Washington 25, D.C.) $1.25.

Vacuum deposition of high opacity, high purity coatings for electron equipments by evaporation of metals in alumina-coated tungsten basket at about 1500° C. Shorter evaporating time cycles and reduced contamination of the film are achieved by the Al_2O_3 coatings which insulate the materials from the tungsten and at the same time overcome the lack of wetting action between the basket and the vaporized metal. 4 ref. (L25g, N15g; Ag, Ni-b, 14-62)

931-L. IVE Anglo/Russian Exchange Visit. Foundry Trade Journal, v. 111, Sept. 14, 1961, p. 325-328.

Report of the Institute of Vitreous Enamellers on the Novocherkassk Polytechnic Institute and the Artyom Factory at Lugansk covering research and plant equipment and processes for the enameling of steel. (L27, 11-63; ST)

932-L. Cleaning and Brightening Stainless Steels. Corrosion Prevention & Control, v. 8, Sept. 1961, p. vii.

Specimens of 18-8 stainless steel are subjected to baths of varing concentrations of hydrochloric, nitric, phosphoric and acetic acid for cleaning and polishing. Comparison with corundum polishing on the basis of time and expense. (L12g, L10b, 1-52; SS)

933-L. Ford Experience With Coated Body Steels. R. J. Saxon. Corrosion Prevention & Control, v. 8, Sept. 1961, p. 45-49.

Effects of corrosion on various types of stainless or clad steels with coatings of Al or Cu or with plating of terne or Zn. Particular applications of Zn to plating of auto bodies, leading to the development of a special galvanizing process. (L16, L17, R-general, 1-52; SS)

934-L. Line Plates 2000 Pipes an Hour. Iron Age, v. 188, Oct. 12, 1961, p. 170.

The design and operation of an automatic electrogalvanizing line which cleans, rinses, electrogalvanizes, hot dip galvanizes, threads, prints and bundles tubes and rigid steel conduits. The use of a chromic acid bath to prevent white rust. (L-general, 1-52; ST, 4-60)

935-L. Automatically Painting Big Structural Sheets. Gilbert C. Close. Products Finishing, v. 26, Oct. 1961, p. 72-79.

Layout, equipment, conveyor and ventilation systems and automatic controls of a painting installation in which 3003 Alclad Al alloy or steel structural sheets are cleaned, deoxidized, conversion coated, spray painted and baked. (L-general, 1-52; Al-b, ST, 4-53)

936-L. EM + IT = 3F/ALC. Products Finishing, v. 26, Oct. 1961, p. 82-90.

Layout, equipment and operations of a metal finishing plant in which sheet steel stampings are cleaned, pickled and Zn plated in a plating unit or are washed, phosphatized, chromic acid dipped and spray painted in a painting unit. Capacity, automatic controls and transfer system of the plant. (L-general, 1-52; ST, 4-53, 4-59, Zn)

937-L. Hinac Coatings: Improved Corrosion Resistance for Zinc. P. G. Rech. Products Finishing, v. 26, Oct. 1961, p. 104-110.

Composition of Cr-containing castings and methods of application to galvanized steel, Zn die castings and Zn-plated wire and parts. Testing of coated parts to determine effects of the coating on corrosion resistance and resistance of the coating to organic solvents, acids, alkalis and weathering. (L16, R-general, 1-52; ST, Zn, Cr, 4-61, 5-61)

938-L. Ceramic Coatings With Conrolled Reflective and Emissive Properties. D. G. Burgess, J. R. Jasperse and E. P. Flint. American Ceramic Society, Journal, v. 44, Sept. 1961, p. 446-450.

Ceramic coatings formulated from barium silicate frit are applied to heavily oxidized Inconel. Emittance as a function of temperature and enameling and reflectance characteristics are determined for black and white enamels with an infrared spectrometer. 6 ref. (L27, P17, 1-53; Ni-b, NM-g34)

939-L. Armco Unveils Wide Continuous Zinc-Coating Line. Blast Furnace and Steel Plant, v. 49, Oct. 1961, p. 994.

Galvanizing of 72-in. sheet steel at 300 ft. per min., producing 30 tons of sheet or coil per hr. Inspection by various devices including radioactive

gages employing Strontium 90 to check the weight of the coating. Uncoiling, welding, cleaning, heat treating, coating, cooling, shearing or recoiling and inspection in a round-the-clock operation. (L16, 1-52, S14e; ST, Zn)

940-L. Anti-Corrosive Elastomeric Linings for Industrial Use. Pt. 2. Corrosion Technology, v. 8, Sept. 1961, p. 278-281.

Methods of applying chlorinated rubbers, neoprene and Hypalon linings to wood, concrete and metal sheets, vessels and pipes prior to shrink curing and vulcanization. Physical, chemical and mechanical design limitations of the linings and the lined materials. (L26r)

941-L. Chromallizing Molybdenum Simplifies Glass-to-Metal Seals. S. J. Koch. Ceramic Age, v. 77, Oct. 1961, p. 116-118.

Production of vacuum-tight seals for application in electronic parts such as ionization gages. Other materials such as carbon and alloy steels, tungsten, Kovar, Fernico, quartz and graphite may be chromallized by diffusion of Cr and other elements. (L15, K11a, 1-52; ST, Ni-b, Mo, W, Cr)

942-L. (Italian.) Surface Treatment of Stainless Steels. Giampiero Colombo. Acciaio Inossidabile, v. 28, July-Aug. 1961, p. 65-68.

Grinding, polishing, roughing and cleaning of austenitic, martensitic and ferritic stainless steels, plates and seams. Use of CSi_2 and Al_2O_3 grinding wheels, for which velocity, grain size and working angle are given. (L10, G18, 1-52; SS, 4-53)

943-L. New Anodizing Technique Cuts Costs. Industrial Finishing, v. 13, Sept. 1961, p. 56-57.

Toro anodizing process using current densities of 500-4000 amp. per sq. ft. to apply on aluminum oxide film of 0.001 in. in 1 min. at 70° F. to Al reel. Physical and chemical properties of the coating with attention to color, electrical resistance and refrigeration requirements. (L19; Al)

944-L. Applying Radiation Resistant Coatings. Industrial Finishing, v. 13, Sept. 1961, p. 63-64.

A nuclear radiation resistant epoxy resin coating for withstanding exposures to high intensity gamma radiation is developed for coating steel and concrete. Application specifications are given for painting steel reactor quadrants and canals based on a catalyst cure epoxy system. Evaluation of radiation resistance for two epikote resins and a chlorinated rubber, an acrylic proprietory and two vinyl mastics. (L26p, T11; ST, NM-f43)

945-L. Some Thoughts on the Economics of Low-Pressure Spraying. J. Muirhead. Metal Finishing Journal, v. 7, Sept. 1961, p. 325-328; 336.

Suggestions for saving on enameling costs by employing low-pressure spraying procedures to reduce dust and overspray. Importance of retraining personnel in proper spraying techniques. Discussion of equipment necessary for low-pressure spraying. (L26, 1-52)

946-L. Metal Finishing Conference. G. Krijl, J. L. Melse, J. A. Whittaker, J. M. Kape and W. Marchand. Metal Finishing Journal, v. 7, Sept. 1961, p. 337-344, 348.

Reports at the Annual Conference of the Institute of Metal Finishing, Llandudno, May 2-6, 1961. Topics include the determination of the thickness of metal coatings on small objects by measuring the heat of solution of the coating; one-year exposure tests on 12 sulphuric-acid anodized Al alloys; and electroplating, metal spraying, chemical treatment and organic finishing of communications equipment made of Fe, steel and Cu and Al alloys. (L-general, S14, R-general, Ti, 1-53, 17-57; Fe, ST, Cu-b, Al-b)

947-L. Electrodeposition of Metals From Nonaqueous Media. Metal Finishing Journal, v. 7, Sept. 1961, p. 345.

Passage of electrical current through anhydrous organic solutions to determine the products formed and to test the feasibility of using such solutions as baths for the electrodeposition of metals. Plating of Zn on metal from a bath of zinc acetate and potassium acetate in formamide. (L17a, 1-52; Zn)

948-L. Control in Aluminum Anodizing Processes and Coatings. J. M. Kape. Metal Finishing, v. 10, Oct. 1961, p. 54-60, 62.

Review of techniques in pretreatment, anodizing, dyeing and sealing processes. Suggested methods for testing abrasion and corrosion resistance, adhesion, thickness and reflectivity. 19 ref. (L19, Q9, R-general, S13, S14, 1-54; Al)

949-L. Finishing Procedures and Magnesium Base Alloys. Lester F. Spencer. Metal Finishing, v. 10, Oct. 1961, p. 63-66.

Review of surface conditioning, surface activation, immersion Zn coating, Cu strike and electroplating techniques for applying Ni, Cr, brass, Zn, Cd, Rh, Au and Ag coatings. (L-general, L17; Mg-b, Mn-b, Ag, Au, Cd, Cr, Cu-n, Ni, Rh, Zn)

950-L. New Methods of Determination of Adhesion and Fatigue Strength of Electrodeposited Antifrictional Coatings. Larissa Domnikov. Metal Finishing, v. 10, Oct. 1961, p. 67-70.

Dynamic test method in which the properties are measured by shearing or tearing the coating from the base metal under a dynamic load; application to Zn-Cu coatings on Cu, cast iron, brass and steel bases. (L17c, 1-54; CI, ST, Cu, Cu-n, Cu, Zn)

951-L. Synthetic Resins. The Backbone of Modern Finishes. Pt. 11. Alkyds (Section A). Harold P. Preuss. Metal Finishing, v. 10, Oct. 1961, p. 71-74.

Tabulation of the solid content, acid number, viscosity, wettability and toughness of various alkyd resins. Applications in enamels, lacquers, textile finishes and water emulsion paints. (L26n, L26p, P10, Q-general, 17-57; NM-g33)

952-L. Finishing Pointers: Volumetric Determination of Zinc and Copper in Brass Plating Solutions. J. R. Luck and E. H. Lindemann. Metal Finishing, v. 10, Oct. 1961, p. 75.

Determination of Zn and Cu in cyanide plating solutions by complexing the Cu with ascorbic acid, then permitting the Zn to react with ethylene dinitrilo tetra acetic acid. 4 ref. (L17a, S11j; Cu, Zn)

953-L. Science for Electroplaters. Pt. 68. Brighteners. L. Serota. Metal Finishing, v. 10, Oct. 1961, p. 76-78.

Review of the effectiveness of bright and semibright Ni deposits used to smooth the surface of the base metal. (L17a; Ni)

954-L. New Flame Retardant Coating. Materials in Design Engineering, v. 54, Oct. 1961, p. 17, 151.

Development of a coating composed of an ammonium phosphate, a polyol and an amine. Coating may be applied by brushing, spraying or dipping and keeps the temperature of the coated metal below 350° F. when exposed to flame temperatures of over 2000° F. for more than 1 hr. (L26, 17-57; SGA-h)

955-L. Polyester Coatings for Metals. Materials in Design Engineering, v. 54, Oct. 1961, p. 11-13.

Mechanical properties, chemical, corrosion and weather resistance, dielectric strength and flexibility of polyester coating resins sprayed on metal surfaces. (L26, 17-52, 17-57; NM-d)

956-L. (German.) Metallic Plastic Coatings. Technik und Betrieb, v. 13, Sept. 1961, p. 132-134.

Review of means of metal coating of plastics by precipitation from aqueous solution with emphasis on Cu plating of resins and Ag plating of cellulose acetate. Metal spraying and evaporation are alternative methods considered. (L17, L23, L25, 10-54; NM-d, Cu, Ag)

957-L. Automatic Machine Deburs Tube Ends. Modern Machine Shop, v. 34, Oct. 1961, p. 154-156.

Use of indexing wheels loaded with 80-grit Al oxide abrasive cloth to debur cut-off ends of rectangular and circular mild steel tubing. (L10, 1-52; CN)

958-L. Spotting. William K. Murray and George W. Taylor. Plating Management, v. 6, Oct. 1961, p. 7-8.

Influence of porosity and inclusions in the base metal and of the plating process on the spotting of plated wire. (L17c, 3-69, 4-61, 9-69)

959-L. Interfacial Reactions. Institute of Vitreous Enamellers Bulletin, v. 12, Sept. 1961, p. 141-146.

Rolling, annealing and testing of titanium steel sheet in order to assess its use for direct application cover-coat enameling. Test results and discussion of future applications and research on titanium steel. (L27, 1-52, 17-57; ST, Ti, 4-53)

960-L. The Economics of Low Pressure Spraying. T. Muirhead. Institute of Vitreous Enamellers Bulletin, v. 12, Sept. 1961, p. 135-140.

Comparison with the established high-pressure equipment and techniques in terms of quality of finish and ease of operation. (L26, W4g, 1-52)

961-L. Industrial Applications of Abrasive Belt Polishing and Grinding. George Saxby. Electroplating and Metal Finishing, v. 14, Oct. 1961, p. 361-366, 382.

Continuous polishing of steel and stainless steel strip, copy belt grinding of turbine blades, dressing of welds, centerless polishing of steel tube and rod, rubbing down of cellulose and polyester finishes and superfinishing of camshaft journals. (L10b, G18, 1-52)

962-L. Electrodeposition of Tin-Nickel Alloys From the Pyrophosphate Bath. T. L. Rama Char and J. Vaid. Electroplating and Metal Finishing, v. 14, Oct. 1961, p. 367-373.

Study of alloy composition, cathode efficiency and potential with reference to operating conditions to obtain satisfactory plates with 10-99% Sn. Investigation of anode behavior. 15 ref. (L17, 1-53; Ni, Sn)

963-L. Coil or Sheet From Continuous Galvanising Line. Engineer, v. 212, Sept. 22, 1961, p. 476-477.

Fabrication techniques including roll forming, coating, oxide removal, welding, galvanizing and coiling of 28 SWG and 14 SWG steel. Workhardening is performed where necessary by roller-type leveling machines. (L16, 1-52; ST, Zn)

964-L. Societe Anonyme Phenix Works. Metal Industry, v. 99, Oct. 6, 1961, p. 281-284.

Rolling mills, tinplate lines, continuous galvanizing lines and a plastics coating line for the production of galvanized sheet, strip and household utensils, tinplate and plastics-coated sheet. Pickling, degreasing, annealing, cold and temper rolling and roll coating. (L-general, F23, J23, 1-52, 17-57, 18-67)

965-L. A.D.A. Nottingham Conference on Anodising. Product Finishing, v. 14, Oct. 1961, p. 85-87.

Abstracts of papers presented Sept. 12-14, 1961, covering theory and practice of Al anodizing. Topics include decorative applications, wear resistance, quality control and dyeing of finishes; pre-anodizing techniques; bright anodizing; and electrolytic and chemical polishing. (L19, L-general, 1-52, 11-63, 17-57; Al)

966-L. Paint or Plastic? Raymond Davids. Product Finishing, v. 14, Oct. 1961, p. 98-102, 108.

Development of a cold dip, paste plastisol coating for cast steel and Al tool parts, transformer coils, wire baskets and instrument cases. Coating qualities considered include abrasion and impact resistance, smoothness, embrittlement and color permanency. Operating principles and equipment layout including hand dipping tanks, infrared tunnel and box oven. (L26p, Q-general, T7, 1-52; Al, ST, 17-57)

967-L. Striking Advance in Epoxy Coatings. Industrial Finishing (London), v. 13, Oct. 1961, p. 35.

Spray or brush application of solventless epoxy paint to provide acid and abrasion resistance to tanks and pipelines as in food processing equipment. (L26n, Q9n, R7n, T29p; NM-d)

968-L. Wash Primers for Light Metals. R. H. Chandler. Industrial Finishing (London), v. 13, Oct. 1961, p. 40-41.

Development, application and operating principles of one and two-pack wash primers for Al, Mg and other light metals and alloys. Adherence and corrosion resistance properties for WP-1 primer with zinc tetroxychromate and phosphoric acid components. (L14, Q10c, R-general; EG-a39)

969-L. Large Vessels Rotated for Nickel Alloy Plating. Western Metalworking, v. 19, Oct. 1961, p. 23-24.

Kanigen plating of a steel tank with Ni alloy coating solutions injected at the center line as the tank rotates. Adherence, Rockwell hardness and corrosion and abrasion resistance of Ni plating. (L28, Q-general, T26q; ST, Ni, 17-57)

970-L. New Enamel Process for Metal Panels, Signs. Western Metalworking, v. 19, Oct. 1961, p. 32, 35.

Porcelain enamel process for coating steel architectural panels and highway signs including stamping, punching, pickling, spraying and drying operations. (L27, L12g, G2, G3; ST, 17-57)

971-L. Use of Aluminum in Lubrication Systems--Design and Specifications. Ewell E. McDole. Lubrication Engineering, v. 17, Oct. 1961, p. 488-493.

Descaling, degreasing, pickling, Tig welding, passivation and leak testing of 5052, 5454, 5456 and 5083 Al alloy tanks, coolers and pipes. (L12, K1d, T26, 11-62; Al, 17-57)

972-L. The Production and Uses of Aluminized Steel. J. D. Sprowl. Iron and Steel Engineer, v. 38, Oct. 1961, p. 97-103.

Production of materials with coatings of Al with additions of Fe, Si, Na, Be, B, Ti, Cr, Mo, Zr, V, W and Mg applied by hot dipping, electroplating, cementation, spraying and cladding. Physical properties and corrosion resistance. 19 ref. (L-general, P-general, R-general, 1-52; ST, Al)

973-L. Very Thin Fused Coatings Deposited by Weld Surfacing. Iron and Steel Engineer, v. 38, Oct. 1961, p. 186.

Fused coatings of Stellite or other metals or alloys which can be powdered are deposited with a plasma arc gun with as little as 0.005 in. penetration in layers from 0.010 to 3/16 in. thick. Surface quality is evaluated. (L24, 1-52; Co-b, 17-57)

974-L. The Plasmadyne Arc Plasma Jet. S. C. Poulsen. Machinery (London), v. 99, Oct. 18, 1961, p. 906-911.

Use of plasma arc welding equipment, which can produce temperatures up to 30,000° F., in cutting, welding, spray deposition, vapor phase alloying and purifying of refractory materials, cermets, metals and nonmetals such as W, Ta, Cb, Mo, ZrO_2, Al_2O_3, Cu, brass, Al, stainless steel, precious metal, epoxy resin, carbide and hafnium carbide. Consideration of thermal shock, heat resistance and hardness properties required for tungsten-lined Ni rocket nozzles and chemical vessels. (L29, K6, 10-54)

975-L. Zinc Chromate Primers: A Snarl in Terminology. Harold A. Page. Products Finishing, v. 26, Nov. 1961, p. 43.

Use of tetroxy zinc chromate polyvinylbutyral wash primer and oil-base zinc chromate primer for preventing corrosion on Al parts exposed to salt water. Specification of film thickness which provides maximum corrosion resistance. (L14c, L26c, R-general; Al)

976-L. Vapor Degreasing: A Study of "Tri" and "Per". R. C. Fullerton. Products Finishing, v. 26, Nov. 1961, p. 44-47, 50.

Vapor degreasing technique using trichlorethylene and perchlorethylene as solvents for metal cleaning. Properties and applicability of solvents in cleaning Al, steel and other metals. (L12h; Al, ST)

977-L. Finishing Process Helps Computer "Remember". Products Finishing, v. 26, Nov. 1961, p. 59-60, 62.

Electroplating and zincating processes for adherent deposition of Cu over Al in the finishing of a 6061 T-6 Al computer memory drum. Data are given for film thickness and surface smoothness. (L17, L14d, X14p; Al-b, 17-37)

978-L. Galvanized Steel to Improve Corrosion Resistance. John C. Widman. Products Finishing, v. 26, Nov. 1961, p. 64-76.

Panels made from galvanized steel are organic coated, painted and tested for corrosion resistance, weldability, paint adhesivity and durability to obtain a material suitable for manufacturing chassis frames for cars and trucks. (L26, R-general, T21a; ST, 8-65, 17-57)

979-L. Panel-Coil Heating and Cooling of Process Solutions. Products Finishing, v. 26, Nov. 1961, p. 91-92.

Panel-type heating and cooling coils of heat exchanger used in plating tanks are coated with rubber, plastics and other specified coatings for protection against corrosive attack by process solution. (L26, W3j)

980-L. Refractory Coating by Fluidized Bed. Missiles and Rockets, v. 9, Oct. 23, 1961, p. 28.

Production of protective coatings of SiI_4 on Mo and other refractory metals capable of a disilicide reaction in a

fluidized bed of Si and I_2 gas at 2200° F. which is considered faster and cheaper than the pack cementation method. Coated parts are tested at 3000° F. for hours without damage. (L29; Mo, EG-d37, RM-h36)

981-L. (French.) Chemical Conversion Coating. Pt. 1. Galvano, v. 30, Sept. 1961, p. 567-573.

Survey of phosphatizing, chromating and other conversion methods for Fe, steel, Zn, Al, Cu alloys, Cd, Sn, Ag, Mg and ferrous alloys for protection against corrosion and wear, color effects and as bases for painting and for lubrication during deformation. Review of bath compositions, process variables and properties of coatings. (L14, 10-54)

982-L. Flame Spraying in the Space Age. C. J. Vlahos. Mill & Factory, v. 69, Nov. 1961, p. 87-90.

Flame spraying of Fe, brass, bronze, Mo, graphite, Al and steel equipment or components with carbides, ceramics, borides and other high melting point materials using wire-fed, powder-fed, ceramic rod or plasma-arc guns improves wear resistance, abrasion resistance and corrosion resistance and reduces weight losses. (L29)

983-L. Coatings for Nuclear Fuels Explored. Chemical & Engineering News, v. 39, Oct. 30, 1961, p. 80.

Corrosion resistant coatings of Cb, Cr, V, Si, Mo, Be, W, Cr-Ni and Cb-Zr are applied to UO_2 particles using hydrogen reduction of metallic chlorides in a vibrating reactor apparatus. Use of a fluidized bed technique for vapor deposition of ceramic coatings,including aluminum oxide, beryllium oxide, magnesium oxide and pyrolytic carbon, at 500-900° C. (L28, L25; U, 14-68, Cb, Cr, V, Si, Mo, Be, W, Zr)

984-L. International Anodizing Conference. Light Metals, v. 24, Oct. 1961, p. 276-278.

Summaries of papers presented at a conference organized by The Aluminum Development Assoc. Topics include quality control, wear resistance, decorative applications, dyeing, electrolytic and chemical polishing, electrical insulation, water impurity effects and coating formation for anodized Al. (L19; Al, 10-54)

985-L. Applying Clear, Mill Type Pipe Coatings--Methods and Problems. Donald A. Golbey. Iron and Steel Engineer, v. 38, Sept. 1961, p. 116-120.

Prevention of pipe corrosion by the application of quick-drying coatings of synthetic resin varnishes using a spray head unit with synchronously adjustable nozzles producing a fan-shaped spray pattern, the angle of which is changed with changes in pipe size. Explosion-proof electric heaters are used to maintain viscosity control of the coating material. (L29n, T26r)

986-L. Epoxy Resins Aid Steel Plant Maintenance. Elmer E. Barthel. Iron and Steel Engineer, v. 38, Sept. 1961, p. 129-130.

Application of epoxy resins for patching, bonding, corrosion protection and electrical insulation of steel piping and plates. (L26p, T26r; ST, 4-53, 18-71)

987-L. Recent Improvements in Roll Etching. C. P. Croft. Iron and Steel Engineer, v. 38, Sept. 1961, p. 231-232, 234.

Review of techniques used in providing quality finishes on mill rolls of steel. Descriptions are given for blast etching, centrifugal blasting, roll rotation and etching using various sizes of steel and chilled iron grit. (L10c, W23k; ST, 17-57)

988-L. How to Get the Most From Phosphating Systems. Pt. 3. George H. Pimbley. Metal Progress, v. 80, Nov. 1961, p. 108-111.

The "iron" phosphate systems, either dip or spray, are simple in operation and maintenance and usually require less equipment than the Zn and Mn phosphating systems. (L14b, 1-52)

989-L. Cladding Steel to Improve Corrosion, Wear and High-Temperature Properties. Digest of "New Techniques for Cladding With the Gas-Shielded Process". Paper presented at 41st Annual Meeting, A. W. S., Los Angeles, Apr. 1960. Metal Progress, v. 80, Nov. 1961, p. 182-183.

Through the use of specially designed equipment, welders can make overlays of

uniform depths and penetrations up to 3 in. in width. (L24, 1-52; ST)

990-L. (German.) Mechanism of Anodic Formation of Thick, Hard Oxide Layers on Aluminum. P. Csokan. Dechema Monographien, v. 39, no. 600-615, 1961, p. 229-238.

Method for formation of a hard oxide film on Al and Al alloys such as AlSi, AlMgSi, AlMgZn and AlMgZnTi alloys using an electrolyte of dilute H_2SO_4 at 0^o C. and a high current of 50-60 v. Evaluation of formation mechanisms, microstructure, surface quality and hardness of oxide film. (L19; Al-b)

991-L. Barrel-Finishing Guide. Pt. 1. William P. Nunn. American Machinist/Metalworking Manufacturing, v. 105, Oct. 30, 1961, p. 123-125.

A procedure is given for test runs on metal parts for barrel-finishing operations, with a reference sheet for selection of equipment and media for polishing using rotating and vibrating-rotating barrels or vibrating tub type machines. (L10d)

992-L. International Conference on Anodizing. Corrosion Technology, v. 8, Oct. 1961, p. 301-306.

Survey of papers on properties and performances of anodic films and finishes for wear resistance on Al and Al alloys. Topics include theory of formation of anodic oxide coatings; theoretical aspects of electrolytic and chemical polishing; study of the growth of primary films on Al surfaces; influence of sealing water impurities on the quality of oxide film; and effect of purity, film thickness and Cu and Zn content on the corrosion resistance. (L19, 10-54)

993-L. Flow-Coat Technique Uses Epoxy Resins and Zinc Chromate. Corrosion Technology, v. 8, Oct. 1961, p. 312.

Coating of aircraft parts using epoxy resin or zinc chromate. Description of the flow-coat system installation, with related cleaning and anodizing processes. Determination of depth, thickness and concentration of coating. (L26p, L14c)

994-L. The Effect of Electroplating Processes on the Fatigue Strength and Embrittlement of the Substrate. C. Williams. Sheet Metal Industries, v. 38, Oct. 1961, p. 749-756.

Electrodeposition of Cr, Ni, Cd and Zn on high-strength steel. Effects of shot peening of the steel before plating and of heat treatment after plating on the fatigue strength and of Cd and Zn plating procedures on hydrogen embrittlement of the steel. (L17, G23n, Q7, Q26s; ST, Cr, Ni, Cd, Zn)

995-L. New Developments in Wetting Agents. Carl Alex Fischer. Wire Industry, v. 28, Oct. 1961, p. 987-988.

Metal wire pickling using a combined wetting agent and inhibitor. Tests results obtained with the addition of Rodine 57, HW 592 and the nonionic Marlophene types 89 and 810. Effect of H_2SO_4 concentration and bath temperature on the pickling bath lifetime and the pickled metal surface cleanness. (L12g; 4-61)

996-L. (German.) Standardizing of Thickness of Metallic Coatings With Particular Reference to Corrosion Protection. R. Bilfinger. Elektrie, v. 14, Aug. 1961, p. 243-244.

Review of domestic and foreign standards for thicknesses of metallic coatings such as Zn, Cd and Cu-Ni-Cr compound coatings on steel for corrosion protection in various surroundings including enclosed rooms, open air for various climates and special conditions such as sea water and corrosive dust. (L17c, R-general, S22; ST, Zn, Cd, Cu, Ni, Cr, 8-62, 17-52)

997-L. (German.) Purification of Metal Surfaces in Alkaline Salt Melts--A New Method for Surface Treatment. G. Hansel. Elektrie, v. 14, Aug. 1961, p. 249-253.

Descaling and cleaning (removal of lacquer or dirt) from metal surfaces with emphasis on steel and cast iron in alkaline salt melts, particularly NaOH, by reducing reactions and by electrochemical techniques in which the workpiece is used as the anode. (L12n, L13n; ST, CI)

998-L. (German.) Protective Metallic Coatings and Material Behavior. H. Wiegand. Dechema Monographien, v. 39, no. 600-615, 1961, p. 151-169.

Properties of metallic coatings and base material including dip and cast, welded, sprayed and rolled on coatings and electrocoatings on steel or light metals are discussed in terms of bonding strength of coatings and material mechanical properties such as fatigue strength and corrosion resistance. 5 ref. (L-general, Q-general, 10-54; ST, EG-a39)

999-L. For Best Results When You Specify a Coating on Iron Castings. S. S. Greene. Product Engineering, v. 32, Nov. 13, 1961, p. 96-98.

Design consideration for eliminating coating troubles on gray iron castings. Comparison of numerous organic coatings in terms of resistance to chemicals and environment and application methods. (L26, R-general; CI-n, NM-b)

SECTION M

METALLOGRAPHY, CONSTITUTION and PRIMARY STRUCTURES

1-M. Electron Microscope Observations on the Annealing Processes Occurring in Cold-Worked Silver. J. E. Bailey. Philosophical Magazine, v. 5, Aug. 1960, p. 833-842.

Dislocation structure of cold worked polycrystalline Ag and processes occurring during annealing. 8 ref. (M26b, M21e, 2-64, 3-68; Ag)

2-M. Observation of Interstitial Atoms in F. C. C. Metals. A. Seeger, P. Schiller and H. Kronmuller. Philosophical Magazine, v. 5, Aug. 1960, p. 853-857.

Disaccomodation of the initial susceptibility and relaxation time of Ni wire. Study of the relaxation process due to the dumb-bell rotation. 14 ref. (M26s, Q3; Ni, 4-61)

3-M. (French.) Stacking Faults in Face-Centered Cubic Metals and Alloys. Pierre Coulomb. Metaux, Corrosion, Industries, v. 35, Sept. 1960, p. 336-343.

Stacking faults in Ni, Cu and Al alloys and their effect on physical and mechanical properties studied by X-ray diffraction and electron microscopy. 41 ref. (M26s, Q-general, M22g; Ni-b, Cu-b, Al-b)

4-M. (German.) Hafnium Containing Phases: $HfAl_2$, $HfSn_3$. H. Boller, H. Nowotny and A. Wittmann. Monatshefte fur Chemie, v. 91, no. 4, 1960, p. 736.

Melting of pressed specimens prepared from pure Hf, Al, Sn and Pb on a corundum support in a quartz crucible under argon atmosphere in a high-frequency furnace. Phase identification by X-ray structure analysis. 3 ref. (M24b; Hf-b, Al, Sn, Pb)

5-M. Phase Relations in the Magnesium-Rich Region of the Mg-Al-Zn Phase Diagram. J. B. Clark. American Society for Metals, Transactions, Preprint no. 199, 1961, p. 295-306.

The constitution of the Mg-rich region of the Mg-Al-Zn phase diagram reinvestigated by means of microscopic, thermal and powder X-ray diffraction analysis. The 635 and 400° F. isotherms show the presence of a second ternary intermetallic phase at 40 wt.% Mg, 40 wt.% Zn, 20 wt.% Al. This ternary compound forms by a ternary peritectic reaction (Class III four-phase invariant reaction) between $Mg_{12}Al_{12}$, $Mg_{32}(Al, Zn)_{49}$ and liquid at 740° F. 11 ref. (M24c; Mg-b, Al, Zn)

6-M. Laves-Type Phases of Hafnium. Rodney P. Elliott. American Society for Metals, Transactions, Preprint no. 201, v. 53, 1961, p. 321-329.

The Laves-type intermetallic compounds HfV_2, $HfCr_2$, $HfMn_2$, $HfFe_2$, $HfCo_2$, $HfMo_2$ and HfW_2, prepared from high-purity iodide-grade Hf investigated by powder diffraction techniques. HfV_2, $HfCo_2$, $HfMo_2$ and HfW_2 are isomorphous with the $MgCu_2$ type of structure; $HfMn_2$, the $MgZn_2$ type of structure; and $HfFe_2$, the $MgNi_2$ type of structure. 13 ref. (M26q; Hf)

7-M. Constitution of the Partial System: Uranium Monocarbide-Uranium Dicarbide. W. Chubb and W. M. Phillips. American Society for Metals, Transactions, v. 53, 1961, p. 465-476.

A miscibility gap exists between UC, having the NaCl-type crystal structure and the high-temperature allotrope of UC_2, having the CaF_2-type structure. Evidence for immiscibility of these structures at 2200° C. is presented.

The additional reactions demanded by such a miscibility gap are described. 13 ref. (M24b; U-b, C)

8-M. Factors Controlling the Occurrence of Laves Phases and AB_5 Compounds Among Transition Elements. A. E. Dwight. American Society for Metals, Transactions, Preprint no. 211, v. 53, 1961, p. 477-499.

Study of the $MgCu_2$, $MgZn_2$, $MgNi_2$, $CaCu_5$ and UNi_5 types. The interrelation of crystal structures is shown for the five families. Laves phases may form in the range of Goldschmidt radius ratios from 1.05-1.68 while the radius ratio has little influence on the structure type. 23 ref. (M26q; Mg-b, Zn, Cu, Ni)

9-M. The Solid-State Constitution of High-Uranium Alloys of the Uranium-Zirconium-Silicon System. M. S. Farkas, A. A. Bauer and R. F. Dickerson. American Society for Metals, Transactions, Preprint no. 213, v. 53, 1961, p. 511-521.

Thermal analysis, metallography and X-ray diffraction were used to construct isothermal ternary sections at temperatures from 550-950° C. No new ternary phase was encountered; however, extensive solution of Zr in U_3Si_2 gives $(U, Zr)_3Si_2$. Otherwise the solubility of Zr in uranium-silicon alloys is less than 2 at.%. 5 ref. (M24c; U-b, Zr, Si)

10-M. The Microstructure of Low-Carbon 3.25% Silicon Steel. W. C. Leslie, R. L. Rickett, C. P. Stroble and G. Konoval. American Society for Metals, Transactions, Preprint no. 226, v. 53, 1961, p. 715-734.

Results indicate that the microstructures are profoundly influenced by carbon content, even within the very limited range encountered in such steels and by the temperature to which the steel is heated. Massive grain boundary carbides and the carbide in pearlite in these steels are cementite, Fe_3C. At least one unidentified metastable carbide and perhaps two have been observed to precipitate from supersaturated Si ferrite at temperatures of 1100° F. and below. 8 ref. (M27; CN-g, Si)

11-M. Cylindrical Textures in Tungsten and Other Body Centered Cubic Metals. S. Leber. American Society for Metals, Transactions, Preprint no. 225, v. 53, 1961, p. 697-713.

X-ray diffraction patterns show evidence that cylindrical textures are normally formed during the fabrication of wires from body centered cubic metals. Studies show that the cylindrical texture is an intermediate structure which is converted into a normal fiber texture by extensive deformation. 13 ref. (M26c, 3-68; W, 4-61)

12-M. A Study of the Liquidus in Aluminum-Uranium Alloys. Victor W. Storhok, Arthur A. Bauer and Ronald F. Dickerson. American Society for Metals, Transactions, Preprint no. 235, v. 53, 1960, p. 837-842.

Liquidus temperatures in the Al-U system have been redetermined for alloys containing 13-50 wt.% uranium. Thermal analysis, electrical-resistance measurements and metallography were employed. Effects of ternary additions of up to 1 wt.% Si and up to 0.5 wt.% Mg. (M24b; Al-b, U)

13-M. (German.) Contribution to the Phase Relations in the System Fe-Ti-O at 1000° C. N. G. Schmahl, B. Frisch and E. Hargarter. Zeitschrift fur Anorganische und Allgemeine Chemie, v. 305, Aug. 1960, p. 40-54.

Measurement of concentration of gas mixtures in equilibrium with Fe_2O_3-TiO_2 mixtures at 1000° C. Isothermal decomposition curves are used for investigation of phase relations in the ternary system Fe-Ti-O. (M24c, N8g, 2-61; Fe-b, Ti, O)

14-M. (German.) Crystal Dislocations and Growth of Etching Pits. Walter Riessler. Zeitschrift fur Angewandte Physik, v. 12, Oct. 1960, p. 433-442.

Microscopic and electron microscopic investigation of Ge after etching with five different etching solutions. Geometry of etching figures. 24 ref. (M26b, M20q; Ge)

15-M. (French.) Diffraction and Electron Microscope Study of Nickel Electrolytically Charged With Hydrogen. A. Janko and P. Michel. Comptes Rendus, v. 251, Aug. 22, 1960, p. 1001-1003.

Existence of f-c-c. Ni-H phases with lattice parameters of 3.70 and 3.83 Å is confirmed by electron diffraction of thin polycrystalline sheets and isolated monocrystals. 4 ref. (M22g, M21e, M26; Ni, H, 4-53, 14-61)

16-M. Quantitative Phase Analysis in Titanium by X-Ray Diffraction. Ralph H. Hiltz, Jr., and Stanley L. Lopata. Paper from "Advances in X-Ray Analysis", v. 1. Plenum Press, Inc., New York, N. Y., 1960, p. 39-57.

Integrated X-ray intensities, with calculated Power Formula variables, determining alpha and beta peaks as constants, are used for phase analysis of a number of Ti alloys. Compensations made for errors in the method arising from Ti crystal structure, texture and peak overlapping. Comparison with results of metallographic analysis. (M22g, 3-71; Ti-b)

17-M. Amorphous Solids, Small Particles and Thin Surface Films. F. Schossberger. Paper from "Advances in X-Ray Analysis", v. 1. Plenum Press, Inc., New York, N. Y., 1960, p. 73-99.

X-ray and electron diffraction effects of metals, alloys and organic and inorganic compounds as influenced by chemical composition, crystal and microstructure and method of preparation. Determination of surface reactions in cold rolled and annealed steel. 20 ref. (M22)

18-M. Electrolytic Isolation and the X-Ray Study of Micro-Constituents in Steel. Kenneth W. Andrews and Hugh Hughes. Paper from "Advances in X-Ray Analysis", v. 1. Plenum Press, Inc., New York, N. Y., 1960, p. 101-127.

Separation and identification of carbides, nitrides and intermetallic compounds in alloy, carbon and stainless steels. Examination of particle size, shape and crystal structure: relation, with solid solution hardening, to mechanical and physical properties. 22 ref. (M22g, M26q, N8r, Q-general, S11f; ST)

19-M. Early Aging Effects in Copper-1.76% Beryllium Single Crystals. Doris Evans. Paper from "Advances in X-Ray Analysis", v. 1. Plenum Press, Inc., New York, N. Y., 1960, p. 143-162.

X-ray and optical micrographic and X-ray diffraction examination of age-hardening mechanisms in specimens aged 6-27 hr. at 200° C. Earliest stages of aging show distortion and fragmentation of the matrix lattice and evidence of order-disorder transformation. Data given for reflection curves and mechanical properties. 7 ref. (M21, M22g, N7a, N10, Q-general; Cu-b, Be)

20-M. A Counting Method for Measuring Single Crystal Diffraction Intensities Using a Weissenberg Camera. David T. Peterson and C. L. Vold. Paper from "Advances in X-Ray Analysis", v. 1. Plenum Press, Inc., New York, N. Y., 1960, p. 181-192.

The oscillating crystal method is used with a modified G-M counting attachment to measure integrated diffraction intensities of single crystal structures at greater speed and accuracy than by photographic means. Comparisons are made using reflections from an ideally shaped crystal of Ni dimethylglyoxime and parameterless structures such as Na-Cl. Application to Al, Zn, Zr and Hf single crystals. 12 ref. (M22g; 14-61)

21-M. Recent Applications With the X-Ray Microscope. Selby E. Summers. Paper from "Advances in X-ray Analysis", v. 1. Plenum Press, Inc. New York, N. Y., 1960, p. 483-494.

X-ray microscopy and X-ray micrography examination of various alloys, elements and organic compounds showing the advantages of the X-ray microscope for revealing structure, composition and physical properties. (M21f)

22-M. (German.) Phase Diagram of the Zirconium-Rhenium System. E. M. Savickij, M. A. Tylkina and I. A. Cyganova. Kernenergie, v. 3, July 1960, p. 641-644.

Investigation of phase equilibria over the entire concentration range by measurements of melting and transition temperatures up to 2500° C. and by microscopic, X-ray (unfiltered Cr radiation)and microhardness techniques. 8 ref. (M24b, N-general, M22, M23; Zr-b, Re)

23-M. (German.) Phase Diagram of the Columbium-Rhenium System. E. M. Savickij, M. A. Tylkina and K. B. Pavarova. Kernenergie, v. 3, July 1960, p. 667-670.

Hydrogen reduced Re (99.8%) powder and forged sintered Cb are alloyed by melting. Identification of solid phases by microscopic, X-ray and microhardness investigations. 6 ref. (M24b; Cb-b, Re)

24-M. (German.) Contribution to the Ternary System Titanium-Molybdenum-Boron. A. Wittmann, H. Nowotny and H. Boller. Monatshefte fur Chemie, v. 91, no. 4, 1960, p. 608-615.

Pressed specimens are heated on a corundum support in a quartz crucible under purified argon in a high-frequency furnace and are subsequently recrystallized in vacuum at 1200° C. Phase identification by X-ray powder method. (M24c; Ti-b, Mo, B)

25-M. (German.) Small Angle Grain Boundaries Inhibit Movement of "Bloch" Walls in Silicon Iron. Wolfgang Stephan. Zeitschrift fur Angewandte Physik, v. 12, Sept. 1960, p. 398-400.

Electrolytic etching with chromic-phosphoric acid and microscopic investigation of microstructure of 4% silicon iron. Shifting of "Bloch" walls by magnetic fields. (M27f, M27g, L13q; Fe-b, Si)

26-M. (English.) The Structure of Electrodeposited Chromium. Masahisa Matsunaga. Institute of Physical and Chemical Research (Japan), Scientific Papers, v. 54, June 1960, p. 177-183.

Cr is deposited on a surface by chromic acid baths at temperatures from 20-70° C. at varying current densities. Tests are conducted to determine crystal orientation, surface roughness, hardness and degree of specular gloss. (M26c, Q29; Cr, 8-62)

27-M. Impurity Trapped Interstitials and the Low Temperature Annealing Stages of Irradiated Copper. Ryukiti R. Hasiguti. Physical Society of Japan, Journal, v. 15, Oct. 1960, p. 1807-1814.

Interaction energies of close impurity-atom-interstitial pairs are evaluated by semi-empirical method. Results are used to interpret the annealing temperature stages of irradiated Cu. 17 ref. (M26s, J23, 3-71; Cu)

28-M. Structure Analysis of $AuCu_3$ by Means of a Fourier Transformation of X-Ray Diffuse Scatterings. Kenji Doi. Physical Society of Japan, Journal, v. 15, Oct. 1960, p. 1815-1822.

Method of analyzing two-dimensional disordered structure. Statistical parameters describing the atomic composition of each atomic site and unit cell compositions. 10 ref. (M25, M22g, N10; Cu-b, Au)

29-M. (German.) The Ternary Phase in the Copper-Aluminum-Zinc System. Pt. 1. Decomposition of the T-Phase Between 200-300° C. H. H. Arndt and K. Moeller. Zeitschrift fur Metallkunde, v. 51, Oct. 1960, p. 596-600.

X-ray investigation of ternary Cu-Al-Zn and Cu-Al-Ni alloys at 200-700° C. by a Berthold counting tube goniometer with vacuum heating device. Effect of pressure and radiation on phase transitions. (M24c, N-general, 2-61, 2-67, 3-74, M22g; Al-b, Cu-b, Ni-b, Zn-b)

30-M. (German.) Change of Orientation of Single Crystallites in Polycrystalline Samples of Aluminum and Copper in Uniaxial Tensile Deformation. Randolf J. Hartmann and Eckard Macherauch. Zeitschrift fur Metallkunde, v. 51, Oct. 1960, p. 560-566.

Crystal orientation and slip deformation mechanism of tensile deformed Al and Cu specimens investigated by X-ray back reflection. Influence of uniaxial stress on orientation change. (M26c, Q24a, 3-66; Al, Cu, 14-61)

31-M. The Metallic State. A. H. Cottrell. Contemporary Physics, v. 1, Aug. 1960, p. 417-432.

Theoretical and practical implications of the existence of free electrons in metals. Importance of the free electron bond for the crystal structures, cohesive properties and alloy behavior of metals. Principles underlying the engineering strength properties of matter and the design of creep resistant alloys are discussed in terms of free electrons and dislocations in solids. 15 ref. (M25h, M26)

32-M. Etch Figures on Cleavage Plane of Bismuth. N. S. Pandya and V. P. Bhatt. Journal of Scientific and Industrial Research, v. 19B, Sept. 1960, p. 363-364.

Bi single crystals, grown from the melt by Bridgmann's method and chemically polished, exhibit at some places characteristic triangular patterns consisting of edges made up of broken triangles. Specimen on subsequent etching in 5% aqueous solution of silver nitrate shows triangular etch pits with random distribution. (M26b, M20q; Bi, 14-61)

33-M. (Russian.) Effect of Heat Treatment on Anodic Dissolution of Ballbearing Steel. A. M. Samarin, V. A. Mehedlishvili and G. A. Lyubimova. Zavodskaya Laboratoriya, v. 26, Sept. 1960, p. 1052-1055.

Anodic dissolution and electrolytic isolation of oxide inclusions in heat treated steel. Annealing at 600-800° C. prior to electrolysis produces an anodic precipitate of higher purity. 12 ref. (M20, S11f, 2-64, 9-69; ST, SGA-c)

34-M. (Russian.) Separation of Carbide Phases From Carbon Steel. A. I. Gardin. Zavodskaya Laboratoriya, v. 26, Sept. 1960, p. 1088-1090.

Carbide phases in steel are electrolytically isolated at 20 and -8° C. using 5% solution of chlorous iron in methyl alcohol and 2% citric acid. Structure of phases formed during isothermic heat treatment of steel at 350° C. is determined by electron diffraction. (M20, M22g, M27, S11f, 9-69; CN)

35-M. (Russian.) Metallographic Investigation of Molybdenum Structure. S. B. Maslenkov and Yu. I. Demkin. Zavodskaya Laboratoriya, v. 26, Sept. 1960, p. 1093.

Mo castings, forgings and sintered powders are examined after mechanical polishing, electropolishing in H_2SO_4 and CH_3OH solution and etching in KOH and $K_3Fe(CN)_2$. (M-general, L10, L13p, M20q; Mo)

36-M. The Metallurgy of Chromium Nickel Austenitic Steel Welding. J. J. Ferris. Welding Fabrication and Design, v. 4, Oct. 1960, p. 9-17.

Mechanical properties, microstructure and Shaeffler phase diagram of 18-8 stainless steel weldments. Causes and mechanisms of joint, weld or base metal cracking, sigma and ferrite phase formation, intergranular corrosion, stress corrosion cracking, weld decay and low temperature brittleness. Use of various welding processes and choice of filler metals. 28 ref. (M24, M27, K-general, Q-general, R-general; SS-e, 7-51)

37-M. A Simplified Procedure for Calculating Peak Position in X-Ray Residual Stress Measurements on Hardened Steel. D. P. Koistienen, R. E. Marburger and R. P. Mitchell. Paper from "Advances in X-Ray Analysis", v. 1. Plenum Press, Inc., New York, 1960, p. 37.

A correction procedure using a multiplicative correction to peak intensity which includes all significant geometrical and absorption factors, the line position being determined as the axis of a parabola fitted to the data. Application to fast determination of residual stresses in hardened carbon steel. (M22g, Q25; CN)

38-M. Sigma Phase in Austenitic Stainless Steels. R. F. Hills and D. R. Harries. Chemical and Process Engineering, v. 41, Sept. 1960, p. 391-396.

Formation of sigma phase and its effect on mechanical properties. 41 ref. (M24, Q-general; SS-e)

39-M. Dislocations in Alpha-Iron. D. G. Brandon and J. Nutting. Iron and Steel Institute, Journal, v. 196, pt. 2, Oct. 1960, p. 160-166.

Electron microscope transmission examination of dislocation distribution in pure alpha iron after different degrees of plastic deformation. Formation of irregular sub-boundary networks. 19 ref. (M26b, M27f, 3-68; Fe-a)

40-M. (French.) Nondestructive Metallography of Light and Ultra-Light Materials (Aluminum, Magnesium, Beryllium and Their Alloys). Pierre A. Jacquet. Revue de l'Aluminium, v. 37, July-Aug. 1960, p. 835-842.

Ellopol technique (electrolytic buffer method) of surface preparation. Use of a group of patented electrolytes and their suitability for specific materials. Use of replicas. 3 ref. (M20; EG-a39, Al-b, Be-b, Mg-b)

41-M. Structure of Carburized and Carbonitrided Cases. S. R. Rouze and W. L. Grube. Metal Progress, v. 78, Dec. 1960, p. 86-90.

Extensive studies of case hardened steels with the electron microscope have revealed three types of surface conditions--normal, overcarburized and decarburized. (M27, J28g, J28m; AY)

42-M. Substructure Characteristics of Fine-Grained Metals and Alloys Disclosed by X-Ray Microscopy and Diffraction Analysis. Pt. 2. Description of X-Ray Double-Crystal Diffractometer Combining X-Ray Microscopy and Diffraction Analysis. Sigmund Weissman and Kenneth A. Turner, Jr. Paper from "Advances in X-Ray Analysis", v. 2. Plenum Press, Inc., New York, 1960, p. 37-44.

10 ref. (M21, M22g, M26, 1-52)

43-M. Substructure Characteristics of Fine-Grained Metals and Alloys Disclosed by X-Ray Microscopy and Diffraction Analysis. Pt. 1. Description and Application of Diffraction Method. Sigmund Weissmann. Paper from "Advances in X-Ray Analysis", v. 2. Plenum Press, Inc., New York, 1960, p. 23-37.

An X-ray analysis method which combines optical microscopy with X-ray microscopy and diffraction to correlate the topographical relationship of the grains of a fine-grained material and the fine-structural details of their surface texture. The individual grains can then be analyzed for modifications of subgrain and lattice structures resulting from chemical or physical changes. (M21, M22g, M26c, 2-64, 3-68)

44-M. X-Ray Projection Microradiography and Divergent Beam Techniques. F. W. Von Batchelder. Paper from "Advances in X-Ray Analysis", v. 2. Plenum Press, Inc., New York, 1960, p. 283-291.

Structural examination of thin polycrystalline sections of ferrous and nonferrous alloys, including toolsteel, malleable cast iron, bronze, brass and Monel by microradiography using an X-ray microfocus unit. Divergent beam analysis of Ge and Li-F single crystals after quenching. 11 ref. (M23n, M27; CI-s, Cu-n, Cu-s, Ni-b, TS)

45-M. X-Ray Methods for Detection of Lattice Imperfections in Crystals. Volkmar Gerold. Paper from "Advances in X-Ray Analysis", v. 3. Plenum Press, Inc., New York, 1960, p. 289-313.

X-ray diffraction analysis of single crystals of supersaturated solid solutions precipitated in Al-Cu, Al-Ag and Al-Mg-Zn alloys, showing the effects of atomic distribution and lattice distortion on clustering. X-ray microradiographic analysis of Ge crystals making use of absorption coefficient to determine dislocations. 22 ref. (M22g, M26s; Al-b, Ag, Cu, Mg, Zn, 14-61)

46-M. An Investigation of the Manufacture of Germanium Single-Crystal Ingots by the Levelling Process. N. G. Anderson and D. Gray. Institution of Electrical Engineers, Proceedings, Pt. B, Supplement, v. 106, May 1960, p. 871-878.

Theoretical examination of factors influencing crystal perfection and resistivity spread of ingots made by zone levelling, with attention to design of levelling equipment and selection of process variables. Results indicate that a low thermal gradient at the growing solid-liquid interface and high growth velocity are desirable for high crystal quality. However, a low thermal gradient adversely affects the cross sectional resistivity variations. 21 ref. (M26, 2-61; Ge, 5-59)

47-M. The State of Etched Semiconductor Surfaces as Revealed by Electron Diffraction. P. J. Holmes and R. C. Newman. Institution of Electrical Engineers, Proceedings, Pt. B, Supplement, v. 106, May 1960, p. 287-292.

Oxide layer on Ge and Si surfaces etched with mixtures containing hydrofluoric and nitric acid. Effect of metal ion concentration on deposit formation. 24 ref. (M20q, M22h; Ge, Si)

48-M. Whisker Research. Irwin Stambler. Space/Aeronautics, v. 34, Nov. 1960, p. 48-52.

Relationship between crystal dislocation and mechanical strength in NaCl and SiC whiskers. 3 ref. (M26b, Q27a; 14-61)

49-M. On the Mechanism of Chemically Etching Germanium and Silicon. D. R. Turner. Electrochemical Society, Journal, v. 107, Oct. 1960, p. 810-816.

Electrode potentials of Ge and Si in chemical etching solutions as functions of solution pH, etching rate, physical surface condition, conductivity type and resistivity. The process is electrochemical, with holes being injected at cathode sites and partially consumed at anode sites. 24 ref. (M20q; Ge, Si)

50-M. (English.) Energy Bands in Partially Disordered Binary Alloys. A. Corciovei and D. Grecu. Revue de Physique (Academie de la Republique Populaire Roumaine), v. 5, Feb. 1960, p. 157-167.

Variation of the forbidden energy bands with the far-range order parameter of binary alloys. Electron energy in the vicinity of forbidden bands as a function of the propagation vector. 11 ref. (M26)

51-M. The Effects of Alloying Elements in Titanium. v. A. Constitution. D. J. Maykuth, H. R. Ogden and R. I. Jaffee.

Defense Metals Information Center, Battelle Memorial Institute, DMIC Rept. 136A, Sept. 15, 1960, 232 p. (Available as PB 151094 from U. S. Office of Technical Services, Washington 25, D. C.)

Constitution and structure of binary and ternary Ti alloys are determined from solid-solubility and alloy-constitution data and phase diagrams. 223 ref. (M24b, M24c, M26; Ti-b)

52-M. (Polish.) The Use of Chromium Replicas in Electron Microscopy. J. Bryniarska. Prace Instytutow Hutniczych, v. 12, Apr. 1960, p. 359-214.

Replicas prepared by evaporation deposition of Cr layer over zapon varnish negatives, with subsequent dissolving of the varnish print. Simplicity of preparation and applications, possibility of using larger surfaces and better quality are attributed to the process. (M20r; Cr, 17-57)

53-M. (Russian.) Study of Bi-Se Constitutional Diagram. N. Kh. Abrikosov, V. F. Bankina and K. F. Kharitonovich. Zhurnal Neorganicheskoi Khimii, v. 5, Sept. 1960, p. 2011-2016.

Microstructure and thermal and electric properties of Bi-Se systems containing 0-37% Se. Composition of a new Bi_2Se compound formed by peritectic reaction at 468° C. 9 ref. (M24b, M27, P11, Q21; Bi-b, Se-b)

54-M. (Russian.) Boron-Silicon-Carbon Alloy Systems. K. I. Portnoi, G. V. Samsonov and L. A. Solonnikova. Zhurnal Neorganicheskoi Khimii, v. 5, Sept. 1960, p. 2033-2041.

X-ray and chemical analysis of B_4C-Si and SiC-B semiconductor-type alloys. Samples after hot pressing and sintering at 1700-2300° C. Data for melting points, electrical resistivity and heat and acid corrosion resistance. 25 ref. (M24c, S11p, P15g, R-general; B-b, Si-b, C-b, EG-j)

55-M. (Russian.) Investigation of Titanium-Chromium-Boron System. Zhurnal Neorganicheskoi Khimii, v. 5, Sept. 1960, p. 2025-2031.

Metallographic and thermal analysis of Cr-Ti_2B and Cr-TiB_2 samples with varying Cr content, produced by melting in a BeO_2 crucible in He atmosphere. Microhardness, heat resistance (at 1200° C.) and solubility of TiB_2 and Ti_2B in Cr. Constitutional diagrams. 11 ref. (M23r, Q29q, P12e, M24c; Ti-b, Cr-b, B)

56-M. (Japanese.) Shapes of Aluminum Nitrides in Steel. Shigeo Hasebe and Mutsuo Yonajzawa. Sumitomo Metals, v. 12, Apr. 1960, p. 387-399.

Electron micrographs and diffraction studies of Al-N precipitates in low carbon Al-killed steel containing 0.20% C, 0.30% Si, 1.35% Mn, 0.12% Al and 0.006-0.41% N after normalizing and solution treatment. Crystal structures and dispersion are shown by C and Cr replica technique. 12 ref. (M20, M26, 2-64; ST-c, 14-68, Al, N)

57-M. X-Ray Measurement of Intragranular Misorientation in Metals. Technical News, U. S. Department of Commerce, National Bureau of Standards, STR-2526, Nov. 1960, 6 p.

Polycrystalline brass is plastically strained to achieve a deformation (bending and tilting) of the atomic lattice known as intragranular misorientation. Deformation is measured by an X-ray diffraction process to determine metal fatigue and mechanical properties. (M26c, M22g, Q-general, 3-68; Cu-n)

58-M. (Italian.) Texture of Rolled Zn. P. Gondi. Metallurgia Italiana, v. 52, Sept. 1960, p. 601-606.

Electrolytic Zn of 99.99% purity is cast into samples of 2 cm. thickness, held at 250° C. for 24 hr., hot rolled to 1.5 mm. thickness and cold rolled in several passes to 0.6 mm. Effect of the number of roll passes on crystal orientation, microstructure and mechanical properties. Effect of transverse rolling. 20 ref. (M26c, M27, Q-general, 3-68; Zn)

59-M. (French.) Pearlitic String in Black-Heart Malleable Iron. Fonderie, Aug. 1960, p. 343-345.

Presence of a string of pearlite in the as-cast structure is attributed to surface oxidation during pouring and undercooling at periphery of casting. Use of annealing as a corrective measure for this condition. (M27, N8h, 2-64; CI-s)

60-M. (Russian.) Characteristics of the Mosaic Structure of Germanium and Silicon Monocrystals. O. V. Bogorodsky, Ya. S. Umanskii and S. Sh. Shilsmtein. Doklady

Akademii Nauk SSSR, v. 134, Jan. 1960, p. 114-116.

X-ray analysis of Ge and Si with 10^2-$10^6 cm^{-2}$ and 10^2-$10^3 cm^{-2}$ dislocation density. Study method based on curves showing dependence of the X-ray diffraction upon the deflection angle of the sample during rotation. Relationship between the atomic blocks boundary and dislocations are studied. 5 ref. (M26, M22g; Ge, Si, 14-61)

61-M. (Japanese.) Behavior of Residual Beta Phase and Recrystallized Grain Size in 65/25 Brass Billets. Shigeo Muromachi and Shigenoni Hori. Japan Institute of Metals, Journal, v. 24, Aug. 1960, p. 506-510.

Relation between elimination of beta phase by soaking or annealing and obtaining optimum recrystallized grain size in billets of cast brass prior to rolling. Data are given for hardness and microstructure of chill, continuous and bran cast specimens after heat treatment at 450-680° C. 7 ref. (M26q, M27, N5, Q29n, 2-64; Cu-n)

62-M. (Japanese.) Electron-Microscopic Observations of Chemically Etched Surfaces of Polycrystalline Zirconium. Tetsuhiko Tomiki and Shiro Ogawa. Japan Institute of Metals, Journal, v. 24, Aug. 1960, p. 522-526.

Etch pit formation and coalescence as a function of etching time and reagent concentration studied on Zr specimens treated with Hf, H_2SO_4 and Gulbransen's reagent. 7 ref. (M20q; Zr)

63-M. (Japanese.) Constant Permeability Alloys. Pt. 2. Equilibrium Diagram of the Fe-Ni-Si System and the Ternary Sigma Phase Compound Appearing in the System. Shuzo Takedo, Yoshiroh Iwama and Akira Sakakura. Japan Institute of Metals, Journal, v. 24, Aug. 1960, p. 534-538.

Microscopic and dilatometric examination and magnetic measurements of solid phase reactions in Fe-rich alloys of the Fe-Ni-Si system at temperatures to 1000° C. The sigma phase is found to be ferromagnetic and formed by the peritectoid reaction alpha plus gamma to sigma after solidifying through the eutectic reaction melt to gamma plus alpha. 7 ref. (M24c, M26q)

64-M. (Japanese.) Constant Permeability Alloys. Pt. 3. Crystal Structure of a Ternary Sigma Phase Compound Appearing in "Senperm" Alloys. Yoshiroh Iwama and Shuzo Takeda. Japan Institute of Metals, Journal, v. 24, Aug. 1960, p. 538-540.

X-ray diffraction and pycnometer examination of the ferromagnetic compound $Fe_{11}NiSi_4$ precipitating after 600-800° annealing. Data are given for crystal structure, lattice parameter, density and unit volume. 4 ref. (M26q, M22q, P10a, 2-64; Fe-b, Ni, Si, SGA-n)

65-M. (Book.) Advances in X-Ray Analysis. William M. Mueller, Editor. 494 p. 1960. Plenum Press, Inc., New York, N. Y.

Proceedings of the 6th annual conference on industrial applications of X-ray analysis held at Denver, Aug. 7-9, 1957. Topics include X-ray diffraction, fluorescence, microscopy and absorption analysis of metals and alloys. Papers are abstracted separately. (M22, M26, S11p)

66-M. (Translation-ConBur.) Properties of Alloys of the Nickel-Chromium-Tungsten Ternary System. P. B. Budberg and K. I. Shakhova. Russian Journal of Inorganic Chemistry, v. 5, Feb. 1960, p. 198-201.

Measurement of electrical resistivity, hardness and hot hardness of 32 alloys with constant tungsten contents of 5, 10, 20 and 30% along sections parallel to the Ni-Cr side of the diagram. Electrical resistivity increases with increasing Cr content; hardness and hot hardness increase more with tungsten than with Cr. (M24c, Q29, P15g, 2-60; Ni-b, Cr-b, W-b)

67-M. (Translation-CHP.) The Antimony-Iron-Sulphur Ternary System. A Contribution to the Theory of Precipitation Smelting of Antimony. G. G. Urazov, K. A. Bol'shakov, P. I. Fedorov and I. I. Vasilevskaya. Russian Journal of Inorganic Chemistry, v. 5, Feb. 1960, p. 214-218.

Thermal analysis and microstructure of eight sections in the trapezoidal portion of the Sb-Fe-S system (bounded by the stable section Sb_2S_3-FeS), in which the basic reaction of the precipitation smelting of Sb takes place. Boundaries of the region of layer formation are used for a projection of the liquidus surface. (M24c, C27; Sb-b, Fe, S)

68-M. (Translation-ConBur.) The Phase Composition of Alloys of the System Cobalt-Boron. P. Kolomytsev and N. Zhukovskii. Academy of Sciences of the USSR, Proceedings, v. 124, Jan-Feb. 1959, p. 151-154.

Crystals of CoB, Co_2B and Co_3B are prepared and studied by X-ray and microphotographic methods to determine phase composition, microhardness and lattice structure. (M24b; Co-b, B)

69-M. (Translation-ChemSoc.) Stability of the Beta Phase in Titanium-Vanadium-Molybdenum Alloys. N. V. Ageev and Z. M. Rugachevskaya. Russian Journal of Inorganic Chemistry, v. 5, Mar. 1960, p. 298-300.

Ti-V-Mo alloys prepared by arc fusion are quenched from 900° C. and studied by metallographic and X-ray structure analysis to determine effect of compostion on the stability of the metastable beta phase. (M24c, M26, M22g, 2-60, 2-61; Ti-b, V-b, Mo-b)

70-M. (Translation-ChemSoc.) Stability of the Beta Phase in Titanium-Vanadium Alloys. N. V. Ageev and L. A. Petrova. Russian Journal of Inorganic Chemistry, v. 5, March 1960, p. 295-298.

A study of the stability of the metastable beta phase in Ti-V alloys between -196 to 500° C. The stability of the beta solid solution of the alloys increases with increased V content and this increase is greatest at 200-400° C. with V content of 34.27 and 38.79 wt.%. 7 ref. (M24b, M26, M22g, 2-61; Ti-b, V-b)

71-M. (Translation-ChemSoc.) Physicochemical Behavior of Manganese With Niobium. E. M. Savitskii and Ch. V. Kopetskii, Russian Journal of Inorganic Chemistry, v. 5, Mar. 1960, p. 363-364.

Phase diagram for the Mn-Cb system up to 30 weight % Cb. The intermetallic compound Mn_2Cb is prepared in beryllia crucibles under He in an induction furnace and studied by microstructural, X-ray and thermal analyses. Data for hardness and microhardness. 4 ref. (M24b, S11p, M23r, Q29; Mn-b, Cb)

72-M. (Translation-ChemSoc.) Phase Diagram for Alloys in the Chromium-Lanthanum System. E. M. Savitskii, V. F. Terekhove and A. V. Kholopov. Russian Journal of Inorganic Chemistry, v. 5, Mar. 1960, p. 362-363.

Phase diagram for Cr alloys containing up to 30 weight % La prepared from 99.5% Cr and 99% La metal in an arc furnace under He. Effect of annealing for 100 hr. at 1200° C. on grain growth in the Cr. Microstructure examination to show evidence of immiscibility in both liquid and solid states. 4 ref. (M24b, N3, M27, 2-64; Cr-b, La)

73-M. (Translation-ChemSoc.) Phase Diagram and Properties of Alloys of the Titanium-Neodymium System. E. M. Savitakii and G. S. Burkhanov. Russian Journal of Inorganic Chemistry, v. 5, Mar. 1960, p. 361-362.

Peritectoid phase diagrams are constructed for Ti-Nd alloys. Effect of temperature on the solubility of Nd in alpha-Ti and of Nd concentrations on the hardness and strength of Ti. 9 ref. (M24b, P12e, Q27a, Q29n, 2-60, 2-61; Ti-b, Nd)

74-M. (Translation-ChemSoc.) The Ternary Bismuth-Iron-Sulphur System (a Contribution to the Theory of Precipitation Smelting of Bismuth). G. G. Urazov, K. A. Bolshakov, P. I. Fedorov and I. I. Vasilevskaya. Russian Journal of Inorganic Chemistry, v. 5, Mar. 1960, p. 303-307.

Thermal and microstructural analysis are used to investigate the Bi-S system and five sections of the ternary Bi-Fe-S system and to determine the boundaries of the region of layer formation. Fusion diagram are constructed for that part of the ternary system in which the precipitation smelting of Bi occurs. 7 ref. (M24c, M23r, D-general, Bi-b, Fe-b, S)

75-M. (Translation-ChemSoc.) Phase Diagram of the Titanium-Tin System. I. I. Kornicon and T. T. Nartova. Russian Journal of Inorganic Chemistry, v. 5, Mar. 1960, p. 300-303.

Alloys in the binary Ti-Sn system up to Ti_3Sn are studied by microstructure, hardness and electrical resistivity measurements. Differential thermal analysis performed at 20-1100° C. A minimum in the phase diagram is observed at 860° C. and a peritectoid reaction at 890° C. 11 ref. (M24b; Sn-b, Ti-b)

76-M. (French.) Nondestructive Metallography of Al, Mg, Be and Their Alloys. Conclusion. Pierre A. Jacquet. Revue de l'Aluminum, v. 37, Sept. 1960, p. 977-987.

Local electrolytic polishing and etching of semiproducts using a plug of cotton or fabric containing the electrolyte, a current being passed through the semiproduct and the electrolyte during application. 11 ref. (M20p; Al-b, Be-b, Mg-b)

77-M. Fusion-Zone Structures and Properties in Aluminum Alloys. Paul E. Brown and C. M. Adams, Jr. Welding Journal, v. 39, Dec. 1960, p. 520-s to 524-s.

Microstructural details of 2014 Al alloy arc deposits are quantitatively related to solidification rate as determined by arc energy input. Data for mechanical properties before and after heat treatment and influence of energy input on dendrite spacings. 11 ref. (M27, Q-general; Al-b, 7-51)

78-M. Microstructures and Notes on Carbon Steels to B. S. 3100: 1957: 592 Grade C. J. Turton and B. H. C. Waters. British Foundryman, v. 53, pt. 2, Nov. 1960, p. 480-482.

All microstructures are satisfactorily clean and exhibit type III inclusions, consisting mainly of manganese sulphides, duplex sulphides and silicates. Typical microstructures are shown for a 0.33% carbon, etched in 2% nital in various states of heat treatment. (M27; CN, 9-68)

79-M. Zirconium-Dysprosium Equilibrium Diagram. J. Croeni, C. E. Armantrout and H. Cato. U. S. Bureau of Mines, Report of Investigations 5688, 1960, 12 p.

Melting point, thermal analysis, resistivity, X-ray and metallographic investigation. Results indicate a single eutectic system with a peritectoid reaction occurring at 890° C. The eutectic isotherm extends from 30-95% dysprosium at 1280° C. (M24b; Zr-b, Dy)

80-M. (Japanese.) Properties of Cons-el Arc Melted Bearing Steel. Pt. 1. Zenichiro Takao, Mamoru Nishihara and Yoshiro Yagi. Tetsu-to-Hagane (Iron and Steel Institute of Japan, Journal), v. 46, Nov. 1960, p. 1543-1549.

Macrostructure, microstructure, hardness, compressive breaking strength, surface defects and impurity content of Cons-el Arc melted (vacuum arc melted) steels are compared to properties of air-melted steels after various heat treatments. 8 ref. (M-general, Q-general, 2-64, D8m; AY, SGA-c)

81-M. (German.) Ternary Phase in the Cu-Al-Zn System. Heinz Herbert Arndt and Kurt Moeller. Zeitschrift fur Metallkunde, v. 51, Nov. 1960, p. 656-662.

Constitution diagrams showing the distribution of ternary, gamma, delta, epsilon, zeta, theta and eta phases at 550-740° C. are constructed from results found by X-ray diffraction. 13 ref. (M24c, M22g; Al-b, Cu-b, Zn-b)

82-M. C-Au-C and C-Pt Pd-C Extraction Replicas for Electron Microscope Analysis. Ivan Hrivnak. Metal Treatment and Drop Forging, v. 27, Nov. 1960, p. 445-448.

Method of preparing extraction replicas for electron microscopy and electron diffraction analysis. Possibility of obtaining unlimited contrast with these replicas enables full power of resolution of the microscope to be utilized. (M20r)

83-M. On the Structure of Deformed F. C. C. Metal Single Crystals. Alfred Seeger and Siegfried Mader. Indian Institute of Metals, Transactions, v. 13, Sept. 1960, p. 249-264.

Structural changes during tensile deformation in terms of the arrangement of and the interaction between dislocations. A close correlation exists between the mechanism of work hardening and the nature of the dislocated structure of the crystal. 27 ref. (M26s, Q24; 14-61)

84-M. (Russian.) Structure of Pulverized Lead. A. I. Smolyaninov. Tsvetnye Metally, Sept. 1960, p. 46-48.

Determination of crystal structure and oxidation resistance of Pb coatings obtained by electrometallizing of Pb powder. Use of pulverized Pb coatings for friction resistant machine parts. (M26, R1h, L29; Pb, 6)

85-M. The Lattice Spacing Relationships in Close-Packed Alpha and Zeta Phases Based on Gold. T. B. Massalski and H. W. King. Acta Metallurgica, v. 8, Oct. 1960, p. 677-683.

Lattice spacings in HCP phases of Au-Sn and Au-Hg alloys as a function of composition and electron: atom ratio. X-ray and metallographic analysis of quenched and homogenized annealed specimens at 30° C. 16 ref. (M26, M-general, 2-60; Au-b, Hg, Sn)

86-M. Lattice Spacing Relationships and the Electronic Band Structure of Close-Packed Alpha and Zeta Phases of Gold-Based Alloys. T. B. Massalski and H. W. King. Acta Metallurgica, v. 8, Oct. 1960, p. 684-690.

Correlation of experimental data with known distortion mechanisms associated with the interactions of the Fermi surface with the faces of the Brillouin zone for determination of lattice spacing relationships in Au alloys containing In, Hg,

Sn and Cd. Deviations considered in the light of the band structure theory are compared to those in alloys of Cu and Ag. 15 ref. (M26, M25; Au-b, Cd, Hg, In, Sn)

87-M. Irradiation Hardening in Copper and Nickel. M. J. Makin and F. J. Minter. Acta Metallurgica, v. 8, Oct. 1960, p. 691-699.

Lattice and dislocation component of irradiation hardening measured in polycrystalline Cu and Ni as a function of testing temperature and neutron dose. Results are compared with Seeger's theory of lattice hardening, which is based on dislocations cutting through a forest of obstacles under the action of stress and thermal activation. 13 ref. (M26b, N7e, Q-general, 2-61, 2-67; Cu, Ni)

88-M. The Copper/Arsenic System and the Copper Arsenide Minerals. R. D. Heyding and G. J. G. Despault. Canadian Journal of Chemistry, v. 38, Dec. 1960, p. 2477-2481.

Alloys containing less than 20% As are melted, quenched, annealed at 680° C. and cooled, then heat treated under vacuum. Alloys containing more than 20% As are crushed to powders and heat treated. Structures and compositions of the phases formed are studied by X-ray diffraction. (M24b, 2-64, M22g; Cu-b, As)

89-M. Direct Observation of Lattice Defects in Cold-Worked High Manganese Steels by Electron Microscopy. Zenji Nishiyama and Ken-ichi Simizu. Physical Society of Japan, Journal, v. 15, Nov. 1960, p. 1963-1969.

Thin foils prepared by electrolytic polishing from bulk specimens are studied by electron microscopy to determine phase formation at strain sites and density of ordinary stacking faults. 8 ref. (M26, M24e, M21e; ST, Mn)

90-M. Some Properties of Titanium Sesquioxides Containing Vanadium Ions. Tatsuyuki Kawakubo, Taketoshi Yanagi and Shoichiro Nomura. Physical Society of Japan, Journal, v. 15, Nov. 1960, p. 2102.

Measurement of lattice parameters and electrical conductivity as a function of reciprocal temperature to show the effect of vanadium concentration on antiferromagnetic ordering of sintered powders containing Ti_2O_3-V_2O_3. 5 ref. (M26, P15g, 2-60, 2-61; Ti, V, 6)

91-M. (Japanese.) Microfractography of Fatigue-Fracture Surfaces of Metals. Pt. 2. Electron-Microscopic Observations of the Fatigue-Fracture Surfaces of Low-Alloy Steels and High-Carbon Steels. Akira Tokuda. Japan Institute of Metals, Journal, v. 24, Oct. 1960, p. 665-668.

Fracture patterns and tensile properties and S-N curves for specimens after annealing, quenching, tempering and spheroidizing heat treatments for various times at 710-900° C. 8 ref. (M23p, M21e, Q26, Q-general, 2-64; AY, CN-r)

92-M. (Japanese.) Phase Diagrams of the Zn-Rich Side of the Quaternary System. Zn-Al-Mg-Cu. Hisafuji Watanabe. Japan Institute of Metals, Journal, v. 24, Oct. 1960, p. 672-676.

Phase diagrams of the systems Zn-Cu-Mg and Zn-Al-Mg-Cu studied by microscopy and inverse rate thermal analysis at 380-630° C. 3 ref. (M24d; Al-b, Cu-b, Mg-b, Zn-b)

93-M. New Data on the System Fe_2O_3-$FeTiO_3$-TiO_2 (Ferriilmenites and Titanomghemites). E. Z. Basta. Egyptian Academy of Sciences, Proceedings, v. 14, 1959, p. 1-4.

Microscopic, chemical and X-ray investigations on carefully separated natural minerals and on synthetic preparations belonging to the system Fe_2O_3-$FeTiO_3$-TiO_2. Data are given for the miscibility of TiO_2 in Fe_2O_3 and $FeTiO_3$. (M24c, M21f; Fe, Ti, 14-59)

94-M. Liquidus and Solidus Relations in Iron-Rich Iron-Carbon Alloys. R. A. Buckley and W. Hume-Rothery. Iron and Steel Institute, Journal, v. 196, Dec. 1960, p. 403-406.

Determination of the equilibrium diagram for Fe-C alloys, from 0-20% C., by thermal analysis, followed by microscopic examination of quenched specimens. 12 ref. (M24b, M-general; Fe-b, C)

95-M. Thermal and Magnetic Analysis of an Fe-Ni Alloy by an Electron Beam Technique. S. Yamaguchi. Iron and Steel Institute, Journal, v. 196, Dec. 1960, p. 462.

Determination of the Curie point and crystalline structure of Invar by observing

the diffraction patterns and Lorentz effect at different temperatures of induction magnetized particles heated by electron bombardment. 3 ref. (M23, M22g, M26, P16d; SGA-r, Fe-b, Ni)

96-M. (German.) Electron Microscope Observation of Dislocations in Electrolytically Deposited Nickel Layers. Ludwig Reimer. Naturwissenschaften, v. 47, Nov. 1960, p. 394-395.

Electron micrographs are obtained by through-radiation of 200 Å thin Ni layers of measured orientation on Zn or Cu supports. Dislocations move to small-angle grain boundaries on recrystallization by electron bombardment. (M21e, M26b, N5f; Ni, 14-62)

97-M. Steel Foundry Sand Clay Bonding.. a Microscopic Study. J. B. Caine, E. H. King and J. S. Schumacher. Modern Castings, v. 39, Jan. 1961, p. 111-116.

Microscopic examination of steel foundry sands casts doubts on accepted theories on "clay film thickness" and "clay distribution" by mulling. Methods for microscopic examination. (M21; NM-f45)

98-M. (Japanese.) Influence of Nitrogen on the Structure of Graphite in Titanium Cast Iron. Yoshisada Ueda. Imono (Japan Foundrymen's Society, Journal), v. 32, Oct. 1960, p. 696-702.

Effect of nitrogen content on the composition of phases, graphite structure, tensile strength and hardness of cast iron containing Ti. 11 ref. (M24b, M27, Q27a, Q29n; CI, Ti)

99-M. Precision Lattice Parameter Determination of Zirconium-Oxygen Solid Solution. Barry D. Lichter. Metallurgical Society of AIME, Transactions, v. 218, Dec. 1960, p. 1015-1018.

The lattice parameters of Zr and Zr-O solid solutions (hcP) are determined from measurements of back reflection X-ray photograms obtained at 29° C. using a symmetrical focusing camera. Linear equations between parameters (c, a) in angstrom unit (10^{-8}cm.) and atom ratio (m) of oxygen to Zr are obtained at 0-5% oxygen. 13 ref. (M26, M22g; Zr-b, O)

100-M. A Further Study of Ti_2Ni-Type Phases Containing Titanium, Zirconium or Hafnium. M. V. Nevitt, J. W. Downey and R. A. Morris. Metallurgical Society of AIME, Transactions, v. 218, Dec. 1960, p. 1019-1023.

An experimental survey has determined the occurrence of Ti_2Ni-type phases in binary and ternary alloys of Ti, Zr or Hf with first, second or third long-period transition metals and also in ternary systems in which O is the third component. The existence of 11 previously unreported isomorphs is cited and some approximate phase boundaries are given with lattice parameters and periodic table relationships involved in the occurrence of the phase. 7 ref. (M24, M25, M26; Hf-b, Ti-b, Zr-b, O)

101-M. Annealing Twins and Coincidence Site Boundaries in High Purity Lead. K. J. Aust and J. W. Rutter. Metallurgical Society of AIME, Transactions, v. 218, Dec. 1960, p. 1023-1028.

Formation of annealing twins during the growth of a recrystallized grain into a striated, melt-grown crystal of high purity Pb, resulting in replacement of the original migrating boundary by a large-angle grain boundary of the coincidence site type or by a near-twin boundary. The results support the Fullman-Fisher theory of annealing twins and demonstrate the usefulness of the coincidence site model. 7 ref. (M27e, M27f, N3; Pb)

102-M. Effect of Strain Rate and Temperature on the Compression Texture of Aluminum. L. J. Dwiggins, William J. Rogers and R. O. Williams. Metallurgical Society of AIME, Transactions, v. 218, Dec. 1960, p. 1133-1134.

X-ray diffraction examination of texture and orientation of specimens deformed in compression at -76 to 150° C. 6 ref. (M26c, M22g, Q28, 3-68; Al)

103-M. X-Ray Line Broadening From Explosively Loaded Copper. J. B. Cohen. Metallurgical Society of AIME, Transactions, v. 218, Dec. 1960, p. 1135-1136.

X-ray diffraction analysis of deformation microstructure of electrolytic tough pitch Cu specimens shock loaded at 10 kilobars pressure using composition B explosives. 3 ref. (M22g, M27, Q6p, 3-68; Cu-a, NM-k34)

104-M. (Russian.) Deformation Texture of Cold Rolled Low Alloy Steel. K. V. Grigorov and M. Ya. Zakutner. Fizika

Metallov i Metallovedenie, v. 10, Mar. 1960, p. 404-411.

Magnetometric study of texture development in the cold rolling of 0.9% Si steel within wide ranges of deformation. Derivation of relative crystal volume and the basic orientation type for the cold rolled texture. The mechanism of texture development in this steel is found to be identical to that of the low carbon steel. 10 ref. (M26c, M23a, 3-68; AY)

105-M. A Comprehensive Examination of Samples of Iron Containing Aluminous Inclusions. G. R. Booker and A. R. Westrope. Iron and Steel Institute, Journal, v. 196, Nov. 1960, p. 294-300.

Metallographic studies, including replica, optical and electron microscopy and electron and X-ray diffraction, revealing additional information concerning morphology and composition of the inclusions, with attention to anomaly concerning the occurrence of magnetite in the inclusions of the oxygen-rich ingots and the manner of formation of hercynite and magnetite. 7 ref. (M-general, 9-69; Fe-b, Al)

106-M. X-Ray Investigations on Fe-Si-B and Mn-Si-B Systems. Bertil Aronsson and Ingvar Engstrom. Acta Chemica Scandinavica, v. 14, June 1960, p. 1403-1413.

X-ray diffraction is used to identify four ternary phases in the metal-rich part of the Fe-Si-B system at 1000° C. and Mn_5SiB_2 phase in the metal-rich part of the Mn-Si-B system, also at 1000° C. (M24c, M22g; Fe-b, Mn-b, B, Si)

107-M. Compositions and Crystal Structures of MnB_2, Mn_3Si, Mn_5Si_3 and $FeSi_2$. Bertil Aronsson. Acta Chemica Scandinavica, v. 14, June 1960, p. 1414-1418.

Powder photography and X-ray diffraction are used to determine crystal structure and atomic scattering parameters. Composition is determined by chemical analysis. (M26, M25, M22g, S11; Fe-b, Mn-b, B, Si)

108-M. The Metallography of Reactive Materials. W. Evans. Canadian Mining and Metallurgical Bulletin, v. 53, Nov. 1960, p. 893-900.

Methods for cutting, grinding and polishing U, UO_2, Zr, Zr alloys and Be for metallographic study. Techniques for determining grain structures and identifying phases. (M-general, G17, G18; Be, U, Zr-b)

109-M. (French.) Color Micrography of Magnesium and Magnesium Alloys by Anodic Fluoridation. P. Lelong and J. Dosdat. Memoires Scientifiques de la Revue de Metallurgie, v. 57, Oct. 1960, p. 755-758.

Metallization of surface of polished specimens to produce sharp color contrasts which facilitate metallographic study of variations of composition and orientation and of phenomena associated with segregation, diffusion, workhardening, restoration and recrystallization. Applications in interference micrography. 12 ref. (M20, M21; Mg-b)

110-M. (French.) Crystallographic Relationships Between the Gamma Phase and the Alpha Phase Resulting From Workhardening of an Unstable Austenite. P. Bastien and R. Margerand. Memoires Scientifiques de la Revue de Metallurgie, v. 57, Oct. 1960, P. 778-786.

Orientation relations observed between austenite and alpha phase produced by wire-drawing operation on a high-Cr steel. Relationship between percentage of alpha phase formed and values of modulus of elasticity and internal friction. Proposal of a theory of gamma-alpha transformation by workhardening using Bain's model and concept of dislocation-transformation. Slip mechanism in cases of deformation by compression and by drawing. 12 ref. (M26, N8, Q23a, Q24a; AY, Cr)

111-M. (German.) Dependence of Magnetic Structure of a Cobalt Crystal Upon Crystal Size. G. S. Kandaurowa, Ja. S. Schur and F. W. Maslennikowa. Physikalische Abhandlungen aus der Sowjetunion, v. 3, Feb. 1960, p. 91-95.

Change of thickness of a monocrystalline 4 mm. diameter Co disk from 0.52-0.015 mm. mechanically by grinding and by electrolytic excavation in Cr containing H_3PO_4. Examination of magnetic structure by powder figures for varying crystal thicknesses. (M27g, M-general; Co)

112-M. The Fermi Surface in White Tin. A. V. Gold and M. G. Priestley. Philosophical Magazine, v. 5, Nov. 1960, p. 1089-1104.

The orientation dependence of the De Haas-Van Alphen periods in Sn single crystals is studied in high pulsed magnetic fields, as many as seven periods being found at some orientations, indicating that the Fermi surface is much more complicated than the 3-ellipsoid model suggested by Fawcett. Effective mass values are determined at the principal orientations from the temperature dependence of the amplitudes. (M26, 3-72; Sn, 14-61)

113-M. X-Ray Evidence for Segregation of Solute to Stacking Faults in a Copper-Aluminum Alloy. R. W. Cahn and R. G. Davies. Philosophical Magazine, v. 5, Nov. 1960, p. 1119-1126.

Study of the intensity of scattering of monochromatic X-rays at small angles from a Cu base solid solution containing 15 atomic % Al. The intensity of scattering from a rolled foil increases after heating at 150-250° C., a temperature range in which the alloy hardens and there is little or no recrystallization. This increase is attributed to segregation of Al to the ribbons of stacking faults between partial dislocations. (M22g, 9-69; Cu-b, Al)

114-M. The Etching of Sub-Structures in Beryllium. J. Sawkill and J. E. Meredith. Philosophical Magazine, v. 5, Nov. 1960, p. 1195-1196.

Aqueous solutions of $CuSo_4$, $AgNo_3$, or gold chloride are used to etch Be, the Cu, Ag or Au being deposited at the grain boundaries. (M20q; Be)

115-M. (English.) Effect of Quenching and Tempering on the Structure of a Hypo-Eutectoid Cu-Al Alloy. Gunji Shinoda and Yoshitsugu Amano. Osaka University, Technology Reports, v. 10, Mar. 1960, p. 357-365.

X-ray study of lattice structures, eutectoid and martensitic transformations and Al solid-solubility in alloys containing 9.96 less than 10.5% Al undergoing beta-beta prime-alpha phase transformations, with resultant bcc-kcp-fct structure transitions as a consequence of quenching from 1000° C., cold working and subsequent tempering at 305° C. 6 ref. (M26, N-general, 2-64, 3-68; Cu-b, Al)

116-M. (French.) Insitu Identification of Cementite by X-Ray Diffraction. P. Gendrel and L. Jacque. Comptes Rendus, v. 251, Nov. 14, 1960, p. 2166-2168.

Some 30 lines of the diffraction spectrum of cementite in 1.03% carbon steels, one pearlitic and one troostitic, are identified without chemical separation of the carbide. Technique may be a means of following evolution of phases during reactions of crystal system of ferrous materials. 5 ref. (M22g, N8k; CN)

117-M. (Japanese.) Directional Properties of One-Way Rolled Aluminum Sheet and Detection of Directionality Using the Knoop Indentor. Takashi Ikeno, Shigeo Zaima and Kizo Shibata. Light Metals, v. 10, Sept. 1960, p. 317-321.

Comparison of earings grown by deep drawing in longitudinal and transverse rolled specimens after annealing at 265-500° C. Directional properties are determined in terms of earing ratio and Knoop ratio as a function of rolling direction, reduction and annealing temperature. (M26c, F23, G4b, 2-64, 3-72; Al-b)

118-M. (Japanese.) The Rapid Determination of Orientation of Aluminum Single Crystals. Pt. 1. Kohara Shiro. Light Metals, v. 10, Sept. 1960, p. 330-336.

The etch-glitter method (Barrett's method) and the light figure method, both using Barrett's reagent as the etchant, are studied for accuracy in determining orientation of single crystals as affected by etching time and temperature and surface condition, purity and orientation of the crystal. 3 ref. (M20, M26c; Al, 14-61)

119-M. (Japanese.) Alloying Elements for Mg-Zr System Alloys. Pt. 2. Riei Ichikawa. Light Metals, v. 10, Sept. 1960, p. 360-368.

The possibility that Zr and alloying element which are over the solubility limit in molten Mg alloys form intermetallic compounds is investigated by X-ray analysis using 17 alloying metals. 12 ref. (M26q, M22g, P12e, 2-60; Mg-b, Zr)

120-M. Improved Metallographic Techniques in Nova Scotia. Pt. 1. Metallic

Films Aid Study of Oxide Coatings. C. A. Godden. Metal Progress, v. 79, Jan. 1961, p. 121-122.

Described are a vacuum deposition technique that aids the study of thin oxide films and a versatile mounting material, diallyl phthalate, which does not shrink from edges of the specimen. (M20; Al, 14-62)

121-M. Improved Metallographic Techniques in Nova Scotia. Pt. 2. Diallyl Phthalate as a Mounting Material. C. A. Godden. Metal Progress, v. 79, Jan. 1961, p. 122-123.

(M20; Al, 14-62)

122-M. (Russian.) Effect of Initial Grain Size of EI43B Type Alloy on the Final Grain Size After Deformation. M. Ya. Dzugutov and B. F. Vakhtanov. Kuznechno-Shtampovochnoe Proizvodstvo, Feb. 1960, p. 1-4.

Samples are heated to 1160° C., press forged within 10-80% deformation and heat treated to determine effect of the degree of deformation on the final grain size. (M27c, 3-68, F22, J-general; ST)

123-M. (Japanese.) Sampling in the Investigation of Earing in Deep Drawing Using One Way Cold Rolled Aluminum Sheet. Takashi Ikeno, Shigeo Zaima and Kizo Shibata. Light Metals, v. 10, p. 373-377.

Effect of temperature and degree of deformation during various stages of rolling on earing phenomena in deep drawing specimens. Application to 2S Al alloy during hot and cold rolling and after annealing to establish reliability in specimen-taking for directional property studies. 5 ref. (M26c, 3-72, F23, G4, 2-61, 3-68; Al-b)

124-M. (Japanese.) The Rapid Determination of Orientation of Aluminum Single Crystals. Pt. 2. Shiro Kohara. Light Metals, v. 10, Nov. 1960, p. 378-385.

Analysis of Laue X-ray transmission photographs of Al single crystals at various incident angles. Crystal orientations are calculated from Laue spot indices prepared from charts of the standard patterns. 7 ref. (M26c, M22g; Al, 14-61)

125-M. (Japanese.) Alloying Elements For Mg-Zr System Alloys. Pt. 3. Riei Ichikawa. Light Metals, v. 10, Nov. 1960, p. 405-412.

Processes of solidification of Mg-Zn-Zr, Mg-Ag-Zr, Mg-Al-Zr and Mg-Ca-Zr alloys on the Mg side of the phase diagram are examined by microstructural, differential thermoanalysis and X-ray diffraction analysis. 3 ref. (M24d, M-general, N12; Mg-b, Zr-b, Zn, Al, Ca)

126-M. (German.) Visualizing Dislocations on Iron-Nickel Alloy (50/50) Surfaces by Chemical Etching. W. D. Hannibal. Zeitschrift fur Naturforschung, v. 152, Sept. 1960, p. 835-837.

Metallographic examination for dislocation density, the method comprising etching at room temperature with electrolyte of varying Fe and Ni ion concentration and electrolytic polishing with and without subsequent annealing in pure hydrogen at 220-1000° C. Influence of orientation and plastic deformation (slight bending before polishing and annealing) on etching rate. (M20q, M26b, 3-68, 3-72; Fe-b, Ni-b)

127-M. (Japanese.) Study of Aging by a Film-Replica Technique. Light Metals, July 1960, p. 25-32.

Structural changes in Al-Cu alloys during aging are studied by electron microscopy. (M27, 2-65, M21e; Al-b, Cu-b)

128-M. Soft X-Ray Spectra of Lithium, Magnesium and Aluminum and Their Alloys. R. S. Crisp and S. E. Williams. Philosophical Magazine, v. 5, Dec. 1960, p. 1205-1216.

The effect of alloying and coating on the valence band energy levels of Mg-Si alloys and of Mg and Al either uncoated or coated with Li is determined from measurements of the X-ray spectra. (M22g, 2-60; Mg-b, Al, Li, 8)

129-M. The Growth of Prismatic Dislocation Loops During Annealing. C. A. Johnson. Philosophical Magazine, v. 5, Dec. 1960, p. 1255-1265.

Proposal of a mechanism for coalescence of loops in annealed Al foil by short circuit diffusion around the periphery of the prismatic dislocation loops, a mechanism contrasted with the theory of loop coalescence by vacancy diffusion through the matrix. (M26b, 2-64; Al, 4-56)

130-M. Grain Boundary Migration in Steel Is Seen With Thermionic Emission Electron Microscope. Norelco Reporter, v. 7, Nov-Dec. 1960, p. 152.

Twin boundary movement occurring in austenite 1095 steel at 1065-1150° C. investigated at 1000-3000 X magnifications. (M21e, M27e, N3, 2-62; SS-e)

131-M. (French.) Structural Study of Thin Beryllium Films by Micrography and Electron Microdiffraction. A Saulnier. Journal of Nuclear Materials, v. 2, Dec. 1960, p. 299-309.

Simple and direct technique for making thin sections of Be which can be directly observed in an electron microscope. Comparison of the structure, both in the cold worked and the annealed conditions, of thin Be sheets made by drawing and rolling either cast billets or billets produced by powder metallurgy. Significant differences are observed in the distribution of dislocations in the two cases. (M22h, M26; Be, 14-62)

132-M. Perovskite-Type Compounds Based on Plutonium. L. E. Russell, J. D. L. Harrison and N. H. Brett. Journal of Nuclear Materials, v. 2, Dec. 1960, p. 310-320.

Preparation of perovskite-type compounds containing trivalent or quadrivalent Pu. Crystallographic data are reported for the compounds $PuAlO_3$, $PuVO_3$, $PuCrO_3$ and $BaPuO_3$. 14 ref. (M26; Pu)

133-M. On the Location and Motion of Rare Gas Atoms in Metals. C. W. Tucker and E. J. Norton. Journal of Nuclear Materials, v. 2, Dec. 1960, p. 329-334.

Energetic rare gas atoms coming to rest in a metal lattice apparently capture vacancies and so do not distort the lattice to an appreciable extent. Wide variations occur in the evolution rates of rare gases from metal to metal. 11 ref. (M26, N15d)

134-M. (Spanish.) Imperfections, Lattice Constants and Densities of Cold-Drawn and of Recrystallized Aluminum Wires. M. E. Straumanis and T. Ejima. Nuovo Cimento, v. 18, Jan. 1960, p. 48-64.

Lattice parameters, lattice perfection and density of cold drawn as compared to recrystallized Al wire are interpreted in terms of the deformation during drawing. (M26, P10a, 3-68; Al, 4-61)

135-M. The Crystal Structure of $Mo_{17}O_{47}$. Lars Kihlborg. Acta Chemica Scandinavica, v. 14, July 1960, p. 1612-1622.

Photographic investigation of single, needle-like crystals of $Mo_{17}O_{47}$ with the Weissenberg camera and the Buerger precession camera to confirm the molecular formula and determine crystal structure and interatomic distances. Structural elements are identified as MoO_6 octahedra and MoO_7 pentagonal bipyramids. 24 ref. (M26q, M22g; Mo, 14-61)

136-M. (German.) Electron Microscopic Structure Investigation of S. A. P. (Sinter Aluminum Product). H. Hug and H. Bichsel. Metall, v. 15, Jan. 1961, p. 19-22.

Electron microscopic investigation of electrolytically etched S. A. P. specimens, bromine-methanol isolated oxide contained in S. A. P. powder and sintered and extruded S. A. P., using the oxide replica method to study formation of gamma Al_2O_3. (M27, M21e; Al, 6-72)

137-M. (Japanese.) Effect of Heat Treatment on Steel Sheets for Galvanizing. Seita Sakui and Tsutamu Mori. Tetsu-to-Hagane (Journal of the Iron & Steel Institute of Japan), v. 46, Dec. 1960, p. 10-14.

Effect of heating rate on the grain size, softening temperature and grain orientation in cold rolled low carbon steel heated at a rate of 2000° C. per second and 10° C. per min. (M27c, 2-64; CN-g, 4-53)

138-M. (Japanese.) Macroscopic Nonmetallic Inclusions in Tubes of High-Carbon Chromium Ball-Bearing Steel. Eiji Miyoshi. Tetsu-to-Hagane (Journal of the Iron & Steel Institute of Japan), v. 46, Dec. 1960, p. 14-21.

Comparison of values obtained during microscope and naked eye inspections of the surface of the cut tubes. (M27, M28, 9-71; TS-g, SGA-c)

139-M. (Japanese.) Sand Markings on Roller-Bearing Steel SUJ 3. Kiyoji Deguchi and Yoshimichi Matsumoto. Tetsu-to-Hagane (Journal of the Iron & Steel Institute of Japan), v. 46, Dec. 1960, p. 21-27.

Description of sand markings which appear in acid and basic furnace products during cutting and are probably

caused by inclusions. 3 ref. (M28, 9-71; ST, SGA-c)

140-M. Formation of Etch Pits and of Silicon Carbide on Silicon Surfaces at High Temperatures. R. C. Newman and J. Wakefield. Solid State Physics in Electronics and Telecommunications, Proceedings of the International Conference, Brussels, Belgium, June 2-7, 1958, v. 3. Magnetic and Optical Properties, Pt. 1, 1960, p. 318-328.

Single-crystal Si samples possessing (100), (111), (221) and (511) orientations are heated to 1000-1300° C. in sealed quartz tubes. Surfaces are subsequently examined in the optical and electron microscopes and by electron diffraction to study the nature of any physical or chemical changes which occur as a result of heat treatment. 13 ref. (M26, 2-64, M21, M22g; Si)

141-M. Microstructural Causes of Heat Affected Zone Cracking in Heavy Section 18-12-Nb Austenitic Stainless Steel Welded Joints. N. E. Moore and J. A. Griffiths. Iron and Steel Institute, Journal, v. 197, Jan. 1961, p. 29-39.

Electron microscope study of hot tensile test specimens to determine ductility, microstructure and grain size after heat treatment at 850-1350° C. Comparative tests with a 17-11-Mo type steel. 27 ref. (M27, Q23p, 2-64, Q27, 9-72, M21e; SS-e, Cb, Mo, 7-51)

142-M. Fabrication and Annealing Factors Affecting Grain Size of 18Cr8Ni-Ti Superheater Materials in Steam Boilers. F. Eberle and J. S. Makris. Journal of Basic Engineering (ASME Transactions, Series D), v. 82, Dec. 1960, p. 855-866.

Effect of cold deformation, annealing time and temperature upon grain size of 18Cr8Ni-Ti and TP321H steel alloys. Recrystallization and grain growth studied at 1450-2200° F. for exposure periods of 5-30 min. (M27c, 2-61, 3-68, J23c, T26q; SS)

143-M. An X-Ray Investigation of Systems Between Niobium Pentoxide and Certain Additional Oxides. H. J. Goldschmidt. Metallurgia, v. 62, Nov. 1960, p. 211-218.

Binary constitutions of Cb pentoxide with oxides of Ni, Co, Fe, Cr, V, Ti, Zr and Mo are studied on mixtures melted to varying compositions and in high and low temperature condition. Some of the intermediate columbates formed for higher secondary oxide content have rutile, columbite, hematite, perovskite and other structural types. Data are given for their stability field, transformation, lattice-dimensional and other changes. Primary solid solubility in beta-Cb_2O_5 is frequently extensive and accompanied by a degree of structural distortion. (M24d; Cb-b)

144-M. The Influence of an Electric Potential Gradient on the Thermal Etching of Silver. E. D. Hondros and A. J. W. Moore. Acta Metallurgica, v. 8, Nov. 1960, p. 751-757.

The size of the etched facets produced on an Ag single crystal, heated to 720° C. for 150 hr. in air while a direct current is passing through it is shown to vary depending on the polarity of the field relative to the crystal orientation. 5 ref. (M28p, 1-68, 3-72; Ag)

145-M. The Influence of Impurities on the Annealing of Nickel After Cold Work. L. M. Clarebrough, M. E. Hargreaves, M. H. Loretto and G. W. West. Acta Metallurgica, v. 8, Nov. 1960, p. 797-803.

Measurements of stored energy and of changes in electrical resistivity and density accompanying annealing are made on Ni of 99.85 and 99.46% purity deformed in torsion and compression revealing two stages of annealing prior to recrystallization and ascribed to annealing of vacancies and interstitials. 11 ref. (M26s, P-general, 2-64, 3-68, 3-69; Ni)

146-M. (German.) Effect of Zinc, Magnesium, Silicon, Copper, Iron, Manganese and Titanium on Primary Crystallization of Al_7Cr. H. Zoller. Schweizer Archiv, v. 26, Dec. 1960, p. 478-491.

Data from microhardness measurements, microscopic, X-ray and chemical examination, two-phase equilibria studies and thermal analysis are presented for Al-rich alloys in the ternary systems Al-Cr-Mg, Al-Cr-Si, Al-Cr-Cu, Al-Cr-Fe, Al-Cr-Mn and Al-Cr-Ti to evaluate solubility of Cr in Al-based alloys and size and amount of primarily precipitated Al_7Cr crystals. (M24c, Q29q, S11p, M23r, P12e, N7, 2-60; al-b, Cr)

147-M. (German.) Electron Microscropic Investigation of Cathode Films in Cr Electroplating. W. Reiner and C. Schiele. Metalloberflache, v. 14, Dec. 1960, p. 357-359.

Electron microscopic investigation (10,000-fold electron enlargement, 5-fold optical enlargement) of invisible films formed on Cr, Fe, Ni, Cu and Ag during cathodic polarization in sulphate containing chromic acid. Preparation of specimen. Structure of film. (M27, M21e; Ag, Cr, Cu, Fe, Ni, Cr)

148-M. Carbides in Waspaloy. J. F. Radavich and W. J. Pennington. Metal Progress, v. 79, Feb. 1961, p. 94-96.

The predominant carbides in this superalloy is MC, which contains Ti, Ni, Mo and Zr. Aging breaks down this phase and $M_{23}C_6$ forms at grain boundaries and within the grains. (M26r; Ni-b, SGA-h)

149-M. Investigational Technique. D. A. Ryder. Metal Industry, v. 98, Jan. 13, 1961, p. 23-26.

Application of metallographic and visual examination, X-ray diffraction and microscopy to the analysis and diagnosis of metallurgical failures in aircraft, including those involving fracture and stress corrosion. (M21, M22g, Q26, R11s, T24)

150-M. Crystallization. Jack Van Den Bogaerde and Herbert M. Schoen. I/EC (Industrial and Engineering Chemistry), v. 53, Feb. 1961, p. 155-158.

Review of 1959-1960 literature on nucleation, crystal growth, vapor phase growth, zone melting and single crystal and whisker formation. 132 ref. (M26, N12)

151-M. (Russian.) Structural Changes of Cast Metal During Plastic Deformation. D. I. Berezhkovskiy. Kuznechno-Shtampovochnoe Proizvodstvo, Apr. 1960, p. 12-16.

Determination of the temperature, reduction rate and degree of reduction necessary to cause transformation from large to small grains in the structure of the cast EI765 nickel alloy. Difference in recrystallization uniformity in the sample as influenced by forging with hydraulic press and by drop forge hammer. (M27c, 2-61, 3-68; Ni-b, 5)

152-M. The Crystallography of Martensitic Transformations. B. A. Bilby and J. W. Christian. Iron & Steel, v. 33, Dec. 19, 1960, p. 648-651.

Theoretical analysis of the crystallographic features of a given martensitic transformation in terms of the lattice pure strain, habit planes and orientation relationships, and shape, lattice and dislocation deformations. (M26, N6q, N8p)

153-M. (German.) Oxide Inclusions in Ferrochromium Alloys. G. Siebert and E. Plockinger. Technische Mitteilungen Krupp, v. 18, Nov. 1960, p. 44-53.

Review of technological parameters for production of Cr alloy steels with few inclusions. Metallographic examination of inclusions in Fe-Cr alloys containing 0.06-0.93% Si using polarized light. (M-general, 9-69, D-general; AY, Cr, 14-68)

154-M. (German.) Potentiostatic Isolation and Analytical Investigation of Inclusions in Ferrochromium Alloys. Christa Ilschner-Gensch. Technische Mitteilungen Krupp, v. 18, Nov. 1960, p. 54-63.

Electrolytic isolation of oxides and oxides plus carbides from low-carbon (0.02) and from commercial 1.27-4.33% carbon Fe-Cr alloys. Radiographic, analytical and microscopic investigation of the isolated residues. 12 ref. (M-general, 9-69; Fe-b, Cr, 14-68)

155-M. (Translation-ConBur.) Equilibrium Diagram of the System Co-Co_2B. P. T. Kolomytsev. Academy of Sciences of the USSR., Proceedings, Chemistry Section, v. 130, Jan-Feb. 1960, p. 121-124.

A new equilibrium diagram for the system Co-B (up to 8.5% B) which includes the compound Co_3B. Data for the maximum solubility of B in Co. (M24b; Co-b)

156-M. (Translation-ConBur.) An Investigation of the Metallic Compounds Formed by the Interaction of a Five-Component Nickel Solid Solution With Titanium Carbide. R. B. Golubtsova and L. A. Mashkovich. Academy of Sciences of the USSR, Proceedings, Chemistry Section, v. 130, Jan-Feb. 1960, p. 5-7.

Composition and crystal structure of carbide phases formed in alloys containing a five-component Ni solid solution and 1, 4 and 8% Ti-C. (M24d, Ni-b)

157-M. (Translation-ConBur.) Investigation of the Metallic Compounds in Multicomponent Nickel Alloys Containing Niobium. R. B. Golubtsova and L. A. Nude. Academy of Sciences of the USSR., Proceedings, Chemistry Section, v. 130, Jan-Feb. 1960, p. 318-321.

Electrolysis products of Ni-Cb-Cr-Ti-Mo-W alloy analyzed to establish distribution of elements between gamma solid solution and Ni_3Cb phases. (M24d; Ni-b, Cb)

158-M. (Translation-ConBur.) Equilibrium Diagram of the Ternary System Ti-Al-Sn. I. I. Kornilov and T. T. Nartova. Academy of Sciences of the USSR., Proceedings, Chemistry Section, v. 131, Mar-Apr. 1960, p. 313-315.

Study of the equilibrium of alloys of Ti-Al-Sn in the region bounded by the partial ternary system Ti-Ti_3Sn-TiAl. Limited solid solutions based on alpha Ti are formed by a perieutectoid reaction between the beta phase of Ti and the gamma phase in the Ti-Al system and between the beta phase of Ti and the sigma phase in the system Ti-Sn. (M24c; Ti-b, Al-b, Sn-b)

159-M. (Translation-ConBur.) The Sigma Phase in the System Rhenium-Vanadium. M. A. Rylkina, K. B. Povarova and E. M. Savitskii. Academy of Sciences of the USSR., Proceedings, Chemistry Section, v. 131, Mar-Apr. 1960, p. 247-249.

A series of high temperature annealings is carried out at 1750-1000° C. to determine the temperature interval over which the sigma phase exists. Data are obtained from X-ray and microstructural observations. 10 ref. (M24b, J23; Re-b, V-b)

160-M. (Translation-ConBur.) Uranium and Its Alloys. G. Ya. Sergeev and V. V. Titova. Soviet Journal of Atomic Energy, v. 6, Nov. 1960, p. 143-149.

Structure and mechanical and physical properties of uranium. Effect of irradiation and elevated temperature on dimensional stability of various alpha-phase and gamma-phase uranium alloys. Metallographic examination of uranium. (M27, Q-general, P-general, P10d, 2-61, 2-67; U-b)

161-M. (Translation.) Structural Transformations of Thin Layers of Tungsten. A. I. Andrievskii and I. D. Nabutovich. Soviet Physics--Solid State, v. 2, Nov. 1960, p. 892-895.

Changes in microstructure of thin tungsten layers heated by electron beam of an electron microscope. Reduction of tungsten trioxide to the dioxide and tungsten dioxide to alpha-tungsten. (M27, M21e; W, 14-62)

162-M. (Translation.) Alloys in the Palladium-Copper-Chromium System. A. T. Grigor'ev, E. M. Sokolovskaya, L. N. Altunina and M. V. Maksimova. Russian Journal of Inorganic Chemistry, v. 5, May 1960, p. 534-538.

Phase relationships in the ternary Pd-Cu-Cr system are studied by thermal analysis, determination of microstructure after annealing and quenching, hardness measurements and electrical resistivity measurements. 14 ref. (M24c, M23r, M27, Q29; Pd-b, Cu-b, Cr-b)

163-M. (Translation.) A Study of the Phase Content, Composition Structure and Boundaries of Homogeneity of the System Vanadium-Carbon-Oxygen. M. A. Gurevich and B. F. Ormont. Journal of Inorganic Chemistry, USSR., v. 2, July 1957, p. 183-212.

Compositions of the V-C system from V to VC are studied by X-ray and chemical methods at 980-2300° C. to determine velocity of carbon diffusion into vanadium and study formation of alpha, gamma, sigma and epsilon phases with homogeneity limits. Determination of microhardness, density and abrasive capacity of vanadium carbides to show similarity to SiC. 78 ref. (M24c, M22g, Q29n, N1e; V-b, C, O)

164-M. (Translation.) Investigation of Alloys of the System Ag-Mn-Al. D. A. Petrov and A. Ya. Potemkin. Journal of Inorganic Chemistry, USSR, v. 2, July 1957, p. 161-182.

Study of the phase diagram of the Ag corner of the Ag-Mn-Al system up to 10% Al and 45% Mn by thermal analysis, microstructure determination, hardness and specific electrical resistance measurements. Data are given for primary crystallization field areas, equilibrium constants, saturation limits, temperature of formation, structural components and magnetic properties. 18 ref. (M24c, M23r, M27, Q29n, P15g, P16; Ag-b, Mn-b, Al)

165-M. (Translation.) The Phase Diagram of the TiFe-V System. Bi Tsin-Khua and I. I. Kornilov. Russian Journal of Inorganic Chemistry, v. 5, Apr. 1960, p. 434-436.

TiFe-V system is studied by thermal, microstructural and X-ray diffraction analysis and by hardness measurements to determine phase compositions and solubilities and regions of homogeneous solid solutions. (M24c, M23r, M27, Q29; Ti-b, Fe-b, V-b)

166-M. (Translation.) Alloys in the Palladium-Silver-Chromium System. A. T. Grigor'ev, E. M. Sokolovskaya, M. I. Zargarova and M. V. Maksimova. Russian Journal of Inorganic Chemistry, v. 5, Apr. 1960, p. 430-434.

Ternary Pd-Ag-Cr system is investigated by thermal analysis and by studies of hardness, microstructure and temperature coefficient of resistivity to determine range of immiscibility and range of mechanical mixtures. 9 ref. (M24c, M23r, M27, Q29, P15g, Pd-b, Ag-b, Cr-b)

167-M. Some Aspects of Research on Thin Solid Films. K. M. Greenland. Journal of Scientific Instruments, v. 38, Jan. 1961, p. 1-11.

Structure of Cu, Ni-Cr alloy, Au, Ag, Pd, selenide, telluride, PbS, Ge, Si, indium antimonide, bismuth oxide, Al and Sb thin films deposited in vacuum is determined by electron and field emission microscopy. Measurement of film-substrate binding energy. 42 ref. (M27, M21; 14-62)

168-M. (German.) Cause and Formation of Abnormal Microstructure in Steels. Hans-Joachim Wiester, Richard Pusch and Manfred Hoffmann. Archiv fur das Eisenhuttenwesen, v. 31, Dec. 1960, p. 731-747.

Hyper-eutectoidal stress (1.2% C) and 0.04-0.18% C steels with additions of Si, Mn, P, S, Al, As, Cu, N and O are 1050° C. annealed, cooled at controlled rate and quenched at different temperatures to investigate effect of alloying elements on formation of abnormal microstructure. Carburization tests on pure Fe, an Fe-oxygen alloy and steels with and without Al additions are made in charcoal, $BaCO_3$ and benzol-hydrogen mixture to determine effect of carbon content of the surface on microstructure. (M27, 2-60, J28g, N12q; Fe, ST, Al)

169-M. (Russian.) Vacancy Concentration in Iron-Chrome Alloys. M. A. Krishtal. Fizika Metallov i Metallovedenie, v. 10, May 1960, p. 720-726.

Methods for determination of vacancy concentration in gamma iron and its alloys containing 0.85-5.75% Cr based on measurements of electric resistivity and internal friction. Results are expressed as a function of Cr content and temperature. 7 ref. (M27, P15g, Q22, 2-60, 2-61; Fe-b, Cr)

170-M. (German.) Uranium-Silicon Alloys and Compounds. H. Steinkopff and F. Thummler. Kernenergie, v. 2, Dec. 1960, p. 1105-1114.

Review of the binary U-Si phase diagram and discussion of mechanical and physical properties of U-Si compounds with emphasis on corrosion behavior in water and gases at elevated temperatures. Influence of radioactive radiation. Production of fuel elements by extrusion of U_3Si with $ZrSi_2$ coating. (M24b, P-general, Q-general, R4, 2-67; U-b, Si-b)

171-M. Sulphides, Selenides and Tellurides of Platinum. Fredrik Gronvold, Haakon Haraldsen and Arne Kjekshus. Acta Chemica Scandinavica, v. 14, Sept. 1960, p. 1879-1893.

X-ray study of phase relationships in the systems Pt-S and Pt-Se and Pt-Te to determine densities and lattice constants. Magnetic susceptibilities are measured at -183 to 450° C. 28 ref. (M24b, M22g, M26; Pt, 14-68)

172-M. Alloys of Uranium With Platinum Series Metals. Soviet Journal of Atomic Energy, v. 6, Dec. 1960, p. 443-445.

Phase diagrams of the systems U-Ru, U-Rh, U-Pd, U-Os, U-Ir and U-Pt with data for solubility of metals in U and structure of alloys. 5 ref. (M24b; U-b, EG-c30)

173-M. Theoretical Analysis of Duplex-Grain Structure. Genziro Mima, Toshihiko Kawai and Yashikiyo Ogino. Tetsu-to Hagane (Iron and Steel Institute of Japan, Journal), v. 47, Jan. 1961, p. 27-33.

Method of determining size and distribution of grains of mixed sizes is tested on carbon steel samples. 3 ref. (M27; CN)

174-M. (Italian.) Metallographic Phenomena on Light Alloy Specimens Submitted to Fatigue Stress. M. Paganelli. Alluminio, v. 29, Nov. 1960, p. 511-519.

Micrographic and radiographic comparisons of Raffinal and an Al-5% Cu alloy after fatigue stress. Observations of "slip-band extrusions". 20 ref. (M21, M23m, 3-66; Al-a, Al-b, Cu)

175-M. Cube Texture in Ultra-Thin Molybdenum Permalloy Tape. P. K. Koh. Metallurgical Society of AIME, Transactions, v. 221, Feb. 1961, p. 50-55.

Quantitative pole density stereograms of (111) and (200) poles of Mo Permalloy tapes in their cold rolled, 760 and 927° C. annealed conditions with some supporting magnetic data are used to study the development of cube annealed texture and the correlation of cube texture with magnetic performance. Influence of cold rolling on texture and relation of pole concentration to the switching coefficient, squareness ratio of the hysteresis loop and coercive force. 3 ref. (M26c, P16a, 2-64, 3-68; Mo, 4-56)

176-M. Microstructure of Unidirectionally Solidified Al-$CuAl_2$ Eutectic. R. W. Kraft and D. L. Albright. Metallurgical Society of AIME, Transactions, v. 221, Feb. 1961, p. 95-102.

The theory of eutectic colony formation is tested on a series of high-purity Al-Cu specimens composed of Al solid solution and theta phase $Cu-Al_2$. Three types of eutectic microstructures, a unique structure consisting of lamellae essentially parallel to one another, a banded structure and the colony structure are observed after solidification in an apparatus with control of the temperature of the liquid and the temperature gradient at the solid-liquid interface. 5 ref. (M27, N12q; Al-b, Cu-b)

177-M. Effect of Quenching on the Grain Boundary Relaxation in Solid Solutions. A. S. Nowick and C. Y. Li. Metallurgical Society of AIME, Transactions, v. 221, Feb. 1961, p. 108-109.

Torsion creep test at 69-160° C. demonstrating that quenching from an elevated temperature (400° C.) accelerates the grain boundary relaxation in two solid solutions (alpha Ag-Zn and alpha Cu-Al). Correlation with the proposal that, in solid solutions, grain boundary relaxation occurs by a mechanism of self-diffusion. An alternative possibility, that quenching introduces vacancies into the boundary itself, is also considered. 12 ref. (M27f, M26s, N1d, Q3, 2-64; Ag-b, Zn, Cu-b, Al)

178-M. Texture Formation in Rolled and Annealed Crystals of Silicon-Iron. Hsun Hu. Metallurgical Society of AIME, Transactions, v. 221, Feb. 1961, p. 130-140.

Three single crystal strips of a 3% Si-Fe alloy with approximately (110) (001), (210) and (100)(001) orientation are rolled at room temperature to 30, 50 and 70% reduction in thickness. Deformation and annealing textures upon recrystallization and subsequent growth and orientation relationships are observed, with temperature dependence of recrystallization textures. 15 ref. (M26c, N3, N5, 2-61, 2-64, 3-68; Fe-b, Si, 14-61)

179-M. Phase Relations in the Titanium-Aluminum System. Elmors Ence and Harold Margolin. Metallurgical Society of AIME, Transactions, v. 221, Feb. 1961, p. 151-157.

The Ti-Al system is investigated in the composition region 0-34% Al at 800-1450° C. The phases encountered in this region are alpha, beta, gamma, sigma and epsilon. Data are given for microhardness, lattice parameters and eutectoid and peritectoid reactions. 16 ref. (M24b, M-general, N-general, 2-61; Ti-b, Al-b)

180-M. The Iron-Carbon-Sulphur System From 1149-1427° C. Albert M. Barloga, Keith R. Bock and Norman Parlee. Metallurgical Society of AIME, Transactions, v. 221, Feb. 1961, p. 173-179.

Coils of pure Fe and Fe-C alloy wire (0.05-0.80% C) and sufficient S to saturate the solid phase are equilibrated in evacuated or argon filled tubes. After rapid cooling and removal of the outside nonmetallic layer, the wires are analyzed for C and S and the data used to construct an Fe-S binary diagram and isotherms of the Fe-C-S ternary diagram at 1149-1427° C. 12 ref. (M24c; Fe-b, C, S)

181-M. Metal Crystal Orientation Using the Polarizing Microscope. H. D. Mallon. Metallurgical Society of AIME, Transactions, v. 221, Feb. 1961, p. 199-200.

The direction of the optic of "C" axis of a uniaxial metal crystal is

found with the metallurgical polarizing microscope by examining two planes of section on the crystal. Complete orientation of the crystal is then determined if a twin crystal is common to both surfaces of section. Application to Bi single crystal with substantiation by X-ray diffraction. 5 ref. (M26c, M21c; Bi, 14-61)

182-M. Rare-Earth Gallium Compounds Having the Aluminum-Boride Structure. S. E. Haszko. Metallurgical Society of AIME, Transactions, v. 221, Feb. 1961, p. 201-203.

X-ray diffraction crystallographic data are presented for several new XGa_2 intermetallic compounds, where X is a rare earth, having the AlB_2 structure, as part of a study of the magnetic and structural properties of rare earth alloys. 5 ref. (M26c, M22g; Ga, EG-g)

183-M. Crystallographic Angles in Tetragonal Crystals: Beta Tin and Indium. B. S. Chandrasekhar and B. W. Veal. Metallurgical Society of AIME, Transactions, v. 221, Feb. 1961, p. 202-203.

Calculation of tables of angles for beta-Sn and In both between planes in principal zones and between zones passing through principal planes for application to Laue method of orienting single crystal, the standard formula being used, with $c/a \simeq 0.54554$ for beta-Sn and 1.07586 for In. (M26c; In, Sn)

184-M. On Coincidence Sites. H. P. Stuwe. Metallurgical Society of AIME, Transactions, v. 221, Feb. 1961, p. 203-204.

A model using sieves with holes corresponding to lattice sites is proposed for checking the density of coincident sites deviating from mathematical accuracy in orientation relationships and boundary structure studies of f-c-c. crystals. 4 ref. (M26, 17-56)

185-M. Observations on the Ti-Zr System. E. Ence and H. Margolin. Metallurgical Society of AIME, Transactions, v. 221, Feb. 1961, p. 205-206.

Ti-Zr alloys, containing 24.1-49.0 Zr are examined for the presence of ordering or compound formation by X-ray diffraction and microstructural examination after various heat treatment at 500-700° C. for times of seven days to two months. (M24b, M-general, N10, 2-64; Ti-b, Zr)

186-M. The Magnesium-Rich Region of the Magnesium-Yttrium Phase Diagram. D. Mizer and J. B. Clark. Metallurgical Society of AIME, Transactions, v. 221, Feb. 1961, p. 207-208.

The liquidus, solidus and solvus of the Mg solid solution in the system is investigated by metallography and thermal analysis of 4-20% Y-Mg specimens at 200-1200° F. Determination of eutectoid composition and Widmanstatten structure precipitation as a function of aging time and temperature. (M24b, M-general, N-general; Mg-b, Y)

187-M. Optical Methods of Studying Surface Finish. O. S. Heavens. Institute of Metal Finishing, Transactions, v. 36, 1958-1959, p. 159-166.

Review of microscopy methods including conventional, light-profile and interference microscopy, multiple-beam interferometry and, with special attention, surface reflectivity measurements. Evaluation of applicability for various electropolished, electroplated and oxidized metal surfaces in studying finish, roughness, structure, contours, deformation characteristics and other properties. Application to Ag, Au, Al, Cu, Cd, Ni, Pb, Ti, Ge, Ta, Zn, Sn and some alloys. 18 ref. (M21; 8)

188-M. (French.) Radiocrystallography. Machine Moderne, v. 54, Dec. 1960, p. 59-64.

Survey of processes utilizing the diffraction properties of X-rays for the analysis and the determination of the crystallographic relations, structures and composition of metals and alloys. Review of Bragg's Law and the Bragg rotating crystal method and the Laue, Debye, Scherrer and Hull and Seeman-Bohlin methods. Application with fluorescent analysis and optical microscopy. (To be continued.) (M22g, M26)

189-M. (Translation.) The Change in the Microstructure of Uranium on Cyclic Heat Treatment. R. I. Garber, S. Ya. Zalinadnyi and V. M. Mikhailovskii. Soviet Physics, Solid State, v. 2, Dec. 1960, p. 950-957. (Translation of Fizika Tverdogo Tela, v. 2, June 1960, p. 1033-1360.)

Grain orientation, recrystallization, crystal displacement, plastic deformation, growth and thermal ratcheting of coarse grained, columnar crystallites after cyclic heat treatment at 100-600° C. as determined by microscopic and X-ray diffraction studies. 11 ref. (M27, Q24, M21, M22g, 2-64; U)

190-M. Properties of Iron Alloys (Fractography of High-Strength Steels With the Electron Microscope). C. D. Beachem and J. E. Srawley. Report of NRL (Naval Research Laboratory) Progress, Jan. 1961, p. 26-29.

Fracture surfaces occurring during stressing in tension of 12MoV steel sheet specimens after various heat treatments and cathodic charging are studied by electron microscopy and replica techniques. Examination of the hydrogen embrittlement crack surface shows brittle fracture "river line" cleavage and narrow "shear lips" as characteristic fracture mechanisms. 3 ref. (M23p, M21e, Q26, 3-66; AY)

191-M. The Fermi Surface of Metals. W. A. Harrison and R. W. Schmitt. Physics Today, v. 14, Feb. 1961, p. 20-25.

The electronic structure and properties of pure metals as affected by the behavior and function of Fermi surface shapes and momentum space and orbiting characteristics. Experimental studies of the de Haas-van Alphen, magnetoacoustic, magnetoresistance, anomalous skin and cyclotron resonance effects. (M25)

192-M. (Italian.) Application of Color Metallography to the Study of Phenomena Connected With the Manufacture of Mild Steel Plate for Deep Drawing. G. Odone and V. Berruti. Metallurgia Italiana, v. 52, Nov. 1960, p. 716-720.

Relation between microhardness of single crystals belonging to the same aggregate and their crystal orientation established by color metallography and applied to the study of the development of microhardness during thermal treatment and annealing of rimming steel specimen. (M21g, J-general, Q29q; ST, 4-53)

193-M. (Italian.) Influence of Crystal Orientation on Etching Figures of Metallic Monocrystals. Pt. 2. Bismuth. A. La Vecchia and B. Rivolta. Metallurgia Italiana, v. 52, Nov. 1960, p. 727-732.

Etching of monocrystals oriented in the (111), (110) and (100) plane by HNO_3, concentrated HCl, methyl alcohol with I_2, H_2O_2 + HF + H_2O (1:1:4), CP_4, CH_3OH, Superoxol and Dash. Shape and orientation of etching figures. 11 ref. (M20q, M26c; Bi, 14-61)

194-M. (French.) Methods for Identifying Gamma Grains. Determination of Gamma Grains by Condensation of Syncrystallizable Alloy. G. Vigneron. Metaux-Corrosion-Industries, v. 35, Dec. 1960, p. 439-454.

Review of methods for determining the gamma grain in steel by microscopic examination of the austenite structure after cooling or by observing the development of the gamma structure during heat treatment. Application of a condensation method of structure analysis by vapor deposition of a syncrystallizable alloy on the specimen surface. 28 ref. (M26q, N15g, 1-54; ST)

195-M. (Japanese.) The Effect of Preheating Conditions on the Recrystallization Texture and Anisotropic Properties of Annealed Aluminum Sheets. Toshio Amitari. Japan Institute of Metals, Journal, v. 24, Dec. 1960, p. 765-769.

Earing phenomena and rolling and recrystallization textures of hot and cold rolled Al sheet preheated at 400-650° C. are examined by microscopy and electrical resistance measurements. Changes in anisotropy and texture orientations are attributed to impurity precipitation caused by preheating. 17 ref. (M26c, N5, 2-64, 3-69, 3-72; Al, 4-53)

196-M. (Japanese.) The Texture and Change in the Anisotropy of Aluminum Sheet in Relation to Various Annealing Conditions. Toshio Amitani. Japan Institute of Metals, Journal, v. 24, Dec. 1960, p. 769-773.

Recrystallization grain growth, textures and orientation relationships, earing phenomena and tensile properties are examined for rolled and deep drawn Al sheet after annealing at 250-370° C. for various times. Changes in anisotropy and texture are attributed to impurity or addition element control of grain growth during annealing. 5 ref. (M26c, N5, Q27, 2-64, 3-72; Al, 4-53)

197-M. (Russian.) Structural Changes in Technical Iron During the Aging Process.

Yu. A. Skakov. Metallovedenie i Termicheskaya Obrabotka Metallov, Jan. 1961, p. 15-19.

X-ray study and hardness measurements of aged samples at 100° C. after hardening and tensile deformation. Microstructure and hardness as dependent on the duration of the aging process and concentration of alloy additions. 5 ref. (M27, Q29n, 2-60, 2-65; Fe)

198-M. (French.) Electronic Microscopy. Replica Techniques. Methods for Surface Preparation. C. Lebrun, A. Huber and P. LeLong. Revue de l'Aluminium, v. 37, Nov. 1960, p. 1257-1267.

Methods for obtaining simple replicas of metal surfaces by direct carbon or Al application and of obtaining double replicas of triafol, carbon and Si, or Al and alumina for electron microscopy studies. Methods of surface preparation by electrolytic or chemical polishing. Quality of electron micrographs with bold relief. 22 ref. (M21e, M20r, 10-54)

199-M. Hardening Due to the Recombination of Dislocations. G. Saada. Acta Metallurgica, v. 8, Dec. 1960, p. 841-847.

Two simplified models for dislocation interaction are studied to determine dislocation recombination mechanism effects during hardening. It is established that, in a dislocation "forest", the piercing of attracting "trees" results in stresses which are decidedly greater than those accompanying penetration of repulsing "trees". The recombination mechanism is responsible for the formation of vacancies and interstitials, the role played by thermal activation being negligible. 7 ref. (M26b, N7e)

200-M. Electron-Microscopic Study of Recrystallization Twins in Copper. E. Votava and H. Hatwell. Acta Metallurgica, v. 8, Dec. 1960, p. 874-877.

Recrystallization twins in thin Cu foil, recrystallized in high vacuum at 600-1000° C. after cold rolling, are associated with twinning dislocations in transmission electron microscopy examinations. Relation of growth and disappearance and other phenomena of recrystallization twins to interactions and properties of these dislocations. 11 ref. (M21e, M26b, M27e, N5, Q24b; Cu, 4-56)

201-M. Influence of Plastic Deformation on the Annealing of Quenched Gold. S. Yoshida and J. S. Koehler. Acta Metallurgica, v. 8, Dec. 1960, p. 878-881.

Annealing behavior of lattice vacancies and activation energy of defect motion in specimens quenched from 700° C., annealed at 40-60° C. and pulled in tension. Enhancement of the annealing rate and other phenomena is attributed to vacancies near a dislocation lattice preferring to exist as divacancies, since as divacancies there is a larger attractive interaction. (M26s, M26b, 2-64, 3-68; Au)

202-M. The Orientation of Martensite in Austenite. H. M. Otte. Acta Metallurgica, v. 8, Dec. 1960, p. 892-896.

Laue back reflection and X-ray microbeam measurements of single martensite plates in an austenite matrix in specimens of a 32% Ni-Fe alloy and 28% Cr 150 Fe-based alloy. Data are given for orientation relationships and habit planes in terms of axis and rotation which would bring the austenite axis into coincidence with the martensite axis. Slip systems of the inhomogenous deformation in the formation of martensite are theoretically calculated for the orientation relationships and habit planes. 14 ref. (M26e, M22g, N8p, Q24a; Fe-b, Ni)

203-M. The Use of Lattice Spacings Data to Evaluate the Effective Valency of Transition Metals in Ag-Based H. C. P. Phases T. B. Massalski and K. W. King. Acta Metallurgica, v. 8, Dec. 1960, p. 900-901.

Variation of axial ratio as a function of electron concentration is determined for binary h. c. p. phases based on Ag, containing Cd, Hg, Ga, In, Sn, As and Sb, to study the electronic contribution of the second solute element, the valency of which is not certain, to binary Ag or Cu-based h.c. p. phases for determining whether a master curve could be plotted for effective valencies and possible changes of valencies of transition metals when dissolved in alloys based on noble metals. 4 ref. (M25q, M26; Ag-b, Cd, As, Ga, In, Sb, Sn)

204-M. Welding Stainless by Electron Beam. C. R. Lehmann and E. G. Littell. Metal Progress, v. 79, Mar. 1961, p. 125-126.

Prizewinner in the 14th Annual A. S. M. Metallographic Exhibit. (M26; SS)

205-M. X-Ray Small Angle Scattering From Guinier-Preston Zones in Deformed Aluminium-Silver Single Crystals. S. Sato and A. Kelly. Acta Metallurgica, v. 9, Jan. 1961, p. 59-61.

Clusters forming in Al-20 Ag single crystals, quenched from the sigma phase and aged at room temperature, are observed to deform under rolling but with less deformation than the specimen as a whole. Orientation and symmetry relations of the clusters after tensile deformation are examined by small angle scattering technique to obtain shear and glide strain values and determine homogeneous slip deformation mechanisms. 10 ref. (M21f, M26, Q24a, 3-68; Al-b, Ag, 14-68)

206-M. The Influence of Phosphorus Upon the Mobility of Half-Dislocations in Copper. F. E. van Wely. Acta Metallurgica, v. 9, Jan. 1961, p. 72-73.

The retarding effect of impurities on stacking fault annealing is investigated for pure Cu and a Cu-0.2% P alloy after isothermal annealing at 180° C. Intrinsic fault peak shifts are determined after cold work as a function of annealing time and specimen composition. 3 ref. (M26b, 2-64, 3-69; Cu-b)

207-M. Some Results Obtained From the Microscopic Examination of Fracture Surfaces of a Cast Aluminium Silicon Copper Alloy. D. A. Ryder. Acta Metallurgica, v. 9, Jan. 1961, p. 73-76.

Optical and electron microscopy and carbon replica study of aged Al-2 1/2% Si-1% Cu specimens broken in tension, impact and slow beading. Intercrystalline cleavage fracture is observed, with characteristic river line, fir tree pattern and deformation loops, as a function of elastic stress wave velocity and interaction and crack propagation and coalescence. (M21, M23p, Q26n, 3-66; Al-b, Si, Cu)

208-M. (French.) Nondestructive Structure Testing of Steel Castings. Fonderie, Nov. 1960, p. 475-477.

Castings are polished mechanically and electrolytically by a pad soaked with electrolyte that is brought to the steel surface while a current is passed. Replicas for microscopic testing are produced by application of a nitrocellulose varnish. (M21, M27, L13p, 1-54; ST, 5)

209-M. (German.) New Methods for Microscopic Investigation of Nodular Graphite. J. Blaha, F. Grasenick, H. Horn and E. Jakopic. Radex Rundschau, Dec. 1960, p. 429-446.

Investigation of graphite precipitation, including nodular graphite in Fe, by isolation, sheathing, coating and replica techniques. Method and apparatus for total or partial oxidation of graphite by electrodeless high-frequency activation of oxygen for subsequent electron microscopic structural investigation. (M21, N8s, S11f; Fe-b)

210-M. (German.) Ternary System Nickel-Zinc-Carbon. H. H. Stadelmaier and F. H. Hammad. Metall, v. 15, Feb. 1961, p. 124-125.

Melting of a mixture of Ni, Zn and C in evacuated quartz tubes and subsequent annealing at 800° C. Measurement of the phase equilibria in Ni corner of the isothermal 800° C. section of the ternary phase diagram by microscopic and X-ray investigation. Composition of ternary carbide $Ni_{60}Zn_{30}C_{10}$. (M24c, M21, M22g; Ni-b, Zn-b, C)

211-M. (German.) Ternary System Iron-Tin-Carbon. H. H. Stadelmaier and J. M. Waller. Metall, v. 15, Feb. 1961, p. 125-126.

Melting of a mixture of Fe, Sn and C in evacuated quartz tubes, subsequent annealing at 800° C. and quenching in water. Investigation of phase boundaries in the Fe-rich corner of the isothermal 800° C. section of the ternary phase diagram by microscopic and X-ray investigation. Composition and lattice parameters of ternary compound $Fe_{70}Sn_{15}C_{15}$. (M24c, M21, M22g; Fe-b, Sn-b, C)

212-M. (French.) Structural Modifications in High Purity and Zone Refined Aluminum During Annealing After Cold Working. Pt. 4. Omourtague Dimitrov. Memoires Scientifiques de la Revue de Metallurgie, v. 57, Nov. 1960, p. 852-862.

Point defects and recrystallization occurring with or without the addition

of impurities observed during annealing of high purity Al and in Al refined by zone melting, after severe cold working at lower than room temperatures. 60 ref. (M26s, N5, 2-64, 3-68, 3-69; Al)

213-M. (Translation-ChemSoc.) Investigation of Solubility of Titanium and Phase Composition of Alloys in the Quinary System: Nickel-Chromium-Tungsten-Aluminum-Titanium. I. I. Kornilov, A. Ya. Snetkov and F. M. Turner. Russian Journal of Inorganic Chemistry, v. 2, Jan. 1957, p. 249-259.

Phase diagrams, microstructural changes, lattice dimensions and Ti solubility are determined for the Ni-rich side of the systems in alloys containing 0-11.7% Ti and 5-20.6% Cr, W and Al. Relations between composition and physico-chemical properties are determined through metallographic and X-ray study and thermal analysis after various heat treatments at 850-1180° C. (M24d, M-general, P12e, 2-60; Ni-b, Cr, W, Al, Ti)

214-M. (German.) Hafnium Based Binary Systems. H. Nowotny, H. Braun and F. Benesovsky. Radex Rundschau, Dec. 1960, p. 367-372.

Production of high-melting Hf alloys under argon protective atmosphere in an electrical arc furnace. Results of X-ray, thermo-analytic and micrographic investigation are presented in terms of binary phase diagrams of Hf with B, Al, C, Si, Ge, Sn, W and O. (M24b, C21d; Hf-b)

215-M. (German.) Observation and Registration of Processes in the Electron Emission Microscope. H. Duker. Radex Rundschau, Dec. 1960, p. 406-420.

Alpha-gamma transformations in 0.45% C steel, oxidation of gamma Fe and Ni specimens at high temperatures and electron etching of UO_2 and Al alloyed with Mo and U are investigated to demonstrate the usefulness of the electron emission microscope and a vacuum film camera which permits photography of observed processes, with control of chemical reactions by proper selection of discharge gases. (M21e, N-general, R1h; Fe-b, Ni, U-b, Al)

216-M. (Russian.) Effect of Neutron Exposure on Crystalline Structure and Properties of Metals and Alloys. I. V. Batenin, V. A. Iliena, V. K. Kritskaya, G. V. Kurdyumov and B. V. Sharov. Doklady Akademii Nauk, SSSR, v. 134, Apr. 1960, p. 802-805.

Neutron irradiation of Fe, Cu, 4% Ni in Fe and 0.6% W in Fe specimens followed by annealing at 400-650° C. Effect of irradiation on interference line width and microhardness. (M26, Q29q, 2-67; Cu, Fe-b, Ni, W)

217-M. (Russian.) Investigation of Iron-Palladium-Silver System. E. V. Akatova. Zhurnal Neorganicheskoi, v. 5, Nov. 1960, p. 2395-2402.

Thermal analysis and measurements of hardness, microstructure and electric resistance are used to determine phase relationships in Fe-Pd-Ag system within a wide concentration range. 15 ref. (M24c; Ag-b, Fe-b, Pd-b)

218-M. (Russian.) Investigation of Cr-Cb-Mo Ternary System in the Region of Cr and Mo Corners. N. N. Kurnakov and M. Ya. Troneva. Zhurnal Neorganicheskoi, v. 5, Nov. 1960, p. 2403-2409.

X-ray study, measurements of macro-microhardness and determination of melting points of the system in relation to various concentrations of Cr, Cb and Mo. Lattice parameter and hardness of Cr_2Cb. 14 ref. (M24c; Cb-b, Cr-b, Mo-b)

219-M. (Russian.) Constitution Diagram for Systems of Manganese With Titanium and Zirconium. E. M. Savitskii and Ch. V. Kopetskii. Zhurnal Neorganicheskoi, v. 5, Nov. 1960, p. 2422-2434.

Establishment of Mn-Zr and Mn-Ti constitution diagrams by radiographic study, microstructure phase analysis and measurements of hardness and microhardness. Lattice parameters and hardness of $ZrMn_2$ and $TiMn_2$ intermetallic compounds are found within investigated concentration range. Alpha-beta phase transformation as a function of Ti and Zr concentration. 10 ref. (M24c; Mn-b, Ti-b, Zr-b)

220-M. (English.) Light Figure Phenomena Revealed and Crystal Faces Developed by Chemical Etching of Silicon Crystal. Katashi Masumoto, Mikio Yamamoto, Jiro Watanabee and Toshiyuki Kawada. National Research Institute for Metals, Transactions (Japan), v. 2, Feb. 1960, p. 96-101.

Chemical etching of specimens at 70-100° C. using alkaline reagents to determine orientation relationships and nature of crystal faces in Si single crystals with diamond lattices. 7 ref. (M20q, M26c; Si, 14-61)

221-M. (German.) Investigation of Texture and Magnetostrictive Anisotropy of Fe-Al and Fe-Cr Alloys. M. M. Borodkina, S. N. Bulytschewa and Ja. P. Selisski. Physikalische Abhandlungen aus der Sowjetunion, v. 3, Apr. 1960, p. 256-268.

X-ray investigation (Mo-K-alpha, beta radiation) of deformation and recrystallization texture and magnetostriction of rolling-deformed and heat treated (850-1200° C.) specimens of Fe-Al (10% Al) and Fe-Cr (14% Cr) alloy. (M26c, P16b; Fe-b, Al, Cr)

222-M. (German.) Distribution of Iron in the Microstructure of Zirconium Alloys. P. L. Gruzin, G. G. Rjabova and G. B. Fedorov. Kernenergie, v. 2, Oct-Nov. 1960, p. 1089-1091.

Investigation of Fe distribution in Zr containing 0.15% Fe and in Zircalloy (1.1% Sn, 0.1% Fe, 0.1% Cr, 0.05% Ni) by radiograms using the radioactive isotope Fe-59. Influence of various heat treatments and working operations on Fe distribution. (M27, 2-64; Zr-b, Fe)

223-M. (German.) Investigation of Alloys in the Uranium-Germanium System. V. S. Ljasenko and V. N. Bykov. Kernenergie, v. 2, Oct-Nov. 1960, p. 1094-1096.

Thermal analysis, dilatometric, microstructure and X-ray (Debye-Scherrer) investigation to establish the U-Ge phase diagram over the entire concentration range up to liquidus temperature. Identification of compounds U_3Ge_4, U_5Ge_2 and UGe_3. (M24b; U-b, Ge-b)

224-M. (German.) Carbides and Intermediary Crystals in Heat Resistant Nickel Alloys and Their Isolation. G. Haussler and M. Zophel. Neue Hutte, v. 6, Jan. 1961, p. 52-55.

Current density and potential measurements on heat treated Ni-Cr alloys containing small amounts of Ti, Al, C, Si, Mn, Fe, Cu, Ce, Mo, W and V and of Cr_7C_3 isolated in aqueous electrolytes based on HCl and H_3PO_4. X-ray identification of following phases: TiC, Cr_3C_2, Cr_7C_3, $Ni_3(Al, Ti)$. Dissolution mechanism. (M26r, M22g, P15; Ni-b)

225-M. Structure of Vacuum-Deposited Germanium Films on Amorphous Quartz. J. E. Davey. Report of NRL (Naval Research Laboratory) Progress, Feb. 1961, p. 14-22. (Available as PB171315 from U. S. Office of Technical Services, Washington 25, D. C.)

Structure and orientation relations of specimens hot deposited on a heated substrate are investigated at 20-650° C. by combined reflection and electron diffraction, X-ray diffraction and interferometry methods and are compared to cold deposited annealed films. Influence of deposition temperature on orientation textures, particle size and deposit thickness. 18 ref. (M26, M-general, L25g, 2-61; Ge, 14-62)

226-M. Basic Studies of the Metallic State (The Structure of $CbZn_2$). C. L. Vold. Report of NRL (Naval Research Laboratory) Progress, Feb. 1961, p. 33-34. (Available as PB 171315 from U. S. Office of Technical Services, Washington 25, D. C.)

Single crystals of $CbZn_2$ are prepared by heating $CbZn_2$ in vacuum at 1045° C. for 3 1/2 hr., with the free Zn being removed by etching in an NH_4OH solution. Data are determined for lattice constants symmetry, space group, unit cell and atomic size, composition and Laues phase structure. 3 ref. (M25, M26; Cb-b, Zn, 14-68)

227-M. (Polish.) Technique for Microscopic Study of Bainitic Steels. J. Eysymontt. Prace Instytutow Hutniczych, v. 12, May 1960, p. 248-253.

18HNWA, 65S2WA and Cr-Mo steel samples are heat treated at 400-900° C. and studied to determine microstructure. Several etching reagents are used at constant concentration and varying etching times. Best results are obtained with an alcohol solution of trichloroacetic and nitric acids. 11 ref. (M22e; ST)

228-M. (Polish.) Optical Method for Determination of Crystallographic Orientation of Single-Crystal Ferromagnetics. B. Wyslocki. Prace Instytutow Hutniczych, v. 12, May 1960, p. 264-262.

Electron microscope observation of electrolytically or chemically etched figures on 3% Si cold rolled steel. Selection of suitable etching solution and method of determining orientation for regular and complicated etch figures. 14 ref. (M21e, M26c; ST, Si)

229-M. The Determination of Accurate Lattice Spacings in Hexagonal Close-Packed Alloy Phases. T. B. Massalski and H. W. King. Institute of Metals, Journal, v. 89, Jan. 1961, p. 169-171.

A graphical extrapolation method which makes use of computed tables of the quadratic functions of the axial ratio is derived for determining lattice spacings and correlated with X-ray diffraction patterns. The method is applied to a zeta phase Ag-44.5% Hg h-c-p. 11 ref. (M26, M22g; Ag-b, Hg)

230-M. Growth Structures in Electrodeposited Copper. G. G. Storey and S. C. Barnes. Institute of Metals, Journal, v. 89, Jan. 1961, p. 174-175.

Surface topography of Cu electrodeposits on Cu electrodes as influenced by substrate and cathode orientation. Networks of probable dislocation arrays are observed and attributed to incorporation of impurities at step edges or by lattice misfit between adjacent platelets. 5 ref. (M26, N3, 3-69, 3-72; Cu, 8-62)

231-M. The Structural Aging Characteristics of Al-Cu-Mg Alloys With Copper: Magnesium Weight Ratio of 7:1 and 2·2:1. J. M. Silcock. Institute of Metals, Journal, v. 89, Feb. 1961, p. 203-210.

X-ray diffraction analysis and hardness measurements on single crystal specimens containing 1.29-3.53% Cu and 0.33-1.52% Cu after isothermal age-hardening treatments and deformation by elongation. The zones found in the alloys with a Cu:Mg ratio of 2·2:1 are distinct from G. P. zones found in binary Al:Cu alloys and are termed G. P. B. zones. In the specimens with 7:1-Cu:Mg ratio, G. P. and G. P. B. zones occur at the same time. Data are presented for nucleation and precipitation mechanisms and structures, orientation relationships and hardness values. 17 ref. (M26, M-general, N-general, 2-65, 3-68; Al-b, Cu, Mg)

232-M. Thermally-Activated Glide in Magnesium Crystals From 4.2-420° K. H. Conrad, R. Armstrong, H. Wiedersich and G. Schoeck. Philosophical Magazine, v. 6, Feb. 1961, p. 177-188.

Effect of changes in strain rate and temperature on the flow stress in Mg single crystals. Data indicate that the intersection of dislocations is the controlling mechanism. 15 ref. (M26b; Mg, 14-61)

233-M. (Translation.) Observation of Dislocations in Tellurium. A. I. Blum. Soviet Physics--Solid State, v. 2, Jan. 1961, p. 1509-1511. (Translation of Fizika Tverdogo Tela, v. 2, July 1960, p. 1361-1680).

Te crystals are etched in nitric and tartaric acid, electroetched at 90-160° C. in an electrolyte containing H_3PO_4, H_2SO_4 and CrO_3, then examined with an optical microscope to observe dislocations during plastic deformation. (M26b, M20q, M21c; Te)

234-M. (French.) Heterogeneity of Large Forging Ingots. C. Roques, P. Martin, Ch. Dubois and P. Bastien. Revue de Metallurgie, v. 57, Dec. 1960, p. 1091-1103.

Form, extent and rate of major, local V and reversed V segregation and microsegregation and O and H distribution of 200 steel forging ingots weighing 7-170 tons are studied by Baumann imprints on longitudinal and cross sections by reducing fusion in vacuum and chemical analysis of impurities. A theory is proposed for segregation mechanisms. 12 ref. (M27, 9-69; ST, 5-59)

235-M. (Russian.) Martensitic Transformation in Titanium-Zirconium System. V. N. Gridnev. Doklady Akademii Nauk SSSR, v. 134, June 1960, p. 1334-1336.

Phase transformation, electric resistivity and linear expansion in relationship to the Zr concentration, cooling rate and quenching temperature. Characteristics and origin of intermediate omega phase in Ti-Zr systems. 8 ref. (M24b, P15g; Ti-b, Zr-b)

236-M. (Russian.) Effect of Aging Time on the Gamma Phase in Ni-Cr-W-Al-Ti Systems. P. B. Golubtsova and L. A. Mashkovich. Doklady Akademii Nauk SSSR, v. 134, June 1960, p. 1353-1355.

X-ray study of structure and composition of the gamma prime phase electrolytically isolated from samples after aging for 0-10,000 hr. 6 ref. (M26, 2-65; Al-b, Cr-b, Ni-b, Ti-b, W-b)

237-M. Optical Methods. A. B. Winterbottom and D. McLean. Paper from "The Physical Examination of Metals". Edward Arnold, Ltd., London, England, 1960, p. 1-80.

Survey of optical microscopy and macroscopy principles, systems and techniques, including geometric and physical optics and application to study

of metal surfaces and structures. Topics include incident light microscopy using coated optical and reflecting systems and interference and polarized light methods. 123 ref. (M21c, 10-54)

238-M. Electrical Measurements. R. King and A. P. Grunaugh. Paper from "The Physical Examination of Metals". Edward Arnold, Ltd., London, England, 1960, p. 81-167.

Survey of electrical resistivity measurement principles and techniques including a-c. and d-c. methods and relation of electrical resistivity changes to structural and compositional changes in metals. Application in metallographic research determining constitutional diagrams, order-disorder transitions, phase transformations and the effect of lattice defects on resistivity of pure metals, alloys and metal surfaces. 100 ref. (M-general, N-general, P15g, 1-54, 10-54)

239-M. X-Ray Diffraction. A. Taylor. Paper from "The Physical Examination of Metals". Edward Arnold, Ltd., London, England, 1960, p. 253-346.

Principles of X-ray generation and correlation of diffraction patterns with lattice geometry in metals and alloys. Survey of diffraction methods and application to determination of grain orientations, transformation mechanisms and microstructural elements, composition and stress-strain relationships. (M22g, M26, N-general, 1-54)

240-M. The Diffraction of Electrons. K. J. Marsh and A. G. Quarrell. Paper from "The Physical Examination of Metals". Edward Arnold, Ltd., London, England, 1960, p. 347-383.

Investigation of surfaces and thin films by electron diffraction. The properties of thin oxide coatings, electropolished surfaces and electrodeposited and evaporated films may be readily studied. 70 ref. (M22h, M26, R1h, 1-54)

241-M. Neutron Diffraction. G. E. Bacon. Paper from "The Physical Examination of Metals". Edward Arnold, Ltd., London, England, 1960, p. 385-406.

Principles of neutron scattering by atoms and experimental methods of neutron diffraction. Application to study of superlattice formation, magnetic structures of metals and alloys, ferromagnetic disorder and inelastic scattering, lattice defects and orientation relationships. 20 ref. (M22j, M26, M27, 1-54)

242-M. Electron Metallography. G. L. J. Bailey. Paper from "The Physical Examination of Metals". Edward Arnold, Ltd., London, England, 1960, p. 407-443.

Principles of electron microscopy, design of equipment and methods of application in conjunction with replica and shadow techniques. Investigation of the surface microstructure of carbon and alloy steels, Al and Fe alloys and pure Al single crystals. 13 ref. (M21e, M27f, 1-54; Fe-b, Al-b, ST)

243-M. Microradiography and Autoradiography. R. G. Ward. Paper from "The Physical Examination of Metals". Edward Arnold Ltd., London, England, 1960, p. 825-852.

Autoradiographic and microradiographic investigation of the microstructure of gray cast iron, Mn, MnS, Mn steel and pure Fe. Design of equipment and principles of application. 52 ref. (M23n, M23q; Fe-b, Mn-b)

244-M. (Ukrainian.) X-Ray Determination of the Lattice Size Caused by Aging of Crystalline EI-437 Alloy. Yu. O. Huslienko and V. H. Chorniy. Ukrainskii Fizichnii Zhurnal, v. 5, Apr. 1960, p. 577-578.

Study of change in lattice size of Ni-alloy at various temperature and time ranges of heating, annealing and aging. Effect of increased hardness caused by higher heating temperatures on lattice size. 4 ref. (M26, 2-61, 2-65; Ni-b)

245-M. (German.) Crystal Structure of Several Hafnium Containing Phases. H. Boller, H. Nowotny and A. Wittmann. Monatshefte fur Chemie, v. 91, June 1960, p. 1174-1184.

X-ray (Cr-K-alpha radiation) investigation in the binary Hf-Al and Hf-Sn systems to investigate structure of following phases: $HfAl_2$, $HfAl_3$, $Hf_{0.75}Al$, Hf_4Al_3, Hf_5Sn_3 and $HfSn_2$. (M26, M24b; Hf-b)

246-M. (German.) Ternary System Zirconium-Silicon-Boron. E. Parthe and J. T. Norton. Monatshefte fur Chemie, v. 91, June 1960, p. 1127-1133.

X-ray diffraction investigation of hot pressed and 1400° C. sintered binary

and ternary specimens to investigate phase equilibria. Presentation of results in terms of a ternary isothermal section at 1400° C. (M24c, M22g; Zr-b, Si, B)

247-M. An X-Ray Study of Silver-Cadmium Alloys. Abdul Quader. Indian Journal of Physics, v. 34, Nov. 1960, p. 506-515.

Investigation to determine the phase boundaries at temperatures below 300° C. with particular attention to the beta field. Complete diagram for the Ag-Cd system is obtained from the X-ray study of the alloys in the solid state. 10 ref. (M24b, M22g; Ag-b, Cd-b)

248-M. (German.) Iron-Molybdenum-Silicon System. Rudolf Vogel and Rolfdieter Gerhardt. Archiv fur das Eisenhuttenwesen, v. 32, Jan. 1961, p. 47-56.

Thermal analysis, microstructure and microhardness investigation in the ternary system Fe-Mo-Si for Si concentrations up to those at FeSi-$MoSi_2$ equilibrium conditions to establish phase equilibria and investigate phase reactions. Results are presented in terms of phase diagram sections. (M24c; Fe-b, Mo-b, Si)

249-M. (German.) Structure and Scaling of Niobium-Boron-Silicon Alloys. H. Nowotny, F. Benesovsky, E. Rudy and A. Wittmann. Monatshefte fur Chemie, v. 91, Nov. 1960, p. 975-990.

X-ray investigation of sintered or protective atmosphere arc-melted specimens to identify phase equilibria, which are presented in terms of an isothermal section of the ternary phase diagram at 1600° C. Oxidation of alloy powder or pressed specimens in normal atmosphere at temperatures from 400-1200° C. Selective oxidation according to structure of alloy. (M24c, R1h; Cb-b, B, Si)

250-M. (German.) Zirconium-Rich Phases in the Mg-Zr System. Hans-Joachim Taschow and Franz Sauerwald. Zeitschrift fur Anorganische und Allgemeine Chemie, v. 307, Jan. 1961, p. 123-136.

Diffusion annealing of solid Mg and Zr at 614° C. and of liquid Mg and solid Zr at 800° C. and sintering of Mg-Zr (54-85% Zr) specimens with subsequent hardness testing, X-ray and microstructure examination to investigate the obtained phases. Preliminary annealing experiments in the Mg-Zn-Zr system. (M24b, N13; Mg-b, Zr-b)

251-M. X-Ray Measurement of Intragranular Misorientation in Metals. Technical News Bulletin (National Bureau of Standards), v. 45, Feb. 1961, p. 19-20.

Specimens of brass are sectioned from the reduced area of extended and compresssed rectangular bars and studied by X-ray diffraction to determine relationship between intergranular misorientation and cumulative strain. (M26c, 3-68, M22g; Cu-n)

252-M. The Effect of the Alpha→Beta→Alpha Phase Transformation on the Preferred Orientation of Alpha Uranium. B. R. Butcher and D. Baverstock. Journal of Nuclear Materials, v. 3, Jan. 1961, p. 30-40.

Dilatometric, metallographic and X-ray observations on specimens of rolled uranium rod subjected to varying amounts of transformation into the beta phase in a temperature gradient. The phase change is accomplished by a transformation band of mixed alpha and beta phases passing through each specimen and the amount of the loss of preferred orientation is a function of the degree of transformation. 19 ref. (M26c, M-general, N6q; U)

253-M. (Translation-ConBur.) The Form of the Equilibrium Diagram of Ni-NiAl-Mo Alloys. Yu. A. Bagaryatskii and L. E. Ivanovskaya. Academy of Sciences of the USSR, Proceedings, Chemistry Section, v. 132, May-June 1960, p. 491-495.

Construction of the equilibrium diagram of Ni-NiAl-Mo alloys after homogenization and quenching treatments at 1200° C. using parallel microstructure and X-ray methods. Phase positions and isothermal sections are determined as related to temperatures of 800, 1000 and 1200° C. 14 ref. (M24d; Ni-b, Al-b, Mo-b)

254-M. (Italian.) Alloys of Noble Metals With More Electropositive Elements. Pt. 4, Gamma Phases of the Systems Magnesium-Rhodium and Magnesium-Palladium. Riccardo Ferro. Atti Della Accademia Nazionale dei Lincei, v. 29, 1960, p. 70-73.

Homogeneity interval, behavior of the constants of the elementary cell and contractions of molecular volume in the gamma phases of the systems. 8 ref. (M26q; Mg-b, Ro, Pd)

255-M. Compounds Present in Aluminum-Rich Alloys of the Aluminum-Molybdenum

System. J. W. H. Clare. Institute of Metals, Journal, v. 89, Mar. 1961, p. 232-234.

X-ray examination of the Al-Mo system showing $MoAl_{12}$ to be b-c-c. and $MoAl_7$ to be monoclinic. A peritectic reaction occurs at 706 ± 3° C., $MoAl_7$ reacting with liquid to form $MoAl_{12}$. 7 ref. (M24b, M26, N12r; Al-b, Mo-b)

256-M. The Influence of Dislocations on the Microstructure of Some Titanium Alloys. T. H. Schofield. Institute of Metals, Journal, v. 89, Mar. 1961, p. 235-237.

The microstructure of some Ti alloys as influenced by the number and arrangement of dislocations present, owing to nucleation and growth of a second phase on the dislocation sites. (M27, M26b, N2; Ti-b)

257-M. The System Thorium-Silicon. A. Brown and J. J. Morreys. Institute of Metals, Journal, v. 89, Mar. 1961, p. 238-240.

X-ray diffraction and metallographic examination of the Th-Si system, three new phases, beta $ThSi_2$, alpha Th_6Si_{11} and beta Th_6Si_{11}, being isolated. Structural relationships are investigated as a function of temperature. 5 ref. (M22g, M24b, M26, 2-61; Th-b, Si-b)

258-M. The Stability of a Tetragonal Phase Gamma Prime in Uranium-Niobium Alloys. J. D. Brown and G. K. Williamson. Institute of Metals, Journal, v. 89, Mar. 1961, p. 246-247.

High temperature X-ray diffraction of a 17% Nb-U alloy showing the cubic gamma phase of the alloy to be present with no evidence pointing to a stable gamma prime tetragonal phase. 4 ref. (M22g, M26q; U-b, Nb)

259-M. The Aluminum Rich End of the Aluminum-Hafnium Equilibrium Diagram. Bhakta B. Rath, Ganesh P. Mohanty and L. F. Mondolfo. Institute of Metals, Journal, v. 89, Mar. 1961, p. 248-249.

X-ray analysis of crystals containing 10% Hf, with the compound $HfAl_3$ having a body-centered tetragonal structure being observed to react peritectically with Al to form an Al-rich solid solution. Data are given for the peritectic temperature and liquid and solid solubilities at this temperature. (M24b, M26p, N12p; Al-b, Hf)

260-M. Split Image Measures Small Objects. J. Dyson. Metalworking Production, v. 105, Mar. 8, 1961, p. 54-57.

Application of the image splitting principle to a microscope for measuring small objects such as fine wire, wire helixes, glass fibers and electron microscope grids, the image splitting eyepiece consisting of two prism blocks fitted to a monocular microscope. (M21c)

261-M. (English.) The Predominant Orientation of Crystals of Electrodeposited Hexagonal Cobalt. N. Pangarov and S. Rashkov. Comptes Rendus de l'Academie Bulgare des Sciences, v. 13, Oct. 1960, p. 555-558.

Co deposition from an electrolyte containing $CoSO_4$, H_3BO_3 and NaCl at current densities of 0.008-0.5 amp. per sq. cm. and at 25-45° C., the acidity being adjusted by NH_3 additions to pH=5.40-5.41. Effect of current density, temperature and glycerol additions on crystal orientation. 5 ref. (M26c, L17c; Co)

262-M. Lattice Spacings in the System Copper + Germanium + Silicon. J. H. Foley and G. V. Raynor. Faraday Society, Transactions, v. 57, Jan. 1961, p. 51-60.

Lattice spacings are measured for the close-packed hexagonal sigma phase in the system Cu + Si and for the continuous solid solution formed between this phase and the corresponding sigma phase in the Cu + Ge system. The variation of lattice spacing with composition is correlated with the electronic configuration of the alloys. 17 ref. (M24c, M25, M26; Cu-b, Ge, Si)

263-M. Electron Microscopy in Metallurgical Research. T. K. Bierlein and B. Mastel. Philips Science and Industry, v. 7, May 1960, p. 157-161.

Application with cellulose acetate replica techniques to study of surface and substructure deformation, transformations and morphology. Examples are given for the deformation surface of irradiated uranium, microstructure of nonirradiated Zircaloy 2 and the fracture surface of a beta-heat treated impact specimen. (M21e, M20r, M23p; U, Zr-b)

264-M. (Russian.) Connection Between Structure and Thermal Expansion Anisotropy in Uranium, Plutonium and Neptunium. N. T. Chebotarev. Atomnaya Energiya, Jan. 1961, p. 43-49.

Structure modifications, lattice parameters, atomic spacing, covalent bonds

and thermal expansion coefficient investigated at -200 to 600° C. 7 ref. (M25, M26, P11g; U, Pu, Np)

265-M. (Russian.) Nickel-Tellurium System. S. A. Shchukarev and M. S. Apurina. Zhurnal Neorganicheskoi Khimii, v. 5, Nov. 1960, p. 2410-2413.

Phase constitution of Ni-rich portion of the system at compositions of 1-2% Te is studied in samples heated to 900° C. Data are given for lattice parameters and homogeneity regions in relation to the composition. 11 ref. (M24b, M26, 2-60, 2-61; Ni-b, Te)

266-M. (Japanese.) Observation of Electron-Microscopic Structures of Stress-Aged Mild Steel. Tadashi Kawasaki, Takehiko Shibai and Hisashi Izumi. Japan Institute of Metals, Journal, v. 25, Jan. 1961, p. 68-72.

Microstructural changes for specimens stretched in tension and strain-aged under mechanical stress for various times at 100-200° C. Effect of ferrite solute atom concentration on precipitation phenomena. 8 ref. (M21e, M27, N7e; CN)

267-M. (Japanese.) The Platinum-Niobium System. Hirozo Kimura and Akira Ito. Japan Institute of Metals, Journal, v. 25, Jan. 1961, p. 88-91.

The binary system Pt-Cb is investigated by X-ray diffraction analysis, microscopic examination and liquidus temperature determination. Data are given for solubility limit, crystal structures and lattice parameters, order-disorder, solid solution and intermetallic compound formation, substructures and eutectics with a phase equilibrium diagram constructed for 1000-2500° C. (M24b, M-general, N-general, 2-60, 2-61; Cb-b, Pt-b)

268-M. (French.) Method for the Analysis of Iron Constituents of High-Strength Brass and of Some Complex Copper-Aluminum Alloys. Francoise Gaillard and Adrienne R. Weill. Memoires Scientifiques, v. 57, Dec. 1960, p. 889-900.

Investigation of the iron precipitates in T brass and in Cu-Al alloys with 75.40-80.30% Cu, 2.68-4.79% Fe, 1.90-5.26% Ni, 0.20-11.75% Mn and 8.02-9.60% Al by micrography, electron-microscope and with X-rays after complete dissolution of the matrix and by etching and nitrocellulose replica techniques. 16 ref. (M-general, N7; Cu-b)

269-M. (Slovak.) Selective C-Au-C and C-PtPd-C Replicas for Electron Microscopic Investigation. Ivan Hrivnak. Hutnicke Listy, v. 16, Jan. 1961, p. 49-52.

Preparation of replicas from a mild carbon steel and three alloy steels by polishing and etching the surface, washing in alcohol, acetone or bezine and evaporation of a thin carbon film, an Au or PtPd film and finally a carbon film, on the surface. The replica is separated from the surface by treatment in a HCl + alcohol solution, or electrolysis in HCl. (M20r; AY, CN)

270-M. X-Ray Diffraction Measurement of Intragranular Misorientation in Alpha Brass Subjected to Reversed Plastic Strain. C. J. Newton and H. C. Vacher. Journal of Research, National Bureau of Standards, Engineering and Instrumentation, v. 65C, Jan-Mar. 1961, p. 57-63.

Construction and use of a monochromatic misorientation goniometer to examine X-ray diffraction spots from brass specimens (70% Cu, 30% Zn alpha) subjected to unidirectional and reversed plastic deformation. Measurements of average subgranular misorientation are obtained with 60% of misorientation being recovered by reversing plastic strain. 17 ref. (M22g, M26c, 1-52, 3-68; Cu-n)

271-M. The Position of Gray Tin in the Tin-Mercury System. P. H. Van Lent. Acta Metallurgica, v. 9, Feb. 1961, p. 125-128.

Determination of the solubility of gray alpha Sn and white beta Sn in Hg at -32 to 0° C. by gravimetry and use of these measurements to determine the phase-fields of gray Sn in the system. Derivation of equilibrium constants as a function of temperature, with a proposed mechanism for the transformation of white Sn amalgams. 12 ref. (M24b, N-general, P12d, P12e, 2-61; Hg-b, Sn)

272-M. Rate-Sensitivity and Dislocation Velocity in Silicon Iron. R. W. Guard. Acta Metallurgica, v. 9, Feb. 1960, p. 163-165.

The variation of dislocation velocity with applied stress for 3 1/4% Si-Fe is determined from measurements of strain rate sensitivity at 20° C. 5 ref. (M26b, 3-68; Fe-b, Si)

273-M. Electron Microscope Investigation of S. A. P. Structure. H. Hug and H. Bichsel. Metal Treatment and Drop Forging, v. 28, Mar. 1961, p. 99-104.

The oxide replica method is used to study the structure of dispersion-strengthened Al alloys before and after sintering and extrusion. (M21e, M27; Al-b)

274-M. (Translation-ConBur.) Dilatometric Studies of Rolled Uranium Rods. I. V. Batenin, A. N. Rudenko and B. V. Sharon. Soviet Journal of Atomic Energy, v. 6, Dec. 1960, p. 414-415.

Anomalous behavior of the dilatometric curve during the first heating of a strained uranium rod associated with the diffusion of impurities present in technically pure uranium. At relatively low temperatures, secondary segregation of impurity atoms may occur as the result of "upward" diffusion. (M23b, N1, 2-61, 3-69; U-a)

275-M. (Japanese.) X-Ray Diffraction Methods for Studying the Strength of Materials. Shuuji Taira. Japan Society of Mechanical Engineers, Journal, v. 64, Jan. 1961, p. 7-16.

Theoretical discussion of X-ray diffraction principles including spectra and half width as related to lattice deformation due to strain. Application to determination of local stress in carbon steel and fatigue characteristics of carbon steel and duralumin. (M22g, Q7, Q25; Al-b, CN)

276-M. (Ukrainian.) Formation and Decay of Marginal Intercolations in Chromium Ferrite. V. N. Gridnev and O. I. Efimov. Dopovidi Akademii Nauk Ukrainskoi RSR, Jan. 1961, p. 22-24.

Interferrometric investigation of the effect of heat treatment on the behavior of grain boundary intercolations in a Fe alloy with small additions of carbon and Cr. The formation and decay processes are reproducible and depend on the heating temperature. Results obtained are applied to study of nature of temper brittleness. 3 ref. (M27f, M-general, N8a, 2-64; Fe-b, Cr, C)

277-M. (Russian.) Structure and Properties of Columbium-Aluminum Alloys. V. V. Baron and E. M. Savitskii. Zhurnal Neorganicheskoi Khimii, v. 6, Jan. 1961, p. 182-185.

Microstructural, thermal and X-ray analysis and measurement of hardness and electrical resistivity of cast and heat treated samples. Establishment of constitutional diagram and nature and formation of Cl_3Al, Cb_2Al and $CbAl_3$ compounds in the system. 7 ref. (M24b, M-general, P15g, Q29n; Cb-b, Al-b)

278-M. (German.) Application of High-Temperature Microscopy in Heat Treatment. R. Mitsche and F. Jeglitsch. Harterei-Technische Mitteilungen, v. 15, Apr. 1961, p. 201-218.

Design and mode of operation of a microscope which allows observation of specimens under 10^{-5} Torr vacuum or protective atmosphere at temperatures up to 1600° C. Examples of application include investigation of ferrite-austenite transformation in soft iron, austenite formation in 16MnCr5 and 20MnCr5 steel, intermediate structure formation of a Cr-W alloyed steel, surface graphitization of a hypereutectoid steel in cooling, cementite dissolution and melting temperatures of alloyed steel at temperatures up to 1270° C. (M21, J-general; ST)

279-M. (German.) Significance of Grain Size in Determining Degree of Homogeneity of Microstructure and Transformation Behavior of Steels. A. Legat. Harterei-Technische Mitteilungen, v. 15, Apr. 1961, p. 218-222.

Review of significance of testing methods (fracture test, McQuaid-Ehn test). Control of grain size by alloying elements with emphasis on Al. Correlation between grain size and hardenability of steel. (M27c, J5; ST)

280-M. (German.) Ternary Phase in the Ag-Sb-Te System. Arnold Stegherr, Fritz Wald and Peter Eckerlin. Zeitschrift fur Naturforschung, v. 162, Jan. 1961, p. 130-131.

Lattice parameters, composition in the temperature range 400-530° C. and microstructure of a peritectic ternary phase in the Ag-Sb-Te system having a composition close to $2Ag_2Te.3Sb_2Te_3$. (M24c; Ag-b, Sb-b, Te-b)

281-M. (German.) Various Metal-Carbon Evaporation Replica Techniques in Electron Microscopic Preparation. G. Hunger. Optik, v. 17, Nov. 1960, p. 595-601.

Various techniques and apparatus for simultaneous or separate evaporation of metal dust (Zn, Cr, Pt), metal oxides

(TiO_2) and metal salts ($BiCO_3$, $SnCl_2$, AgCl, uranium acetate) on carbon pins, V-shaped tungsten wire or a tungsten probe. (M21e, N16n; Cr, Pt, Zn)

282-M. (Pamphlet.) X-Ray Diffraction Study of Crystal Perfection in Silicon. Robert H. Bragg and Leonid V. Azaroff. Illinois Institute of Technology Research Report no. AFOSR TN60-632. June 24, 1960, 8 p. (Available from ASTIA, Document Service Center, Arlington Hall Station, Arlington 12, Va.)

Examination of Si crystals to determine crystal perfection, variations in line widths and total diffracted intensity using a modified Laue focusing arrangement. Small perfection differences are disclosed by short-wave X-ray and results are compared with etch-pit determination. 6 ref. (M22g; Si)

283-M. (Books-French.) Constitution Diagrams of French Steels. v. 3-4, 1960. G. Delbart, A. Constant and A. Clerc. Institut de Recherches de la Siderurgie (IRSID), 185, rue President-Roosevelt, St. Germain-en-Laye, France, 90 p.

Constitution diagrams of various carbon steels, Mn-Mo, Ni-Cr, Ni-Mo, Cr-Mo-Al, Cr-V and Ni-Cr-Mo steels, heat resistant stainless steels, toolsteels and high-speed toolsteels, based on thermodynamic measurements. 9 ref. (M24; ST)

284-M. (German.) Electrolytic Polishing of Aluminum and Aluminum Alloys for Microstructure Investigation. F. Rammele and K. Veit. Feingerate-Technik, v. 9, Dec. 1960, p. 551-552.

Electrolytic polishing and subsequent etching of pure Al (99.5 and 99.99), AlMg7 alloy, AlMg3 alloy, AlCuMg alloy and GAlSi 12 (Cu) cast alloy by electrolytes containing perchloric acid, methanol, glycerin, methylglycol and butylcellosolve. (M20p, M20q, M27; Al-b)

285-M. (German.) Properties of Stainless Austenitic Chromium-Nickel Nuclear Reactor Steels Containing Boron. Karl Bungardt and Rudolf Oppenheim. Archiv fur das Eisenhuttenwesen, v. 32, Feb. 1961, p. 95-101.

Description of microstructure investigations, mechanical tests at temperatures from -75 to 750° C., welding tests in Ar-W arc and corrosion tests in boiling $CuSO_4$-H_2SO_4 solution for austenitic CrNi steels with 17-22% Cr, 10-11% Ni and 0.15-1.3% B. (M27, R6, K9r; SS-e)

286-M. (German.) Thermodynamics of the Ternary Systems Iron-Carbon-Copper, Iron-Carbon-Tin and Iron-Carbon-Antimony. Pt. 1. Solubility of Graphite in the Temperature Range 1200-1600° C. Hermann Schenck and Gottfried Perbix. Archiv fur das Eisenhuttenwesen, v. 32, Feb. 1961, p. 123-127.

Measurement of graphite saturation in binary Fe-C and ternary Fe-C-Cu, Fe-C-Sn and Fe-C-Sb melts at temperatures from 1200-1600° C. for the homogeneous region of the Fe-C-Cu system and for Sn and Sb concentrations up to 9%. (M24c, P11; Fe-b, C, Cu, Sb, Sn)

287-M. Rhodium-Platinum Alloys. A. S. Darling. Platinum Metals Review, v. 5, Apr. 1961, p. 58-65.

Constitutional diagrams and lattice parameter curves as functions of composition. Tests at -20 to 1600° C. to determine effect of temperature and composition on electrical, thermoelectric and mechanical properties. Use of alloys in thermocouples. 41 ref. (M24b, P15, Q-general; Pt-b, Rh-b)

288-M. (English.) Quenching Vacancies in Aluminum. Takao Kino and Satoru Kabemoto. Hiroshima University, Journal of Science, Series A, v. 24, Oct. 1960, p. 287-296.

Effect of quenching in water from 290-550° C. on electrical resistivity of high-purity Al wire. Determination of activation energy for the decrease in resistivity from isothermal annealing curves. (M26s, P15g, 2-64; Al-a)

289-M. (English.) Rolling Deformation and Recrystallization in Aluminum Single Crystal Plates. Yasumasa Takano. Hiroshima University, Journal of Science, Series A, v. 24, Oct. 1960, p. 297-310.

Preparation of single crystal plates by heating to 450° C. under a vacuum in an electric furnace, followed by rolling. X-ray photographic examination to determine effect of annealing at 400-600° C. on microstructure. (M26, M27f, N5, Q24, 2-64; Al, 14-61)

290-M. Dislocation and Impurity Boundaries in Zinc Crystals Grown From the

Melt. V. V. Damiato and G. S. Tint. Acta Metallurgica, v. 9, Mar. 1961, p. 177-183.

The distribution of etch pits at microsegregation produced by constitutional supercooling is investigated using progressive polishing and etching techniques. The density of etch pits, their rearrangement into walls and their formation into networks behind the interface suggests that the etch pits reveal the ends of decorated dislocations introduced at the segregation boundaries to accommodate the lattice strain. 13 ref. (M26b, M27f, N12, 3-69, 9-69; Zn, 14-61)

291-M. An X-Ray Investigation of the Effects of Hydrogen in Iron. A. S. Tetelman, C. N. J. Wagner and W. D. Robertson. Acta Metallurgica, v. 9, Mar. 1961, p. 205-215.

X-ray line broadening resulting from cathodic charging of hydrogen into annealed and cold worked pure Fe is investigated by electrolytic charging or tensile straining at 20 and 400-500° C. with X-ray diffraction examination and Fourier analysis. The Fourier coefficients, half widths, particle sizes, strain and recovery kinetics are identical for Fe charged with hydrogen and for Fe strained 5% in tension indicating that the results can be interpreted in terms of plastic deformation. 20 ref. (M22g, Q24, Q26s, 3-68; Fe-a, H)

292-M. X-Ray Measurements of Dislocation Density in Deformed Copper and Aluminum Single Crystals. M. J. Hordan and B. L. Averbach. Acta Metallurgica, v. 9, Mar. 1961, p. 237-246.

Measurements of double crystal rocking curve broadening are used to estimate the dislocation density in annealed and plastically strained single crystals of Cu and Al at 20° C. The total diffraction broadening is resolved into components which depend separately on average lattice tilting, localized bending, dislocation strain and subgrain size. 18 ref. (M22g, M26b, 3-68; Al, 14-61)

293-M. Guinier-Preston Zones in an Aluminum-Silver Alloy. E. J. Freise, A. Kelly and R. B. Nicholson. Acta Metallurgica, v. 9, Mar. 1961, p. 250-255.

X-ray small angle scattering measurements and electron microscope transmission studies on the same specimen of an Al-4.4% Ag alloy, quenched and aged at 125° C. to compare the two methods of examination for validity in delineating substructures. Data are presented for composition, cluster size and concentration of G-P zones. 9 ref. (M21e, M22g, N7, 2-64; Al-b, Ag)

294-M. Estimation of Equilibrium Vacancy Concentration in Solid Metals. R. F. Mehl, M. Swanson and G. M. Pound. Acta Metallurgica, v. 9, Mar. 1961, p. 256-257.

Proposal of a semi-empirical correlation, a rule relating enthalpy of formation of vacancies to the enthalpy of fusion and the solidification shrinkage, to calculate equilibrium vacancy concentration. Comparison of calculated and experimental data for Al, Cu, Au, Na, K, Fe, Ni, Ag and Pb. 24 ref. (M26s, P10c, P12)

295-M. Microstructures and Notes on Chromium-Molybdenum Steel to B. S. 3100: 1957:1458 and 1459. J. Turton and B. H. C. Waters. British Foundryman, v. 54, Mar. 1961, p. 99-102.

Review of the range of properties and microstructures that may be obtained from Cr-Mo steel made to BS 3100; 1957:1458: and 1459. All test bars are heat treated at 950° C. for 6 hr. Some bars are given subsequent normalizing and tempering and others are treated by water quenching and tempering. Specific heat treatment and physical properties are presented in table form. (M27, 2-64, P-general, Q-general; ST, Cr, Mo, 5)

296-M. (English.) The Characterization of Lattice Distortion Spectra With Deformation Indices. I. S. Szanto. Acta Technica Academiae Scientiarum Hungaricae, v. 32, Jan-Feb. 1961, p. 65-92.

Determination of deformation indices by measuring the interference maxima and the change of line profiles observed in the X-ray back reflection diagram of samples after tensile deformation. Use of standard samples for comparison. 13 ref. (M26c)

297-M. Techniques for the Metallography of Porcelain Enameled Steel. H. L. Conaway. Paper from "Porcelain Enamel Institute Forum, Proceedings". v. 20. Porcelain Enamel Institute, Inc., Washington, D. C., 1958, p. 55-69.

Discussion of metallographic procedures for the study of enameled steel. Specimen selecting; mounting, polishing, etching and photographing methods. (M-general; ST, 8-71)

298-M. (Japanese.) Lattice Structure of High-Purity Aluminum. Igarashi Isamu and Igarashi Tamotu. Light Metals, v. 11, Jan. 1961, p. 4-10.

The lattice structure of super purity Al is studied by measuring the Bragg angle of X-ray diffraction on 27% annealed and cold forged specimens. The lattice is distorted in both the annealed and cold forged states. 4 ref. (M26, M22g; Al-a)

299-M. (English.) An Electron Diffraction Study on Cu-Sn Alloys. Tomokuni Mitsuishi. Physical Society of Japan, Journal, v. 16, Mar. 1961, p. 453-455.

Intermetallic compounds produced by the interdiffusion of Cu and Sn are examined by electron diffraction. A new phase of structure type A4 is found. 4 ref. (M22h, N1e; Cu-b, Sn)

300-M. (English.) Study on the Ordered Alloys of the Gold-Manganese System by Electron Diffraction. Pt. 3. Lattice Modulation in Ordered Au_3Mn. Denjiro Watanabe. Physical Society of Japan, Journal, v. 16, Mar. 1961, p. 469-478.

Discussion of the nature of the lattice modulation which is believed to cause the satellites to flank main reflections in electron diffraction patterns of ordered Au_3Mn alloy. Two types of modulation, a periodic change of lattice spacing and of scattering factor, are considered. 13 ref. (M22h; Au-b, Mn)

301-M. (English.) New Magnetic Phase in Manganese-Aluminum-Copper System. Ichiro Tsuboya and Makoto Sugihara. Physical Society of Japan, Journal, v. 16, Mar. 1961, p. 571.

Study of vacuum annealed, cast specimens by X-ray powder analysis to determine the structure, composition range and magnetic properties of a newly discovered cubic phase. 3 ref. (M27, P16, S11p; Al-b, Cu-b, Mn-b)

302-M. (English.) X-Ray Small Angle Scattering From Precipitated Platelets in Al-Ag Alloy. Yashuhara Yoneda and Kouzou Nishioka. Physical Society of Japan, Journal, v. 16, Mar. 1961, p. 578-579.

Scattering is recorded with radiation monochromatized with a LiF crystal monochrometer. Distribution of thickness of the platelet is evaluated by extending the Fankuchen method to a one dimensional case. 6 ref. (M22g; Al-b, Ag)

303-M. (German.) Change of Orientation in Aluminum Crystals Drawn From Melt. F. Wiesmuller. Physikalische Verhandlungen, v. 11, Oct-Nov. 1960, p. 203.

Investigation of orientation in single crystal wire specimens of pure Al and after 0.4% Si addition by a rotating crystal camera which allows scanning of a 55 mm. long specimen by one exposure. (M26c; Al, 14-61)

304-M. (German.) Measurement of Electron Diffraction Intensities of Polycrystalline Aluminum Layers and Comparison With Cinematic and Dynamic Scatter Formula. M. Horstmann and G. Meyer. Naturwissenschaften, v. 48, Jan. 1961, p. 41-42.

Size of crystallites in a 300 Å. thick polycrystalline Al foil is stepwise enlarged from 25-240 Å. by annealing and diffraction intensities are measured in the primary electron energy range of 20-50 Kev. Ring intensity as influenced by electron energy and size of crystallites. (M22h; Al)

305-M. (German.) New Method for Evaluation of the Intensity Curves of Monatomic Metal Melts. H. Richter and G. Breitling. Naturwissenschaften, v. 48, Jan. 1961, p. 44.

Evaluation of preferred atomic distances of Bi, Hg, Sn and Au melts direct from a single intensity curve by a graphical method. (M25h; Au, Bi, Hg, Sn)

306-M. (German.) Importance of Eutectic Research for Quaternary Eutectic Aluminum Alloys. H. Spengler. Metall, v. 15, Mar. 1961, p. 225-227.

Classification of quaternary eutectic alloys according to their eutectic coordinates, crystallization mechanism, macro and microstructure and properties. Analysis of crystallization and structure of eutectic Al-Cu-Fe-Si, Al-Cu-Mg-Si and Al-Fe-Mg-Si alloys. (M24d, M-general, N12; Al-b, Cu, Fe, Mg, Si)

307-M. (German.) Interpretation of Aluminum Textures. W. Bunk and W. Norman. Metall, v. 15, Mar. 1961, p. 230-234.

Pole figures are investigated by an X-ray goniometer for specimens of 99.3-99.99% Al and ALRMg1 (0.95% Mg) sheet obtained by hot (500° C.) rolling and cold finish-rolling in the as-rolled (hard) state and after 400° C. annealing. Reordering of crystals as influenced by annealing and by residual and alloying elements. (M26c, M-general, F23, N-general, 2-60, 2-64; Al-b, 4-53)

308-M. (German.) Tantalum-Gold Alloys. Ernst Raub, Hans Beeskow and Dorothea Menzel. Zeitschrift fur Metallkunde, v. 52, Mar. 1961, p. 189-193.

Microstructure, microhardness and X-ray examination after various heat treating operations at 600-1750° C. of the structure and composition of Ta-Au alloys containing 4-90% Ta. (M24b, M-general, Q29q, 2-60, 2-64; Au-b, Ta-b)

309-M. (German.) Electron Optical Investigation of Electrolytically and Chemically Produced Oxide Crystals on Polycrystalline Copper. Johanna Vahl. Zeitschrift fur Metallkunde, v. 52, Mar. 1961, p. 193-195.

Production of CuO single crystals by anodic oxidation at 60° C. of polycrystalline electrolytic 99.98% Cu sheet using an NaOH electrolyte and by oxidation in an alkaline $K_2S_2O_8$ solution at 65° C. Subsequent X-ray diffraction identification of CuO crystals and electron microscopic examination of crystal geometry. (M21e, M22g, L19, R1h; Cu)

310-M. The Dependence of Wire Texture in F-C-C Metals on Stacking Fault Energy. Norman Brown. Metallurgical Society of AIME, Transactions, v. 221, Apr. 1961, p. 236-238.

Theoretical examination, correlated with existing data for Al, Cu, Ni, Au, Ag and alpha brass cold drawn specimens suggesting that the relative amounts of (111) and (100) wire texture which occur in f-c-c. metals are determined by the difference in the ease of cross slip which is controlled by the stacking fault energy. 17 ref. (M26c, Q24a, 3-68; Ag, Al, Au, Cu-b, Ni, 4-61)

311-M. Liquid-Solid Phase Distribution Studies in the Systems Iron-Lead, Cobalt-Lead, Chromium-Tin and Nickel-Silver. David A. Stevenson and John Wulff. Metallurgical Society of AIME, Transactions, v. 221, Apr. 1961, p. 271-275.

The solubility of Fe and Co in liquid Pb, of Cr in liquid Sn and Ni in liquid Ag are determined at 450-1300° C. to show the relationship between lag mole fraction of solute and the inverse of the absolute temperature. Values are given for the differential heat of solution and the excess partial molar entropy. 9 ref. (M24b, P12, 2-61; Pb-b, Co, Fe, Sn-b, Cr, Ag-b, Ni)

312-M. A Study of the Ti-Cu-Zr System and the Structure of Ti_2Cu. Elmars Ence and Harold Margolin. Metallurgical Society of AIME, Transactions, v. 221, Apr. 1961, p. 320-322.

The partial isothermal section of the Ti-Cu-Zr system is studied at 750° C. with X-ray diffraction determination of the crystal structure of Ti_2Cu. 9 ref. (M24c, M26; Ti-b, Cu, Zr)

313-M. Phase Equilibria and Elevated Temperature Properties of Some Alloys in the System Ni_3Cr-Ni_3Al. C. M. Hammond, R. A. Flinn and Lars Thomassen. Metallurgical Society of AIME, Transactions, v. 221, Apr. 1961, p. 400-405.

A portion of the Ni_3Cr-Ni_3Al phase diagram is investigated including the precipitation of gamma prime (Ni_3Al) and the existence of ordered gamma (Ni matrix) with metallographic studies by electron microscopy and X-ray diffraction and creep and tensile testing at 20 and 600-1300° C. 22 ref. (M24d, M-general, N-general, Q-general, 2-60, 2-62; Ni-b, Al, Cr)

314-M. A Technique for the Preparation of Thin Films of Two-Phase Alloys Suitable for Use in Transmission Electron Microscopy. G. S. Ansell, L. R. Sefton and E. Eichen. Metallurgical Society of AIME, Transactions, v. 221, Apr. 1961, p. 406-407.

An air-abrasion technique using minute Al_2O_3 particles in a CO_2 stream impinging on the specimen surface is used for thinning SAP dispersion alloy foil for metallographic examination. (M20p; Al-b, 6-70, 14-62)

315-M. Shock Loading to Produce Fine Grain Structure. E. G. Zukas and R. G. McQueen. Metallurgical Society of AIME,

Transactions, v. 221, Apr. 1961, p. 412-413.

Production of isotropic fine grain microstructure in ingot Fe plate by shock loading, using a plane-wave initiated high-explosive charge through a 1 5/8 air space, followed by recrystallization annealing at 650° C. for 2 hr. (M27c, G-general, 2-64; Fe-a, NM-k34, 17-57)

316-M. (Russian.) Composition Diagram of Fe-Al Alloys in the Region of Self-Regulating Solid Solutions on the Basis of Fe. Ya. P. Selinskii. Zhurnal Neorganicheskoi Khimii, v. 5, Nov. 1960, p. 2435-2439.

Dilatometric and thermomagnetic determination of critical temperatures and ferromagnetic transition ranges in Fe-Al alloys. Relation of magnetic saturation to temperature and Curie point. Effect of composition on transitions, Curie point and magnetic properties. 10 ref. (M24b, M-general, N8, P16; Fe-b, Al)

317-M. (German.) Trends of Development in Electro Steel Sheet. H. Reinboth. Umschau, v. 14, Oct. 1960, p. 372-378.

Development of dynamo and transformer sheet of low-carbon steel with up to 4.5% Si and Ni alloyed steel with classification in terms of dynamo steel sheet; textureless transformer sheet, "simple texture sheet" (large texture, one cube edge in rolling direction) and "cube texture sheet". (M26c, P16, S22; ST-f, 4-53)

318-M. (Russian.) Nature of the Sigma Phase. N. V. Ageev and V. Sh. Shekhtman. Doklady Akademii Nauk SSSR, v. 135, Feb. 1960, p. 309-311.

A Cr-Re alloy with 37 at.% Cr, a Mn-Re alloy with 47.7 at.% Mn and a Fe-Re alloy with 55 at.% Fe are heat treated at 1000-1500° C. for 6-500 hr. From the results of X-ray tests, conclusions are drawn on the atomic structure and the amount of Re present in the sigma phase. 15 ref. (M25; Cr-b, Fe-b, Mn-b, Re-b)

319-M. X-Ray Measurement of Intragranular Misorientation in Metals. Wire and Wire Products, v. 36, Apr. 1961, p. 482, 522-523.

Quantitative measurement by X-ray diffraction techniques of the misorientation in plastically strained polycrystalline specimens of cartridge brass. (M26c, M22g; Cu-n)

320-M. (German.) Influence of Several Elements on Grain Size of Silicon Crystals in Al-Si Cast Alloys. Chiu Shiu-Tang. Naturwissenschaften, v. 48, Mar. 1961, p. 71-72.

Influence of alloying elements on grain size in hypo-eutectic (5.46% Si, 0.3% Fe), eutectic (12% Si, 0.44% Fe) and hypereutectic (22.52% Si, 0.64% Fe) Al-Si alloys. Classification of influencing elements in terms of phase reactions such as monotectic (Na, K, Pb, Cd and Bi), peritectic (Cr and Mn) and eutectic (Sb, Ca and Li) reactions favored by respective elements and elements which diminish oxidation impurities (Ni, Zn and S). (M27c, 2-60; Al-b, Si, Fe)

321-M. (German.) Selenium and Its Crystallographic Properties. Lieselotte Moenke-Blankenburg. Jenaer Jahrbuch 1959, 1959, p. 211-225.

Review of crystal properties in terms of polymorphy, crystal geometry and lattice structure. Investigation of crystallization mechanism by microstructure examination at 20-210° C. (M26, M27, 2-61; Se)

322-M. Crystal Structure of $PdGa_5$. Suraj Bhan and Konrad Schubert. Indian Institute of Metals, Transactions, v. 13, Dec. 1960, p. 332-336.

X-ray diffraction and metallographic examination of powder and single crystal specimens relating structure to $CoGa_3$ and $CuAl_2$. Data are given for mean atomic volume, lattic constants and space group. 4 ref. (M25, M26; Ga-b, Pd)

323-M. The Ternary System Aluminum-Silver-Manganese. Werner Kosten and Mohendar Sekhii. Indian Institute of Metals, Transactions, v. 13, Dec. 1960, p. 337-350.

The constitution of the system is investigated by thermal, microscopic and X-ray analysis in the melt area and an isothermal section at 500° C. with data given for eutectic and peritectic transformations, solubility relations and boundary systems. (M24c; Al-b, Ag-b, Mn-b)

324-M. Structural Irregularities in Mechanically Deformed Cobalt. T. R.

Anantharaman. Indian Institute of Metals, Transactions, v. 13, Dec. 1960, p. 374-382.

Effect of microstresses and stacking faults occurring during mechanical deformation (rolling) on X-ray line broadening in rod and thin film Co specimens annealed in vacuum at 800° C. 12 ref. (M26b, M22g, 3-66, 3-68; Co-a)

325-M. (French.) Notch Effect Due to Graphite. Gabrielle Aubrion. Fonderie, v. 181, Feb. 1961, p. 70-84.

Determination of the K coefficient, representing the notch effect in relation to the form of the graphite and the nature of the matrix for gray, malleable and spheroidal graphite castings. 9 ref. (M27; CI)

326-M. Dislocation Loops Formed in Zinc Crystals During Low Temperature Pyramidal Glide. P. B. Price. Philosophical Magazine, v. 6, Mar. 1961, p. 449-451.

Electron microscopy examination of elongated dislocation loops formed during tensile straining of single crystals at -60 to -120° C. (M21e, M26b, Q24, 2-63, 3-68; Zn, 14-61)

327-M. The Cooperative Movement of Dislocation in Very Pure Aluminum Foil. R. N. Wilson and P. J. E. Forsyth. Philosophical Magazine, v. 6, Mar. 1961, p. 453-454.

Thin foils of 99.99% pure Al and 99.9999% pure zone refined Al are strained in tension with transmission electron microscopy examination to determine the effect of the impurity level on deformation movement and mode of fracture. Cooperative movement in arrays is observed in the zone refined specimens. 5 ref. (M26b, M21e, 3-68, 3-69; Al-a, 4-56)

328-M. Dislocation Loops and Hardening in Neutron Irradiated Copper. M. J. Makin, A. D. Whapham and F. J. Minter. Philosophical Magazine, v. 6, Mar. 1961, p. 465-468.

Foil specimens of 99.998% Cu are neutron irradiated at -195° C. and examined in the cold stage of a Siemens microscope. Loop growth is determined as a function of temperature-influenced point defect mobility with irradiation hardening being related to loop density. 6 ref. (M26b, N3, 2-63, 2-67; Cu, 4-56)

329-M. (Ukrainian.) Crystal Structure of $MnNi_{1.55}Si_{0.45}$ Compound. Yu. B. Kuzma and E. E. Cherkashin. Dopovidi Akademii Nauk Ukrainskoi RSR, Oct. 1960, p. 1413-1415.

Microstructure and X-ray analysis of Mn-Ni-Si and Mn-Co-Si alloys with 30-35 at.% of Mn. Homogeneous range and lattice parameters of $MnNi_{1.55}Si_{0.45}$ compound. Existence of ternary compounds such as $Mn_{20}Ni_{55}Si_{25}$ and $Mn_{50}Ni_{35}Si_{15}$. 7 ref. (M26, S11p; Co-b, Ni-b, Mn, Si)

330-M. (Ukrainian.) Fine Crystalline Structure Changes in Aged Nimonic Type Alloys. V. G. Chornii. Ukrainskii Fizichnii Zhurnal, v. 5, May 1960, p. 689-691.

Alloy containing 1.6% Ti, 0.43% Al and 19.67% Cr (rest Ni) is hardened in water from 1080° C. with subsequent aging at 400-950° C. for 4 hr. Study of heterogeneity of lattice parameters and determination of mosaic block size by the width of interference lines in the region of X-ray scattering. 5 ref. (M26, M22g; Ni-b)

331-M. (German.) Influence of Deformation on Cold Rolling and Recrystallization Textures of Iron-Silicon Sheets. Konrad Sagel. Archiv fur das Eisenhuttenwesen, v. 32, Mar. 1961, p. 153-164.

X-ray, microstructure and magnetic (torque measurement) investigation of cold rolling and primary recrystallization textures after four cold rolling operations and various annealing treatments (400-1200° C.) of Fe-Si alloy (0.01% C, 2.6-3.45% Si). (M26c, 3-68; Fe-b, Si)

332-M. Crystal Structures and Phase Transitions of the Gold-Rich Gold-Cadmium Alloy. H. Hirabayashi and S. Ogawa. Acta Metallurgica, v. 9, Apr. 1961, p. 264-274.

Single crystal and polycrystal specimens containing 23.2-28.6% Cd are examined by X-ray diffraction and by electrical resistance and specific heat measurements after annealing and quenching. A one-dimensional antiphase domain is noted in the ordered state exhibiting f-c-t. structure with stacking faults being evident in the hexagonal structure. Data are given for lattice constants, order-disorder transitions, resistivity and thermodynamic properties. 17 ref. (M26, M-general, N10, N-general, P12r, 2-60, 2-64; Au-b, Cd)

333-M. Texture and Earing in Deep Drawing of Aluminium. G. E. G. Tucker. Acta Metallurgica, v. 9, Apr. 1961, p. 275-286.

A theoretical approach using the maximum resolved shear stress criterion for dip on (111) (110) systems is advanced for predicting the important features of the earing of cups pressed from single crystals with substantiation by measurement of cups pressed from Al specimens. The theory is extended to include polycrystalline materials. 15 ref. (M26c, G4b, 3-71, 3-72; Al)

334-M. The Deformation of a Tilt Boundary Under Applied Forces. A. N. Stroh. Acta Metallurgica, v. 9, Apr. 1961, p. 315-319.

The equilibrium positions of the dislocations forming a tilt boundary are found when they are acted on by applied forces varying both periodically and aperiodically along the boundary. Explicit expressions are obtained for the displacements when these are small; large displacements are determined by using a relaxation technique. 4 ref. (M26b, 3-66)

335-M. (Hungarian.) Determination of the Residual Austenite Content in Hardened Steels by X-Ray Diffraction. E. G. Fuchs. Acta Technica Academiae Scientiarum Hungaricae, v. 32, Mar-Apr. 1961, p. 389-414.

Metallographic, dilatometric, magnetic and X-ray diffraction analysis of the residual austenite content in hardened steels. 24 ref. (M22g, N8n; ST)

336-M. (Translation-ConBur.) Phase Diagram of the Zirconium-Rhenium System. E. M. Savitskii, M. A. Tylkina and I. A. Tsyganova. Soviet Journal of Atomic Energy, v. 7, Mar. 1961, p. 724-727.

The phase diagram of the Zr-Re system is constructed from X-ray and microscopic analysis and melting points, hardness and microhardness data. Solubility studies are made from 550-2500° C. Zr_5Re_{24}, ZrRe2 and Zr2Re are formed by peritectic reactions. 8 ref. (M24b, P12e; Zr-b, Re-b)

337-M. (Translation-ConBur.) Phase Diagram for the Niobium-Rhenium System. E. M. Savitskii, M. A. Tylkina and K. B. Povarova. Soviet Journal of Atomic Energy, v. 7, Mar. 1961, p. 937-940.

Phase analysis of the alloys of the system by X-ray structural analysis and microscopic methods and by measuring the hardness and microhardness of the structural components. Alloying and annealing is from 1000-3170° C. Starting materials are Re powder (99.8% purity) and a forged Cb cermet. $Re_{22}Cb_7$ is formed by peritectic reaction. 6 ref. (M24b; Re-b, Cb-b)

338-M. (French-German.) Quantitative Micrography. A. Braun. Pro-Metal, v. 14, Apr. 1961, p. 466-477.

Method for evaluation and interpretation of three-dimensional microstructural grain size in single and multiple phase isotropic and anisotropic Cu and Cu alloys by unidimensional measurement. (M27c; Cu-b)

339-M. (Russian.) Metallographic Investigation of Alfenol Alloy (Fe and 16% Al). N. G. Lahman and B. G. Livshits. Izvestiya Vuz-Chernaya Metallurgiya, Sept. 1960, p. 148-156.

An induction melted alloy of Armco Fe and Al is analyzed following homogenization and hot rolling by chemical and metallographic methods. Data are given for lattice structure, hardnesses, electrical resistance and micro emf. as affected by cooling rate and homogenization. 17 ref. (M26, M-general, P-general, Q29n, 2-64; Fe-b, Al)

340-M. Phase Identification in Nickel-Base Alloys. J. E. Wilson and J. F. Radavich. Metal Progress, v. 79, May 1961, p. 94-96.

As-cast structures contain gamma prime, Ni_3Al, a complex boride and Ti carbonitride. During heat treatment the carbonitride breaks down and another complex carbide forms at its expense. Grain size and distribution of phases determine rupture life. (M27, M21e, M22g; Ni-b, SGA-h)

341-M. The Electron Microscope...a New Tool for Examining Fractures. Austin Phillips and Guy A. Bennett. Metal Progress, v. 79, May 1961, p. 97-102.

Fracture surfaces of metals can now be examined at magnifications up to 50,000 x by the electron microscope. This technique, termed "electron microfractography", may become an important tool in failure analysis; it promises to reveal many of the heretofore undisclosed details associated with the various failure phenomena. (M12e, M23p)

342-M. Cryogenics and Radiation Damage. L. Weil. Cryogenics, v. 1, Mar. 1961, p. 129-134.

Review of radiation defect occurrence and this observation in solids, such as Cu, W, Cb, Al, Bi, Re, other metals and nonmetals. Measurement of related thermal conductivity and electrical resistivity at 1-80° K. Effect of irradiation time, thermal treatment and straining on recovery and out of defects and lattice imperfections. (M26s, P11h, P15g, 2-63, 2-67; Cu, W, Cb, Al, Bi, Re, NM)

343-M. (German.) X-Ray Determination of Frenkel Defects in Copper. M. Schenk. Kernenergie, v. 4, Jan. 1961, p. 9-11.

X-ray measurement of intensity variations in radiation of a f-c-c. lattice (using Cu) with fast neutrons (Mo radiation). Computation of Frenkel defects using an atomistic model. (M26s, M21f; Cu)

344-M. (Japanese.) The Microstructure of Radar Housings Etched With 5% Hydrofluoride. Takuichi Morinaga, Shigeo Zaima, Tsuneo Takahashi and Yukio Aono. Imono (Japan Foundrymen's Society, Journal), v. 33, Feb. 1961, p. 12-18.

Metallographic examination of specimen parts of radar housings cast from AC7A Al-Mg alloy by sand and metal molding methods. Effect of casting's shape, nonuniformity of casting pressure and cooling conditions on variance of properties. 3 ref. (M27, M-general, E25; Al-b)

345-M. Metallurgical Application of X-Ray Projection Microradiography. J. Vettraino and F. Seppi. U. S. Office of Technical Services, PB 171381, Aug. 1960, 55 p. $1.75.

Methods of preparing thin specimens. Several microradiographs were obtained of ferrous and Al alloys so that the usefulness of the X-ray microscope could be compared with the optical metallograph. (M21f; Al-b, Fe-b)

346-M. Refractory Metal Constitution Diagrams. A. R. Kaufman. Nuclear Metals, Inc., Massachusetts Institute of Technology and Westinghouse Research Laboratories (Wright Air Development Division). U. S. Office of Technical Services, PB 171391, Oct. 1960, 197 p. $3.

Nine binary constitution diagrams and one ternary constitution diagram of some of the refractory metals including Ta-Ru, W-Ru and Ta-Os. (M24; Ta-b, Ru-b, W-b, Os-b)

347-M. (Russian.) Structure and Heat Resistance of Alloys and Steels. I. L. Mirkin and V. Z. Tseitlin. Metallovedenie i Termicheskaya Obrabotka Metallov, Feb. 1961, p. 2-11.

Kinetics of structural changes in heat resistant materials exposed to long service at elevated temperatures. The rate of pearlite and carbide grain growth in various materials, long time tensile strength and creep strength are tested at 300-700° C. Heat resistance in relation to composition. 21 ref. (M27, Q27a, Q3m)

348-M. (Russian.) Sigma Phase in 1Kh20N14S2 Steel. V. S. Lyashenko, V. N. Bykov and V. A. Rudenko. Metallovedenie i Termicheskaya Obrabotka Metallov, Feb. 1961, p. 22-24.

Phase composition and microstructure study of steel (containing 0.14% C, 20.2% Cr, 15.5% Ni, 2.44% Si and 1.14% Mn) aged at 650° for 5000 hr. Stabilization of structure to prevent tendency to embrittlement resulting from aging. 5 ref. (M24, M27; ST)

349-M. (Russian.) Effect of Alloying Elements on the Phase Composition of Austenitic Steel. N. Ya. Karasik and N. E. Shepyanova. Metallovedenie i Termicheskaya Obrabotka Metallov, Feb. 1961, p. 28-30.

X-ray analysis of electrolytically isolated carbides from four identical steels containing 0.85-0.99% Cb and additionally alloyed with Mo, W or both in various concentrations. 5 ref. (M24, S11p; SS-e, 5)

350-M. Tin-Antimony Equilibrium Diagram. R. F. Smart. Tin and Its Uses, no. 51, 1961, p. 8-9.

Data given for the solid solubility, order-disorder transformation temperature, alpha and beta phases and crystal structure and parameters of Sb-Sn equilibrium diagram. 12 ref. (M24b; Sb-b, Sn-b)

351-M. Fractographic Analysis of AISI 4340 Steel by Optical and Electron Microscopy. N. A. Tiner. ASTM Preprint no. 82, 1961, 9 p.

Shear and transverse fractures are examined to determine direction of crack propagation. 11 ref. (M21, Q26q; ST)

352-M. (Czech.) Nonaging Deep Drawing Steel for Heavy Duty Stampings. J. Solc, M. Zezulova and Zd. Zdenek. Hutnicke Listy, v. 16, Mar. 1961, p. 159-168.

Sheet of 1.5-3 mm. thickness containing 0.10-0.12% C, 0.30-0.45% Mn, 0.05-0.10% Si, 0.07-0.10 Al, max. 0.030% P and max. 0.030% S is normalization annealed at 910° C., allowed to cool to 650° C., held at this temperature for 16 hr. and subsequently stored for 3 months. Structure and tensile testing at various stages of the above treatment. 9 ref. (M27, Q27a, 2-65; ST)

353-M. (Czech.) Microstructure and Mechanical Properties of Welded Austenitic and Ferritic-Pearlitic Steels Used in the Construction of Heavy Duty Boilers. Karel Pawera, Vaclav Pilous and Frantisek Poboril. Hutnicke Listy, v. 16, Mar. 1961, p. 186-197.

The filler metal VZU60 is used in the Ar arc welding of CSN15225 and 17481 steels containing 0.05-0.15% C, 0.45-19% Mn, 0.15-0.70% Si, 0.40-8% Cr, 0-1% Mo, 0-0.35% V, 0-0.60% Ti, 0-0.045% P and 0-0.045% S. The weldments are subjected to heat treatments at 680-980° C. for 1/2-1 hr. and X-ray tested, bend tested; tension tested at 20 and 575° C.; structure tested, exposed to thermal cycling and corrosion and creep tested. 20 ref. (M27, Q-general; SS, 7-51)

354-M. X-Ray Microscopy. W. C. Nixon. Contemporary Physics, v. 2, Feb. 1961, p. 183-197.

X-ray microscopy is used to examine alloy specimens of Al, Sn, Mn, Cr, Fe and steel. Comparison of the wavelength limitation on resolution in various methods including reflection X-ray microscopy, contact microradiography, projection X-ray microscopy, X-ray microanalysis in air, direct emission, electron microscopy and optical mirror microscopy. 3 ref. (M21f; Al, Cr, Fe, Mn, Sn, ST)

355-M. Producing Small Parts From Sheet Metal by Etching. Machinery (London), v. v. 98, Apr. 19, 1961, p. 876-878.

Production of computer components, missile guidance system parts and other electronic apparatus by photoengraving and etching of Ni-Ag sheet metal with H_3PO_4 and $FeCl_3$. Good results are also obtained when etching ferrous metals such as Cu, Al and their alloys. (M20q, T1; Ag, Ni, 4-53)

356-M. Reticular Density in Cubic Lattices. R. H. Deiter, J. P. Ostriker and J. E. Davey. Report of NRL (Naval Research Laboratory) Progress, Apr. 1961, p. 46-47.

Method for calculation of reticular density or number of atoms per unit area, in a particular plane, for simple body-centered, face-centered and diamond cubic lattice structures. (M26)

357-M. Liquidus-Solidus Relation in Iron-Rich Iron-Niobium and Iron-Molybdenum Alloys. W. S. Gibson, J. R. Lee and W. Hume-Rothery. Iron and Steel Institute, Journal, v. 198, May 1961, p. 64-66.

The liquidus and solidus relations in Fe-rich alloys of the systems Fe-Cb and Fe-Mo are determined for alloys of high purity. Information is given on the constitution of the alloys in the solid state. (M24b; Fe-b, Cb, Mo)

358-M. The Ag-Rich Side of the Binary Phase Diagrams Ag/Au and Ag/Cu as Studied by Zone Refining. J. Markali and P. Thoresen. Acta Chemica Scandinavica, v. 15, Jan. 1961, p. 31-35.

Determination of the segregation coefficients of Ag/Au and Ag/Cu binary alloys as a function of the concentration of the solute. Concentration profiles are determined by neutron activation analysis, radioactive tracers, chemical analysis and direct spectrographic analysis. 8 ref. (M24b, 9-69; Ag-b, Au-b, Cu-b)

359-M. (Russian.) Effect of Arsenic on Structure and Properties of Rolled St. 3 sp. Steel Sections. A. V. Demakova, L. P. Tarasova and Z. I. Baranova. Stal', Dec. 1960, p. 1127-1130.

Ingots are cast from steel containing 0.142-0.260% As. Samples are taken from the upper, middle and lower parts of the ingot, exposed to a tensile deformation of 10%, held at 250° C. for 1 hr. and impact tested at -60 to +20° C. Mechanical testing of samples taken from rolled profiles with and without previous normalization at 880° C. (M27, Q6, 2-60; ST, As)

360-M. (Japanese.) The Origin of Cube Texture in Copper. Taichi Kamijo and Kazuma Yamamoto. Japan Institute of Metals, Journal, v. 25, Feb. 1961, p. 151-155.

The orientation relationship between rolling and annealing texture is examined for tough pitch Cu strip specimens after secondary rolling at right angles to the primary rolling direction and after 150° C. annealing for various times to test the oriented nucleation and growth theories for cube texture. 10 ref. (M26c, 2-64, 3-68; Cu-a)

361-M. A Metastable Compound in the System Copper-Bismuth. A. K. Covington, K. Groenwolt and B. W. Howlett. Institute of Metals, Journal, v. 89, Apr. 1961, p. 291-292.

X-ray metallograph observation of metastable Cu_5Bi_2 compounds forming in alloys of the system containing 25-75% Cu, after annealing from 200-600° C. and subsequent quenching. Precipitation of the compound occurs as a result of quenching from Bi supersaturated with Cu in the absence of Cu nuclei. 9 ref. (M26q, M-general, 2-64; Cu-b, Bi-b)

362-M. The Isobaric Point in Ternary Liquid Systems. Marc Van Lancker and Franz Halla. Institute of Metals, Journal, v. 89, Apr. 1961, p. 293-295.

Occurrence of a common point of intersection, the isobaric point, in the activity curves of several ternary systems as a function of the partial systems, irrespective of the ratio of the atomic fraction of the two components dissolved in the solvent. Investigation of intersection points in Zn-Cd-Sn, Zn-Cd-Sb, Na-Pb-Hg and Cd-Pb-Bi systems at 400-823° K. 13 ref. (M24c, P12b)

363-M. (Book-French.) Metallographic Technique. Preparation of Metallic Surfaces for Micrography and Macrography. A. Roos. 1960. 121 p. Dunod, 92, Rue Bonaparte, Paris (6e), France.

Surface conditions and principles of metallography. Specimen preparation, polishing technique, metallographic attack and final surface preparation. Electrolytic polishing. Macrography. Application to nonferrous metals, steels and cast iron. 41 ref. (M20; CI, ST, EG-a38)

364-M. Grain-Size Control in Automatic Weld Deposits. B. Phelps. Australian Institute of Metals, Journal, v. 6, Feb. 1961, p. 78-82.

Methods of refining the "as cast" grain size of weld deposits by nucleation, vibration and heat treatment. It is concluded that vibration and heterogeneous nuclei can be effective grain refiners if the parent plate itself is reasonably fine-grained. 13 ref. (M27c; AD-p35, 7-51)

365-M. (Russian.) Temperature Dependence of the Growth Velocity of Beta Crystals in Bronze. A. L. Belinkii. Metallovedenie i Termicheskaya Obrabotka Metallov, Mar. 1961, p. 25-27.

The bronzes BrO 24.6 and BrO 24.8 are cooled in a vacuum to -160 or -182° C. respectively. The growth of beta crystals is studied by microcinematography exposing 25-600 pictures per sec. 6 ref. (M26; Cu-s)

366-M. The Isolation of Surface Films From Copper. A. F. Beck and M. I. Pryor. Electrochemical Society, Journal, v. 108, May 1961, p. 417-423.

Oxide and sulphide films are isolated from Cu by selective attack of the film-metal interface by a 3% ammonium acetate, 0.25% bromine in methanol solution When stripping is performed in dry air, no film dissolution or contamination is detectable. 19 ref. (M20q; Cu)

367-M. On the Mechanism of Cathodic Crystal Growth Processes. B. C. Banerjee and P. L. Walker, Jr. Electrochemical Society, Journal, v. 108, May 1961, p. 449-454.

Effects of bath composition and current density on the structure and morphology of thin films of Cu deposited on Cu and Pt foil from acid-Cu and Cu-glycine baths are studied by electron diffraction and electron microscopy. Some results of similar studies of Ni deposited on brass are presented. 22 ref. (M26, M21e, M22g; Cu, Ni)

368-M. (English.) Some Observations on Copper Electrodeposits. T. B. Vaughan. Electrochimica Acta, v. 4, May 1961, p. 72-77.

Investigation into the nature of unusual metallographic markings on etched Cu electrodeposits from acid sulphate baths. Growth mechanism involving twinning on (111) planes is suggested as possible explanation. Mechanism complicates

but does not invalidate bunching mode of growth previously reported. 16 ref. (M27; Cu, 8-62)

369-M. (German.) The Phase Diagram Niobium-Rhenium. J. M. Savitzki, M. A. Tylkina and K. B. Povarova. Planseeberichte fur Pulvermetallurgie, v. 8, Jan. 1961, p. 188-191.

Establishment of the binary system Cb-Re by measurement of melting temperatures by the "bore-hole method" and phase analysis measurement, radiation, hardness measurement and microscopic investigation. 6 ref. (M24b; Cb-b, Re-b)

370-M. (English.) The Phase-Diagram Tantalum-Rhenium. M. A. Tilkina, I. A. Tsiganova and E. M. Savitzkij. Planseeberichte fur Pulvermetallurgie, v. 8, Jan. 1961, p. 192-194.

Establishment of the binary phase diagram Ta-Re by thermal analysis, metallographic investigation, X-ray analysis and microhardness measurement. Occurrence of two intermetallic compounds formed by peritectic reaction. 7 ref. (M24b; Re-b, Ta-b)

371-M. (German.) Study of the Systems Uranium-Zirconium-(Hafnium, Niobium, Tantalum) Carbon. F. Benesovsky and E. Rudy. Planseeberichte fur Pulvermetallurgie, v. 9, Apr. 1961, p. 65-76.

X-ray investigation of sintered specimens to establish structure of following ternary systems in terms of phase equilibria: UC-ZrC-C, UC-CbC-C and UC-TaC-C. Evaluation of free enthalpies of formation for UC_2. Use of UC as fuel in graphite moderated high-temperature reactors. (M24d; Cb, Hf, Ta, U, Zr, 6-69)

372-M. (English.) Alloys of Tantalum Diboride With Iron, Cobalt and Nickel. H. W. Lavendel. Planseeberichte fur Pulvermetallurgie, v. 9, Apr. 1961, p. 80-95.

Chemical analysis, microstructure and X-ray investigation of cold pressed and sintered specimens to establish the binary phase diagram TaB_2-Ni with particular reference to solid-liquid equilibria and intermetallic compounds. Substitution of Ni by Co and Fe. Formation (by peritectic reaction) temperatures and crystal structure of $MeTaB_2$ and Me_5TaB_2-type intermetallic compounds; Me_5TaB_2/Me eutectic. 5 ref. (M24d; Ta-b, Co, Fe, Ni, 6-72)

373-M. Preparing Titanium for Microscopic Examination. W. C. Coons. Metal Progress, v. 79, June 1961, p. 93.

Electrolytic polishing procedures for samples of "alpha-beta" Ti. (M21, L13p; Ti)

374-M. A Century-Old Razor. Samuel J. Rosenberg. Metal Progress, v. 79, June 1961, p. 94-96.

Spectrochemical and chemical analysis and hardness measurements of a pre-Civil War razor of German manufacture. The excellent service rendered by the razor is attributed to its being of an unusually clean steel, hardened to over C-60 and with a microstructure of fine martensite plus tiny particles of excess carbide. (M26; CN)

375-M. Growth of Single Iron Crystals for Corrosion Studies. Willard F. Brickell and Edward C. Greco. Corrosion, v. 17, May 1961, p. 237t-238t.

Method based on hydrogen reduction of $FeCl_2$ for the production of single Fe crystals with characteristic plane surfaces and essentially cubic dimensions. (M26; Fe)

376-M. (English.) On the Crystallography of Martensite--The "(225)" Transformation in Alloys of Iron. C. M. Wayman, J. E. Hanafee and T. A. Read. Acta Metallurgica, v. 9, May 1961, p. 391-402.

Microscopic and X-ray observations of orientation relationships in an Fe-7.90% Cr-1.11% C alloy, with habit plane of (449) on the austenite axis, after austenitizing and transformation to martensite by quenching. Theoretical analysis and correlation of lattice correspondence and parameter, invariant shear, Bain distortion and isotropic interface dilation. 27 ref. (M26c, M-general, N8p, 2-64; Fe-b)

377-M. (English.) Interactions of Interstitials With Dislocations in Iron. K. Kamber, D. Keefer and C. Wert. Acta Metallurgica, v. 9, May 1961, p. 403-414.

The interaction between interstitial N and C with dislocations in body-centered cubic Fe is examined by anelastic measurement, using both the

Snoek damping and the cold work damping peak. 17 ref. (M26b, Q22, 3-69; Fe-a)

378-M. (English.) Transmission Electron Microscopy Studies of Dislocation and Stacking Faults in a Hexagonal Metal: Zinc. A. Berghezan, A. Fourdeux and S. Amelinckx. Acta Metallurgica, v. 9, May 1961, p. 464-490.

Observation of dislocation loops containing stacking fault, dislocation networks and tilt and twist boundaries in 99.999% Zn polycrystal and single crystal specimen deformed by rolling. Analysis of interaction and review of dislocation theory and deformation phenomena, with classification of types of dislocations and stacking faults possible in hexagonal close-packed lattices. 26 ref. (M26b, M21e, 3-68; Zn)

379-M. (French.) Reversible Striations of Metallic Surfaces in Sulfurizing Atmospheres. J. Audar, F. Brouty and J. Benard. Acta Metallurgica, v. 9, May 1961, p. 520-521.

Polycrystal specimens of Au are exposed to H_2-H_2S atmospheres at 900° C. to determine whether surfaces grooving similar to those occurring in absorption of oxygen also occur when other elements are absorbed. The observed surface striations are compared to those for Ni and Fe. 7 ref. (M28, P13d, 2-62; Au, Ni, Fe)

380-M. (Translation-ConBur.) State of Carbon in Liquid Cast Iron. A. A. Vertman and A. M. Samarin. Academy of Sciences of the USSR, Proceedings, Physical Chemistry Section, v. 134, Sept-Oct. 1960, p. 895-897.

Carbon formation and structure in liquid cast iron by a centrifuging process. Results indicate that cast iron is a nonequilibrium, microheterogeneous system consisting of a dispersion medium of carbon and carbon enriched micelles with particle diameter of 10^{-6} cm. 8 ref. (M27; CI, C, 14-60)

381-M. (German.) Structure and Properties of Semimetals. Pt. 13. Formation of Solid Solutions Between the Metals, Arsenic and Antimony and Semiconductive Chalcogenides of the Fourth Group. H. Krebs, K. Grun, D. Kallen and W. Lippert. Zeitschrift fur Anorganische und Allgemeine Chemie, v. 308, Mar. 1961, p. 200-211.

Microstructure and X-ray investigation of vacuum melted, pulverized and 400-470° C. stress-free annealed alloys of As and Sb with Sn, Ge and Te. Evaluation of boundaries of solid miscibility, lattice parameters of solid solutions and chemical bonds. (M26q; As-b, Sb-b, Sn, Ge, Te)

382-M. (German.) Phase Diagram of Zirconium-Beryllium. V. S. Emel'janov, J. G. Godin, A. I. Evstjuchin and A. A. Rusakov. Kernenergie, v. 4, Mar. 1961, p. 228-232.

Construction of binary phase diagrams for all concentrations of the system from thermal analysis, metallographic and X-ray investigation and by hardness measurements. Formation of intermetallic phases $ZrBe_2$, $ZrBe_6$, $ZrBe_9$ by peritectic reactions is observed at 1235, 1475 and 1555° C., respectively. 5 ref. (M24b, M-general; Be-b, Zr-b)

383-M. (Translation-Chemical Society.) A New Boride Phase in the Beryllium-Boron System. G. S. Markevich, Yu. D. Kondrashev and L. Ya. Markovskii. Russian Journal of Inorganic Chemistry, v. 5, Aug. 1960, p. 865-867.

X-ray diffraction analysis of the crystal structure and lattice parameters of Be_5B formed by compacting B and Be powders in atomic ratios from 1:9-1:2 and annealing at 1000-1100° C. Other properties investigated include electrical conductivity and resistivity, hydrolysis in acids forming suboxides and boron hydride formation in HCl. 6 ref. (M24b, M22g; Be-b, B)

384-M. (Italian.) Influence of Preheating Time Before Hardening on Structure and Tensile Strength of Some Chill-Cast Aluminum Alloys. C. Panseri and G. Bracale. Alluminio Nuova Metallurgia, v. 30, Mar. 1961, p. 119-130.

Variations of microstructure, tensile strength, elastic limit and elongation of Inafond C 41, S 52, S 71 and Termafond C 3 and C 46 as a function of composition and preheating time. 4 ref. (M27, Q23p, Q21e, Q27, 2-60, 3-67; Al-b, 5-66)

385-M. Light Alloy Grain Size Control and Supercooling Measurements. V. B.

Kurfman. Modern Castings, v. 39, Apr. 1961, p. 98-102.

Rapid determination of grain size in commercial purity Mg and Al alloys by a simple cooling curve determination based on supercooling measurement. Possible usage of this measurement to estimate the grain diameter of various alloys to determine if the melt will be coarse grained. (M27c; Al-b, Mg-b)

386-M. Binary and Ternary Phase Diagrams of Columbium, Molybdenum, Tantalum and Tungsten. J. J. English. Defense Metals Information Center, Battelle Memorial Institute, DMIC Report 152, Apr. 28, 1961, 225 p. (Available as PB 171421 from U. S. Office of Technical Services, Washington 25, D. C.)

Compilation of 93 binary and 68 ternary phase diagrams of Co, Mo, Ta and W in combination with other elements. Information on solubility and crystal structure of intermediate phases. 233 ref. (M24b, M24c; Co-b, Mo-b, Ta-b, W-b)

387-M. (Russian.) Equilibria of the Cb-C-O System. F. G. Kusenko and P. V. Gel'd. Isvestiya VUZ-Tsvetnaya Metallurgiya, Feb. 1961, p. 43-52.

Temperatures for the gradual reduction of Cb_2O_5 by carbon. Partial reduction to CbO_2 is achieved at a temperature above 1230° K., further reduction to CbO occurs at more than 1650° K. At 2860° K. and 1 atm. pressure (or at 1550° C. in a technical vacuum) the higher carbide forms as an intermediate product. 19 ref. (M24c, C26; Cb-b, C, O)

388-M. (Russian.) Radiographic Testing of Nonferrous Metals While Exposed to Cycling. Yu. S. Terminasov and A. M. Toropov. Isvestiya VUZ-Tsvetnaya Metallurgiya, Feb. 1961, p. 116-122.

Effect of cycling at room temperature on the width of /222/ and /311/ lines, size of mosaic blocks and lattice distortions of Al and Cu. 7 ref. (M23n; Al, Cu)

389-M. (Translation-Columbia) Investigation of the Principal K Absorption Edge of Nickel in Nickel-Aluminum Alloys. S. A. Nemnonov and M. F. Sorokina. Academy of Sciences of the USSR, Bulletin, Physical Series, v. 24, Apr. 1960, p. 462-466.

Investigation of Ni, Ni_3Al, NiAl and $NiAl_3$ by X-ray spectroscopy shows that the K absorption edge undergoes modification in crystallographic structure and electron density with an increase of Al. (M22g, M25, M26, P17, 2-60; Ni-b, Al)

390-M. An X-Ray Study of Deformation Stacking Faults at Low Temperature in Lead, Some Lead Alloys and Aluminum. G. F. Bolling, T. B. Massalski and C. J. McHargue. Philosophical Magazine, v. 6, Apr. 1961, p. 491-502.

The deformation stacking-fault probability, alpha, is determined by the deformation of bulk specimens of zone-refined Pb at 4.2 and 77° K. Al (99.996%), alpha-brass (70:30), 0.1% Pb, Ag and Pb-20% In are also examined at 4.2° K. with relation of stacking-fault probability to twin boundary energy and electron interaction as a function of deformation increase. 19 ref. (M26b, Q24b, 2-63, 3-68; Pb-b, In, Ag, Al, Cu-n)

391-M. Dislocation Decoration by Precipitation in Gold-Cobalt Alloys. R. B. Campbell and L. Muldower. Philosophical Magazine, v. 6, Apr. 1961, p. 531-534.

Precipitation from an alloy of Au-5% Co is observed by electron microscopy using replication and transmission technique after solution, quenching and aging treatments. Dislocation walls are observed as a result of polygonization during aging. 12 ref. (M26b, M21e, N7, N-general, 2-65; Au-b, Co)

392-M. (German.) Improved Microstructure Evaluation by Interference Evaporation Layer. Werner Pepperhoff. Archiv fur das Eisenhuttenwesen, v. 32, Apr. 1961, p. 269-273.

Microstructure evaluation of unetched polished metal and nonmetallic specimens using SiO_2 and TiO_2 evaporated layers which improve identification of phases with almost identical reflection power. Examples for Cu, Zn, Al, Ni, austenitic steel, Fe, Al-Ag alloys, heat treated X20 CrNiSi 25/4 steel and scale layers on Fe. (M27; Al, Cu, Fe, Ni, ST, Zn)

393-M. (German.) Etching and Corrosion of Aluminum Specimens in the As-Cast State. U. Benedict. Metall, v. 15, May 1961, p. 415-420.

Corrosion and etching of Al specimens of various purity (99.968-99.9992% Al)

in HCl (7%) with and without addition of 0.5 ppm. Cu, and in a concentrated mixture of HNO_3, HCl and HF. Usefulness of etching agents in metallographic examination. 10 ref. (M20q, R6g; Al, 5)

394-M. (German.) Microstructure Assessment of Melted and Sintered Materials. H. Schreiner. Metall, v. 15, May 1961, p. 422-425.

Review of theoretically possible and practically occurring types of microstructure in compact and porous, melted and sintered materials. Techniques of microstructure assessment with emphasis on porous metals such as sintered Fe, sintered Cu-Pb-Sn and W-Cu alloy. (M27; Cu-b, Fe, W-b, 6-71, 6-72)

395-M. Studies of Ferrous Materials With Electron Microscopes. Takeshi Akutagawa and Iku Uchiyama. Tetsu-To-Hagane Abstracts (Abstracts from Iron and Steel Institute, Journal), no. 10, 1960, p. 31-52.

Historical and technical review of the use of optical microscope and electron microscopes for the study of the microstructure of ferrous materials. Methods of preparing the metal specimen. 106 ref. (M21e)

396-M. On the Relation Between the Change in Modulus of Rigidity of Brass Wires by Cold Rolling and Rolling Textures. Jun Kuroyanagi. Physical Society of Japan, Journal, v. 16, May 1961, p. 1019-1023.

Pole figures are given for brass specimens after 90% reduction in cross-sectional area by cold rolling. Intensity of the texture is affected by Zn content. 5 ref. (M26c, 3-68; Cu-n)

397-M. Structural Studies of Liquid Metals by X-Ray Diffraction. P. C. Sharrah and R. F. Kruh. Paper from "Physical Chemistry of Process Metallurgy". Pt. 1. v. 7. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1959, p. 419-420.

Radial distribution numbers and coordination numbers are determined for Ga, In, Hg, Sn-Bi, Au-Sn and In-Hg systems using a diffractometer employing Bragg-Bretano geometry with a stationary level sample and counter-rotating X-ray tube and detector. (M22g; Au-b, Ga, Hg-b, In-b, Sn-b, 14-60)

398-M. (Japanese.) The Effect of Small Amounts of Additional Elements on the Anisotropic Properties of Annealed Aluminium Sheets. Toshio Amitani. Japan Institute of Metals, Journal, v. 25, Mar. 1961, p. 170-173.

Deep drawing tests on 400-450° C. annealed Al sheet specimens containing about 0.3% addition of Pb, Si, Sb, Ni, Fe, Be, Ti, Zr, Cr, Mn, Cu, Li, Mg and Zn. Influence of addition elements on recrystallized grain size and anisotropy (earing). 8 ref. (M27c, 2-60, 2-64, 3-72; Al-b, 4-53)

399-M. (Japanese.) Formation of Cube Texture in Copper. Taichi Kamija and Kazuma Yamamoto. Japan Institute of Metals, Journal, v. 25, Mar. 1961, p. 220-224.

Effect of rolling direction, annealing time and temperature on cubic texture formation in tough pitch Cu is investigated by X-ray diffraction, optical microscopy and sterographic projection examination of orientation relationships in straight and cross-rolled specimens annealed from 130-140° C. for various times. Recrystallization and polygonization phenomena in terms of oriented nucleation and oriented growth theories. 8 ref. (M26c, M-general, N-general, 2-64, 3-68; Cu-a)

400-M. (French.) Preservation of the Gamma Grain by Deposition of Nickel Alloy Vapors. G. Vigneron. Revue du Nickel, no. 2, Mar-Apr. 1961, p. 39-45.

Polished samples of an extra hard chromium steel, ferronickel with 36% Ni, cupronickel of various composition and Armco iron are brought to austenitization temperature in a vacuum while vapors of a Ni alloy, Ni or Cu are precipitated on the surface. The vapor deposit assumes and preserves the austenitic microstructure. (M27c, L25; Cu-b, Ni-b, ST, Cu, Ni)

401-M. Single Crystal Diffraction Pattern of Germanium. R. Bubakova, J. Drahokoupil and A. Fingerland. Czechoslovak Journal of Physics, v. 11, May 1961, p. 199-204.

Diffraction pattern for the (111)-reflection of Ge is measured by the three-crystal arrangement and compared with dynamical theory. Results obtained indicate the possibility of using Ge crystals for precise measurements in X-ray spectroscopy. 10 ref. (M22g; Ge, 14-61)

402-M. (Czech.) Effect of Small Aluminum Contents on Austenitic Grain Size. Zdenek Rusnak, Karel Stransky and Marie Kralova. Slevarenstoi, v. 9, Apr. 1961, p. 138-143.

To a melt of carbon steel containing 0.20-0.28% C, 0.54-0.84% Mn, 0.24-0.46% Si, 0-0.34% P and 0-0.39% S, 0-800 g. Al per ton steel are added. Test pieces are cast, normalized at 890° C. and relief annealed at 620° C. The austenitic structure at 930° C. is recorded by carbide or oxide precipitation along the grain boundaries. 12 ref. (M27c, 2-60; CN, Al)

403-M. Electron Microscopy of Etch Pits. R. E. Pawel. Materials Laboratory (Wright Air Development Center). U. S. Office of Technical Services, PB 161838, Oct. 1959, 23 p. $.75.

Advanced electron microscopic techniques uses etch pits to delineate the crystalline structure and orientation of single grains of polycrystalline Cu, brass and Al. Prior to etching, small block specimens are annealed, ground and polished on metallurgical papers and wheels. (M21e; Al, Cu, Cu-n)

404-M. The Influence of Large Amounts of Undercooling on the Grain Size of Nickel. J. L. Walker. Paper from "Physical Chemistry of Process Metallurgy". Pt. 2. v. 8. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1959, p. 845-853.

Experimental determination of the dependency of grain structure of Ni on undercooling. An hypothesis is presented to explain grain size transition in terms of mechanical disturbance caused by the rapid change in volumes at very high freezing rates. 5 ref. (M27c, N12, 3-67; Ni)

405-M. Grain Size Control During Ingot Solidification. W. A. Tiller. Paper from "Physical Chemistry of Process Metallurgy". Pt. 2. v. 8. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1959, p. 855-863.

Thermal and chemical factors controlling the ratio of equiaxed zone width and the grain sizes in these zones in ingots. Interaction between the heterogeneous nuclei and the concentration gradients and effects on the thermal properties of the alloy. 10 ref. (M27c, N12, P11, 2-61)

406-M. (Czech.) Preparation of Samples From Soft Tin and Cadmium Solders for Metallography. Zdenek Kremla, Zdenek Demek and Zdenek Hamza. Sbornik, v. 6, May-June 1960, p. 595-604. (4 p. of Tables.)

Casting of samples. Description of mechanical grinding, electrolytic and chemical polishing. Sampling by distribution of a solder drop on the surface of a glass slide. Etching with a mixture of HNO_3, acetic acid and glycerine. 18 ref. (M20; Cd, Sn, SGA-f)

407-M. (Translation.) The Structure of Copper Microwire. E. M. Nadgornyi and B. I. Smirnov. Soviet Physics--Solid State, v. 2, June 1961, p. 2707-2708. (Translation from Fizika Tverdogo Tela, v. 2, Dec. 1960, p. 2989-3196.)

X-ray analysis of the structure of Cu microwires of 4, 5, 6.6, 8, 9, 10.5, 14, 15 and 17 microns diameter. Variation of structure with diameter. 4 ref. (M26, 3-73, M22g; Cu, 4-61)

408-M. Titanium-Gadolinium Phase Diagram. J. G. Croeni, S. C. Rhoads, C. E. Armantrout and H. Kato. U. S. Bureau of Mines, Report of Investigations 5796, 1961, 14 p.

Physical properties of Ti and Gd. Impurity analysis, hardness tests, solidus-liquidus determinations, X-ray diffraction analysis and alpha-beta transformation temperatures. 6 ref. (M24b, P-general, Q29, M22g; Ti-b, Gd-b)

409-M. Cobalt-Carbon Alloys. Jozef Dilewijns. Cobalt, no. 11, June 1961, p. 28-35.

Metallographic structure of Co-C alloys containing up to 3% C. Effect of noncarbide-forming and Mn additions on the existing phases. Evaluation of hardness, tensile strength, Young's modulus and damping capacity. Effectiveness of Ce-mischmetal and Ni-Mg additions made to obtain spheroidal graphite. 11 ref. (M24b, Q-general; Co-b, C, AD-p37)

410-M. Investigation to Develop Optimum Properties in Forged Ti-7Al-4Mo. J. E. Hamer. Crucible Steel Co. for America. (Wright Air Development Division). U. S. Office of Technical Services, PB 171546, Oct. 1960, 145 p. $2.75.

Influence of six processing sequences on the microstructure, mechanical properties and heat treatment response. Forging entirely above the beta transus produces the usual Widmanstatten type of

structure found in Ti alloys after such processing. Notch tensile and notch stress rupture do not show any direct relationships with processing history. (M27, Q-general, J-general; Ti-b, Al, Mo, 4-51)

411-M. The Zirconium-Platinum Alloy System. E. G. Kendall, C. Harp and R. E. Swift. Metallurgical Society of AIME, Transactions, v. 221, June 1961, p. 445-452.

Investigations of the Zr-Pt system by metallography, incipient melting and X-ray diffraction to determine the phase relationships from 0-50% Pt. Phase fields in the Pt-rich region, intermetallic compound and solid solution formation. Eutectic, eutectoid and peritectic reactions and phase solubility relations are established after various heat treatments as a function of time, temperature and composition. 7 ref. (M24b, M-general, N-general, Pt-b, Zn-b)

412-M. Interpretation of the Rolling Texture of Copper. M. N. Parthasarathi and Paul A. Beck. Metallurgical Society of AIME, Transactions, v. 221, June 1961, p. 461-463.

X-ray methods are used to determine the (220) pole figure of OFHC Cu rolled to 96% R. A., the occurrence of four texture components of the type (135) (211) being confirmed. The total volume fraction of material close to the four symmetrical orientations of this type is larger than the volume fraction of the other components together. 12 ref. (M26c, M22g, 3-68; Cu-a)

413-M. Oxygen Potentials and Phase Equilibria in the Fe-Ca-O System. E. T. Turkdogan. Metallurgical Society of AIME, Transactions, v. 221, June 1961, p. 546-553.

A compilation and review of the data on the system. Using the results on the reduction-equilibria, an oxygen potential diagram is drawn with a number of univariant systems and invariant points, not determined experimentally, being evaluated using the theorem on univariant curves intersecting at an invariant point. The formation of solid solutions and tenary compounds are given with the crystal structures of some of the phases for some temperatures. 39 ref. (M24c, D11r, 2-61; Fe-b, Ca, O)

414-M. Dilatometric Investigations of Vacuum-Melted Zircaloy-2. Josef Intrater. Metallurgical Society of AIME, Transactions, v. 221, June 1961, p. 567-572.

A dilatometric determination of the alpha + beta region temperature limits in vacuum melted Zircaloy-2 and the temperature of transformation for alpha to alpha + beta and alpha + beta to beta on heating and cooling as a function of rate of heating and heat treating history. Data are given for thermal expansion. 14 ref. (M23b, N-general, P11g, 2-62, 2-64, 3-67; Zr-b)

415-M. Phase Diagram and Thermodynamic Properties of the Thorium-Zinc System. P. Chiotti and K. J. Gill. Metallurgical Society of AIME, Transactions, v. 221, June 1961, p. 573-580.

Thermal, metallographic and vapor pressure data are obtained to establish the phase diagram for the system. Four compounds corresponding to the stoichiometric formulas Th_2Zn, $ThZn_2$, $ThZn_4$ and Th_2Zn_{17} are observed with melting points determined. The standard free energy, enthalpy and entropy of formation for the compounds are determined from Zn vapor pressure data. 18 ref. (M24b, M-general, P12, 2-60; Th-b, Zn-b)

416-M. The Gadolinium-Iron System. V. F. Novy, R. C. Vickery and E. V. Kleber. Metallurgical Society of AIME, Transactions, v. 221, June 1961, p. 580-585.

The constitutional diagram is determined in part for the system Gd-Fe, seven intermetallic compounds being found at compositions corresponding to the following Gd-Fe ratios: 2:3, 1:2, 1:3, 2:7, 1:4, 1:5 and 2:17. Differential thermal analysis, densitometry, gravimetry and X-ray diffraction are used to determined melting points, lattice parameters, transformation structure and reactions and thermodynamic properties. (M24b, M-general; Gd-b, Fe)

417-M. The Gadolinium-Nickel System. V. F. Novy, R. C. Vickery and E. V. Kleber. Metallurgical Society of AIME, Transactions, v. 221, June 1961, p. 585-588.

The constitutional diagram is determined for the system Gd-Ni with nine intermetallic compounds being found

at compositions corresponding to the following Gd-Ni ratio: 3:1, 3:2, 1:1, 1:2, 1:3, 2:7, 1:4, 1:5 and 2:17. Differential thermal analysis, densitometry, gravimetry and X-ray diffraction methods are used to determine melting points, lattice parameters, transformation structure and reactions and thermodynamic properties. 8 ref. (M24b, M-general; Gd-b, Ni)

418-M. The Gadolinium-Cobalt System. V. F. Novy, R. C. Vickery and E. V. Kleber. Metallurgical Society of AIME, Transactions, v. 221, June 1961, p. 588-590.

The constitutional diagram for the Gd-Co system is determined with seven intermetallic compounds being found at compositions corresponding to the following Gd-Co ratios: 3:1, 1:1, 2:3, 1:2, 1:3, 1:4. 1:5. Differential thermal analysis, densitometry, gravimetry and X-ray diffraction methods are used to determine melting points, lattice parameters, transformation structures and reactions and thermodynamic properties. 9 ref. (M24b, M-general; Gd-b, Co)

419-M. A Study of the Titanium-Nickel System Between Ti_2N1 and TiNi. G. R. Pundy and J. Gordon Parr. Metallurgical Society of AIME, Transactions, v. 221, June 1961, p. 636-639.

The phase boundaries of "TiNi" is determined by high-temperature X-ray diffraction and metallographic techniques. The phase (centered at 51% Ni) has a restricted range of homogeneity at 500° C. and a much greater range at 800° C. "TiNi" in all alloys containing less than 51% Ni decomposes rapidly and reversibly at 36° C. to form a previously unreported phase. 9 ref. (M24b, M26q, M-general, 2-60, 2-61; Ti-b, Ni-b)

420-M. The Structure of Ti_3Al. A. J. Goldak and J. Gordon Parr. Metallurgical Society of AIME, Transactions, v. 221, June 1961, p. 639-640.

The hexagonal structure and lattice parameters for powdered Ti-25% Al alloys prepared by levitation melting are determined by X-ray diffraction examination at temperatures to 900° C. No superlattice lines are observed. 7 ref. (M26q, M22g, 2-61; Ti-b, Al)

421-M. The Phase Relationships in the Magnesium-Rich Region of the 335° C. Tetrahedrom of the Mg-Al-Ca-Zn Phase Diagram. J. B. Clark. Metallurgical Society of AIME, Transactions, v. 221, June 1961, p. 643-644.

X-ray diffraction examination of phase equilibria in the 60-80% Mg regions of the system, with data for ternary phase stability, composition and solid solubility relation. No quaternary intermetallic compounds are found. (M24d, M26q, M22g; Mg-b, Al, Ca, Zn)

422-M. The Solid Constitution in the Magnesium-Rich Region of the Mg-Ca-Zn Phase Diagram. J. B. Clark. Metallurgical Society of AIME, Transactions, v. 221, June 1961, p. 644-645.

X-ray diffraction metallography is used to determine the existence of two ternary intermetallic compounds, beta and omega, in equilibrium with the Mg solid solution in the Mg-rich isothermal section of the system. (M22g, M24c, M26q; Mg-b, Ca, Zn)

423-M. Stacking Faults in Platinum. J. Taranto and F. R. Brotzen. Metallurgical Society of AIME, Transactions, v. 221, June 1961, p. 645-646.

The loss of stacking faults and dislocations in Pt specimens during recovery as a result of annealing is investigated by line shift measurements using X-ray methods on Pt filings after isochronal annealing at 1200° C. 10 ref. (M26b, M22g, N4, 2-64; Pt)

424-M. On the Existence of Lower Tantalum Oxides. R. J. Wasilewski. Metallurgical Society of AIME, Transactions, v. 221, June 1961, p. 647.

X-ray diffraction examination of Ta powder specimens after annealing in oxidizing atmospheres at 1050° C. and nitriding at 850° C. to investigate the existence of the Ta_2O phase. The suboxide is identified as oxynitride, rather than Ta_2O, with data given for lattice parameters and crystal structure. 8 ref. (M22g, M26q; Ta, 14-68)

425-M. (German.) Ternary System of Aluminum-Silicon-Vanadium. Erich Gebhardt and Gunter Joseph. Zeitschrift fur Metallkunde, v. 52, May 1961, p. 310-317.

Microstructure investigation, microhardness and X-ray examination, thermal analysis, tensile testing from 20-350° C. and corrosion testing in NaCl solution (5%), of Al-Si-V specimens with 0-12% V and 0-14% Si. Establishment of the Al-rich portion of the ternary phase diagram. (M24c; Al-b, Si, V)

426-M. (German.) Bonding Types in Intermetallic Phases of the NiAs Type. Hans Wever and Gunter Wintermann. Zeitschrift fur Metallkunde, v. 52, May 1961, p. 329-336.

Electrolytic measurements of transport numbers and diffusion coefficients in binary Ni-Sn (composition $Ni_{1.5}Sn$) and binary Cu-Sn specimens at 1084° C. Interpretation of results in terms of bonding types. (M25h, N1; Cu-b, Ni-b, Sn-b, 14-68)

427-M. Stainless Lox Vessels Must Meet Extreme Cleanliness Tests. Inco Nickel Topics, v. 14, Apr. 1961, p. 10-11.

Sand blasted, vacuum cleaned and pickled 304 stainless steel pressure vessels are subjected to microscopic tests to determine cleanliness. (M21, T26q)

428-M. (French.) Orientation in a 50% Iron-Nickel Alloy Caused by Neutron Irradiation in a Magnetic Field. J. Pauleve and D. Dautreppe. Journal de Physique et Le Radium, v. 22, Apr. 19, 1961, p. 39S.

Sample is irradiated in a magnetic field from 25-250° C. Anisotropy due to orientation as a function of irradiation intensity ranging from 1×10^{17} to 15.10^{17} nvt. (M26c, P16, 2-67; Fe-b, Ni-b)

429-M. (English.) The Crystal Structure of HfAl. Lars-Erik Edshammar. Acta Chemica Scandinavica, v. 15, Feb. 1961, p. 403-406.

X-ray powder measurements of space group, unit cell dimensions and interatomic distance of HfAl specimens. Comparison of structure with that of CrB. 11 ref. (M22g, M25, M26; Hf-b, Al-b)

430-M. High Temperature X-Ray Diffraction Techniques for Active Metals. J. J. Hanak and A. H. Daane. Review of Scientific Instruments, v. 32, June 1961, p. 712-714.

Technique for obtaining X-ray diffraction information on metals such as tungsten and rare earths at high temperatures (1000, 1400 and 2200° C.) One method permits simultaneous measurement of specimen heat resistance with diffraction patterns. 11 ref. (M22g, 2-62, P11h; W, EG-g45)

431-M. X-Ray Diffraction Camera for the Alignment of Large Single Crystals. R. W. Meyerhoff, D. M. Bailey and J. F. Smith. Review of Scientific Instruments, v. 32, June 1961, p. 715-717.

Examination of the degree of single crystallinity of a specimen by a back-reflection Laue camera incorporating three rotation axes and three orthogonal translation axes. Camera allows for alignment of large single crystals with a precision of ± 0.25°. (M22g, 1-52, M26)

432-M. (German.) Nitride Phases of Niobium. G. Brauer and R. Esselborn. Zeitschrift fur Anorganische und Allgemeine Chemie, v. 309, Apr. 1961, p. 152-170.

Nitriding of pure Cb sheet or powder and of CbH from 750-1450° C. in NH_3 and N_2 atmospheres. Investigation of nitride phases by chemical analysis, X-ray examination (using Cu, Ni or Fe-K alpha radiation) and density measurements. Data are given for lattice structure and phase transformations. (M26q, M-general, N-general; Cb, N, 14-68)

433-M. (German.) System Potassium-Arsenic. Friedrich Wilhelm Dorn, Wilhelm Klemm and Sigurd Lohmeyer. Zeitschrift fur Anorganische und Allgemeine Chemie, v. 309, Apr. 1961, p. 205-209.

Establishment of the K-As phase diagram up to 60 at.% As quantitatively by thermal analysis and, for higher As contents, qualitatively by comparative techniques and by X-ray methods. Data are given for melting, sublimation and transition temperatures of the compounds K_3As, K_5As_4, KAs and KAs_2. (M24b, M-general, 2-60; K-b, As-b)

434-M. (German.) On Some A_3B and AB_2-Type Compounds of the Heavy Alkali Metals With Elements of the Fifth Group. Geert Gnutzmann, Friedrich Wilhelm Dorn and Wilhelm Klemm. Zeitschrift fur Anorganische und Allgemeine Chemie, v. 309, Apr. 1961, p. 211-225.

X-ray determination using Ni-filtered Cu-K alpha radiation of crystal structure of K_3P, Rb_3As,

Rb_3Sb, Rb_3Bi and Cs_3Bi. Discussion of lattice types and space chemistry of A_3B-type compounds. Influence of electronegativity on volume contraction of ABi_2 compounds. (M25, M26; EG-e, EG-a)

435-M. (German.) Influence of Residual Copper Clouds Around Dislocations on Recombination in Germanium. S. G. Kalaschnikow and A. K. Mednikow. Physikalische Abhandlungen aus der Sowjetunion, v. 4, Feb. 1961, p. 151-160.

Measurement of specific resistance, type of conductivity and diffusion length of minority charge carriers for Ge single crystal specimens of various dislocation densities, before and after tempering in contact with Pb from 625-700° C. Influence of Cu on recombination rate. 12 ref. (M26b, P15g, 2-64, 3-69; Ge, Cu)

436-M. Moire Pattern and Dislocation Grid in Pure Iron. Hiroshi Fujita and Zenji Nishiyama. Osaka University, Institute of Scientific and Industrial Research, Memoirs, v. 18, 1961, p. 55-64.

Electron microscopic distinction between moire patterns and dislocation grids in Fe foils made by electropolishing after annealing, despite their spacings being as small as 100 A or less. 4 ref. (M26n, M26b, M21e; Fe-a, 4-56)

437-M. Distribution of Dislocations in Pure Iron Deformed at Low Temperatures. Hiroshi Fujita and Zenji Nishiyama. Osaka University, Institute of Scientific and Industrial Research, Memoirs, v. 18, 1961, p. 65-70.

Transmission electron microscope observations on pure Fe deformed at low temperatures reveal formation of the sub-boundary-like structure by heavy cold working, formation of the irregular dislocation networks and moire patterns and dynamic formation of dislocation loops. 4 ref. (M26n, M26b, M21e, 3-68; Fe-a)

438-M. (Russian.) Radiographic Investigation of Austenitic Steels. V. I. Grigorkin and G. V. Korotushenko. Izvestiya VUZ--Chernaya Metallurgiya, Feb. 1961, p. 96-99.

Investigation of crystal lattice periods, alteration in the fine grain structure and grain hardenability as dependent on fast plastic deformation of commercial forged hoop Fe and rich Mn austenitic steels. 13 ref. (M23n, M26, M27, J5, 3-68; Fe, SS-e, Mn)

439-M. (Russian.) Investigation of Iron-Aluminum Alloys. F. L. Edel'man and L. I. Tushinskii. Izvestiya VUZ--Chernaya Metallurgiya, Feb. 1961, p. 128-132.

Inexpensive alloy of low-carbon Fe and 2.49-29.36% Al is investigated to determine structure, machinability, hardness and oxidation at high temperatures (800-1100° C.) 5 ref. (M26, Q29, G17k, R1h, 2-62; Fe-b, Al)

440-M. Open Orbits and the Fermi Surface of Copper From Magnetoresistance and Hall Effect Data. J. R. Klauder and J. E. Kunzler. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 213-216.

A phenomenological determination of the topology of the Fermi surface by correlation of high-field magnetoresistance data for transverse and longitudinal rotation, as indicating the number of open orbits existing as a function symmetry direction and by calculations for the Hall constant as an indicator of closed orbits. Measurements are made at 4.2° K. with longitudinal and transverse magnetic field rotation in the case of magnetoresistance. 5 ref. (M25n, P15p, P16e, 2-63; Cu)

441-M. Fermi Surface Areas and Fermi Velocities of Mg, Zn and Cd. E. Fawcett. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 228-229.

Estimates of the free area in wave-vector space of the Fermi surface are obtained for fine-grain polycrystalline samples using a thermal method of measurement at 35.5 Gc/s and 4.2° K. An equation is derived combining Fermi surface area with d-c conductivity and electronic specific heat to obtain values for the carrier mean free path and the Fermi velocity and, consequently, the relaxation time. 4 ref. (M25, P15g, P12r; Mg, Zn, Cd, 14-61)

442-M. A Direct Comparison of the Mean Free Paths for Electrical and Thermal Conduction in Indium at Low Temperatures. J. L. Olsen and P. Wyder. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 266-267.

The size dependence of the electrical and thermal conductivities are used to determine the electron mean free paths in pure In by experimental methods and calculation using the Wiedemann-Franz law, at 0-293° K. as a function of temperature and as related to relaxation time. (M25, P11h, P15g, 2-63, 3-73; In)

443-M. Scattering of Lattice Waves by Point Defects. P. G. Klemens, R. J. Tainsh and G. K. White. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 273-276.

Thermal and electrical conductivities from 2-90° K. of Cu-rich alloys containing 0.5-2% Pr, 2.3-4% Si and 0.06% Fe and Ag-rich alloys and 2% Al, 2% Pt and 0.2% Sn, are measured to determine lattice wave scattering cross sections by point defects as influenced by impurity concentration and mass differences. 9 ref. (M26s, P11h, P15g, 2-60, 2-63, 3-69; Cu-b, Ag-b)

444-M. A Study of the Band Structure and Superconducting Properties of Several Gamma-Uranium Alloys From Measurements of Their Specific Heats Between 1° K. and 4° K. B. B. Goodman, J. Hillairet, J. J. Veyssie and L. Weil. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 350-356.

Investigation of the shape of the density of states curve in gamma U-Mo (13.7-29.6%) and U-Cb (25.9%) alloys and alpha uranium (99.95%). Correlation of data in studying the BCS relation for the transition temperature of a superconductor. 11 ref. (M25, P13h, P15g, 2-60, 2-63; U-b, Mo, Cb)

445-M. The Use of Superconductivity in Studying Neutron Irradiation Damage in Rhenium and Tin. J. Blanc, B. B. Goodman, G. Kuhn, E. A. Lynton and L. Weil. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 393-395.

Study of magnetization curves of specimens irradiated at 77° K. and 20° C. after 500° C. annealing to determine the critical temperature and frozen-in-moment as indicators of irradiation damage. Relation of superconductivity parameters to point defect and dislocation occurrence and annealing out, probably by the recombination of Frenkel pairs, as a function of temperature. 7 ref. (M26s, M26b, P15g, P16, 2-63, 2-64, 2-67; Rh, Sn)

446-M. The Effect of Free Electron on Lattice Vibration. W. C. Overton, Jr. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 677-679.

The effect of free electron gas on the lattice vibrations of f-c-c. metals is investigated for Cu in terms of a central force model with nearest and next-nearest neighbor interactions and the same model immersed in the gas of the free electron. Experimentally elastic constants near 0° K. are used to determine force constants for determining the vibration spectra. 6 ref. (M25, Q21, 2-63; Cu)

447-M. Quenched-In Vacancies and Quenching Strains in Gold. J. Takamura. Acta Metallurgica, v. 9, June 1961, p. 547-557.

The contraction in length of quenched Au specimens is observed during annealing from 8-30° C. and is interpreted in terms of vacancies. The concentration of quenched-in vacancies is given by an equation in terms of the total fractional-volume change deduced from the length measurement, the fractional volume of a vacancy, the formation energy and the quenching strain and temperature. 29 ref. (M26s, P10d, 2-61, 2-64; Au)

448-M. The Observation of Dislocations in Mica. E. C. H. Silk and R. S. Barnes. Acta Metallurgica, v. 9, June 1961, p. 558-562.

Thin cleaved fragments of mica are examined in the electron microscope and show dislocations lying in the cleavage planes. The dislocations are formed by slip and interact simply. The superposition of loose sheets of the mica produces

moire patterns which reveal those dislocations which are perpendicular to the cleavage plane. 9 ref. (M26b)

449-M. (Japanese.) The Configuration of Titanium Sulphide in Steels. Toshio Saito. Tetsu-to-Hagane (Iron and Steel Institute of Japan, Journal), v. 47, May 1961, p. 707-714.

The effect of Ti-S ratio on the distribution, shape and structure of Ti sulphide inclusions in cast steels is examined by X-ray diffraction and electron microscopy after quenching from 1200-700° C. Data are given for lattice parameters and thermodynamic properties of the sulphides and for formation of oxides, carbides and nitrides. Influence of inclusions on tensile properties and microhardness. 26 ref. (M26q, M-general, Q-general, 2-60, 2-64, 9-69; ST, Ti, S)

450-M. International Union of Crystallography--Fifth International Congress and Symposia. K. Rajagopalan. Scientific and Industrial Research, Journal, v. 20A, Apr. 1961, p. 193-196.

A review of crystallographic theory, research, techniques and apparatus. Topics include crystal structures of various metals, alloys, minerals and compounds, including the study of chemical bonding and lattice structure. (M26, A-general. 10-54)

451-M. (Translation-Brutcher no. 4985.) Nature of the Manganese Phase of Certain Magnesium Alloys. M. E. Drits. Metallovedenie i Termicheskaya Obrabotka Metallov, Oct. 1959, p. 33-37.

Development of an electrolytic method of separating Mn from Mg alloys containing 1 1/2-2% Mn. Nature of the Mn-rich phase in various systems--Mg-Mn-Al, Mg-Mn-Ca, Mg-Mn-Al-Ca and Mg-Mn. Microstructure and X-ray analysis on residues. (M27, S11; Mg-b, Mn, Al, Ca)

452-M. Fractographic Analysis of AISI 4340 Steel by Optical and Electron Microscopy. N. A. Tiner. ASTM Preprint no. 82, 1961, 9 p. $.50.

Study is made of the modes of fracture for AISI 4340 steel. Fracture surfaces are examined by electron microscopy. The discontinuous nature of fracture propagation is analyzed and two methods are developed for determining the direction of propagation. 11 ref. (M23p, M21, Q26q; AY)

453-M. (Book.) Advances in X-Ray Analysis. v. 4. William M. Mueller, Editor. 1961. 568 p. Plenum Press, New York. $15.

Proceedings of the Ninth Annual Conference on the application of X-ray analysis, sponsored by the University of Denver, Aug. 10-12, 1960. Papers are abstracted separately. (M21f, M22g, 10-54)

454-M. Electrocrystallography of Cobalt and Cobalt-Nickel Alloys. H. F. Quinn and I. M. Croll. Paper from "Advances in X-Ray Analysis", v. 4. Plenum Press, New York, 1961, p. 151-174.

X-ray analysis reveals preferred orientation in the polycrystalline deposits generally and extreme preferred orientation (characterized by (00.2) and (11.0) fiber axes) in the case of those samples obtained with additive-free electrolyte. A change in the pH of the bath or the addition of an a-c. component are equally effective in determining the type of fiber axis in the deposit. 6 ref. (M21e, M26c, L17; Co-b, Ni)

455-M. A Study of Phase Reactions in a Complex 4.5 Al-3.5 Ti-Ni Base Alloy. John F. Radavich and W. J. Boesch. Paper from "Advances in X-Ray Analysis", v. 4. Plenum Press, New York, 1961, p. 233-243.

Investigation of the phase changes after solutioning at high temperatures and aging at lower temperatures. The physical distribution and size of the precipitated phases are studied by electron microscopy. X-ray diffraction and fluorescence analysis are carried out on chemically extracted residues. 7 ref. (M21e, M22g, M24c, N7, 2-64, 2-65; Ni-b, Al, Ti)

456-M. (Translation-Brutcher no. 5010.) Structural Changes in Ferritic Magnesium-Treated Cast Iron. A. I. Yatsenko. Metallovedenie i Termicheskaya Obrabotka Metallov, Dec. 1959, p. 47-50.

Previously abstracted from original. See item 71-M, 1960. (M27, Q29q, P16a, 2-64; CI, Mg)

457-M. (Translation-Brutcher no. 5192.) Surface Defects on Rolled Steel. P. Ya. Ryzhkov and R. M. Shereshevskaya. Metallurg, May 1961, p. 25-26.

Metallographic patterns on artificially produced surface defects on tube blanks as a potentially useful guide in identifying the nature of actual surface defects such as occur on rolled stock. (M-general, 3-68; ST, 9)

458-M. Analysis of Germanium-Silicon Alloy Grown by Pulling Technique. Zensho Ishii and Yasuo Matsukura. Electrochemical Laboratory, Bulletin (Japan), v. 25, Apr. 1961, p. 280-282.

Ge-Si alloy crystals are grown from the melt using Si seeds. X-ray analysis shows that parts of about 40 wt. % in the grown crystals are single with the same orientation as the seed. X-ray diffraction and measurement of specific gravity show that the composition of the grown crystals is in the range of 97.5-91.0% Si and is homogeneous in the plane perpendicular to the growing axis. Segregation constant of Ge in Si. (M26, M22g, P10a; Si-b, Ge, 14-61, 9-69)

459-M. Projections on Electrobrightened Aluminium Surfaces. J. P. A. Wortley and T. B. Vaughan. Institute of Metals, Journal, v. 89, June 1961, p. 376.

Occurrence of geometrical shapes (i.e., pyramids with rectangular or hexagonal bases) on the polished surfaces of single and polycrystal specimens of super-pure Al during electrobrightening with a phosphoric acid solution containing chromic acid. Growth of the projections and their orientation and grain boundary relations are attributed to the absence of normal dissolution at certain sites as a function of solution age and electrobrightening time. (M28m, M27f, L13, 3-67; Al-a)

460-M. A Metallurgical Look at 300-Year-Old Iron. Warren C. Jeffery. Foundry, v. 89, Aug. 1961, p. 48-49.

Chemical composition and microstructure of a large diameter cast iron pressure pipe cast in 1664 for use in a water transporting system. (M27, T26r; CI, 17-57)

461-M. Metallographic Investigations of Ancient Iron Objects From the Territory Between the Oder and the Basin of the Vistula River. Jerzy Piaskowski. Iron and Steel Institute, Journal, v. 198, July 1961, p. 263-282.

Structures, inclusions, segregation and carburization in a variety of ancient tools, jewelry and weapons. 51 ref. (M-general, M26, M27; Fe, 9-69)

462-M. (German.) Comparative Investigation and Assessment of Methods of Evaluation of Austenitic Grain Size. Jiri Skarek and Karel Ciha. Neue Hutte, v. 6, May 1961, p. 301-309.

Direct and indirect microscopic and electron microscopic investigation of austenite grain size for unalloyed case hardenable and heat treatable steel; alloyed Mn-Si, Cr-Mn, Cr-V and Cr-Ni steel; and differently deoxidized heat treatable Cr-Ni steel, employing techniques such as direct observation in a high-temperature microscope or electron microscope; thermal etching and etching by acids and fused salts; thermal embrittlement and diffusion methods. 49 ref. (M27c, M-general, N8; ST)

463-M. (German.) Ternary System Iron-Nickel-Gold. Werner Koster and Werner Ulrich. Zeitschrift fur Metallkunde, v. 52, June 1961, p. 383-391.

Investigation of phase equilibria and establishment of the ternary Fe-Ni-Au phase diagram over the concentration range and up to melting temperatures by thermal analysis; microstructure, magnetic, X-ray and dilatometric examination and by hardness and electrical resistance measurement. (M24c, M-general, 2-61, 2-64; Au-b, Ni-b, Fe-b)

464-M. (German.) Ternary C Alloys of Pd and Pt With Mg, Al, Zn, Ga, Ge, Cd, In, Sn, Hg, Tl and Pb. Hans H. Stadelmaier and William K. Hardy. Zeitschrift fur Metallkunde, v. 52, June 1961, p. 391-396.

Preparation of ternary specimens by melting and sintering under vacuum and phase identification and lattice structure investigation by microscopic and X-ray examination. Structure of PdMg, Pd_2Zn, Pd_3Tl, Pt_3Mg, PtMg, Pt_3Al, Pt_3In and Pt_3Hg. (M24c; Pd-b, Pt-b, C, Al, Zn, Ga, Ge, Cd, In, Sn, Hg, Tl, Pb)

465-M. (German.) Combined Electrolytic and Mechanical Polishing of Iron-Carbon Alloys. Jurgen Just and Wilhelm Altgeld. Zeitschrift fur Metallkunde, v. 52, June 1961, p. 410-413.

Method, apparatus and electrolytes for polishing of Fe-C alloys (examples--lamella and nodular cast iron, steel) in microstructure investigations. (M20p; Fe-b, C)

466-M. (German.) New Shapes of Silicon Crystals in Aluminum-Silicon Alloys. Chiu Shiu-Tang. Zeitschrift fur Metallkunde, v. 52, June 1961, p. 414-416.

Microscopic investigation of shapes of Si crystals precipitated from hypereutectic Al-Si alloys (12-23% Si). Influence of alloying elements. (M26, N7, 2-60, 3-73; Al-b, Si)

467-M. (German.) Atom Distribution in Melts. Siegfried Steeb. Zeitschrift fur Metallkunde, v. 52, June 1961, p. 422-425.

Critical analysis of atom distribution curves in liquid elements (He, Ar, Xe, Li, Na, K. Al, Ag, Au, Zn, Cd, Hg, Ga, In, Tl, Ge, Sn, Pb, Bi) and in the amorphous state of Bi and Ga. Interpretation of maxima in atom distribution by a "chain model" and a statistical model derived by Bernal. (M25; 14-60)

468-M. (French.) Application of the "Total Replica" Technique to the Detection of Defects in the Inner Surface of Pipe. L. Alfille, M. Azam and M. Fignon. Revue de Metallurgie, v. 58, May 1961, p. 429-436.

The replica of the entire inner surface is obtained by use of a prevulcanized rubber solution. The quality of the replicas obtained is illustrated by some typical examples--cross wires, Knoop hardness indentations, etch pits and induced scratch marks. (M20r, M-general, 9-69; 4-61)

469-M. Notes on the Microstructure of Centrifugal Castings for the Automobile Industry. F. Cumberland. British Foundryman, v. 54, July 1961, p. 302-304.

Chemical composition and mechanical properties of pearlitic gray irons and free carbide materials used in cylinder liners and piston rings. Effect of heat treatment on microstructure. (M27, 2-64, Q-general, 2-60, T21b; CI-n, 5-65)

470-M. An Effect of Composition on the Macrostructure of Ingots of a Low-Alloy Steel. T. B. Smith, J. S. Thomas, R. Goodall and R. T. Allsop. Iron and Steel Institute, Journal, v. 198, June 1961, p. 161-163.

Effect of reducing the Si and Mn content of 1.57% Ni-Cr-Mo steel ingots on the increase in length of the columnar crystals, ingots are cast at 1600° C. from a melt consisting of Lowmoor Fe, low-Si pig iron, pure Cr, ferro-Mo, and carbonyl Ni. Si and Mn content of the steel has an influence on the ingot macrostructure which outweighs that of casting temperature. (M28, 2-60; AY, Si, Mn)

471-M. (French.) Radiocrystallography. Machine Moderne, v. 55, June 1961, p. 83-88.

X-ray diagrams are obtained for Cu, a Cd-Bi alloy, Au and single crystals, powders, sheets and wires of Al for determination of phases present, chemical composition, texture and thickness. 12 ref. (M21f, M22g, S11p, S14e)

472-M. Electron-Microscope Studies at the N. P. L. Metal Treatment and Drop Forging, v. 28, July 1961, p. 279-280.

Application of the electron microscope to ferrous and nonferrous metallurgy including Fe, Au, Cu and Cu-Sb alloys at the Metallurgy Div. of the National Physical Laboratory at Teddington. Study of precipitation of phases from solid solutions by thin film techniques and analysis of aging, surface energy, creep and composition. (M21e, N7, P13h, Q3; Fe, Au, Cu, Cu-b, Sb)

473-M. Ternary System Th-Ce-Al. J. H. N. van Vucht. Philips Research Reports, v. 16, Feb. 1961, p. 1-40.

Metallographic examination and X-ray analysis of the ternary system Th-Ce-Al, the binary systems Th-Al Ce-Al and Th-Ce and of Ce. Data are given for structure, lattice constants, atomic sites and composition. The structure of Ceto, a nonevaporating getter, is determined. 39 ref. (M26, M25, M24; Th, Ce, Al)

474-M. The Phase Diagram of the Gallium-Tellerium System. P. C. Newman, J. C. Brice and H. C. Wright. Philips Research Reports, v. 16, Feb. 1961, p. 41-50.

Phase diagram is investigated by differential thermal analysis and direct observation of melting points under controlled Te pressures. Results indicate the existence of Ga_3Te_2 and $GaTe_3$ compounds which are not stable at room temperature. Upper decomposition limits. 14 ref. (M24b, P12n, S11g; Ga, Te)

475-M. (German.) Changes on Corpuscular Irradiated Copper and Boron Surfaces. Willi Marth. Zeitschrift fur Angewandte Physik, v. 13, May 1961, p. 224-230.

Electron microscopic and X-ray investigation by replica technique of surface changes before and after bombardment with alpha particles and heavy atoms of the ThB decomposition series under 10^{-4} Torr vacuum. Leveling effect of alpha bombardment on Cu surface and "cold sintering" effect on sintered boron specimens. (M28n, M-general; Cu, B)

476-M. The Constitution of Quaternary Aluminum-Copper-Magnesium-Silicon Alloys at 500° C. D. P. Smith. Metallurgia, v. 63, May 1961, p. 223-230.

Alloys severely worked and annealed at 500° C. exhibit a quaternary phase in addition to the phases of the constituent ternary systems. Phase boundaries derived by calculations are confirmed by experiment indicating the Al solid-solution region at 500° C. 12 ref. (M24d, 2-62, 3-68; Al-b, Cu, Mg, Si)

477-M. (Japanese.) The Surface Faults of Hot-Rolled Stocks. (Supplement) Takashi Ikeno. Light Metals, v. 11, May 1961, p. 165-170.

The constituents of surface faults in hot rolled Al plate specimens after pickling and anodizing are examined by electron microscopy, X-ray, and ultraviolet and infrared absorption spectrum methods. Ca, Mg, Si, C and H are identified in both the macro and microstructure of the faults. (M-general, M28, S11, 9-71; Al-b, 4-53)

478-M. (Japanese.) Earing in the Deep Drawing of Aluminium Alloy Sheet. Pt. 1. (In the Case of 3S Aluminium.) Takuichi Morinaga and Shigeo Zaima. Light Metals, v. 11, May 1961, p. 171-176.

Effect of cold rolling reduction, direction of rolling and annealing temperature on directionality phenomena including earing height and growth and Knoop ratio as determined by deep drawing tests on specimens of 3S Al, a hot rolled, nonheat treatable alloy. 4 ref. (M28k, M28p, 2-61, 3-72, 9-71; Al-b, 4-53)

479-M. (Japanese.) Earing in the Deep Drawing of Aluminium Alloy Sheet. Pt. 2. (In the Case of 52S.) Takuichi Morinaga and Shigeo Zaima. Light Metals, v. 11, May 1961, p. 177-181.

Cold rolling reduction, direction of rolling and annealing temperature effects on directionality phenomena including earing height and growth and Knoop ratio correlation as determined by deep drawing tests on 52S Al specimens. (M28k, M28p, 2-61, 3-72, 9-71; Al-b, 4-53)

480-M. Large Dislocation Loops in Antimony Telluride. P. Delavignette and S. Amelinckx. Philosophical Magazine, v. 6, May 1961, p. 601-608.

Electron microscopy examination of hexagonal, prismatic dislocation loops in Sb_2Te_3 crystals slowly grown from the melt. The loops are attributed to deviations in the stoichiometric composition causing the precipitation of Te vacancies. Equilibrium shapes are calculated with projection of Burgers vectors and analysis of glide interactions. 8 ref. (M26b, 3-67; Sb-b, Te, 14-61)

481-M. Lattice Spacing Relationships and the Electronic Structure of H.C.P. Zeta Phases Based on Silver. H. W. King and T. B. Massalski. Philosophical Magazine, v. 6, May 1961, p. 669-682.

Phases in the systems Ag-Cd, Ag-Hg, Ag-Ga, Ag-In, Ag-Sn, Ag-As and Ag-Sb are studied by X-ray powder methods. Changes in the lattice spacing are determined as functions of electron:atom ratio and interpreted in terms of distortions of the Brillouin zone following interactions between the Fermi surface with various zone faces. 25 ref. (M25, M26, M-general, 2-60; Ag-b, Cd, Hg, Ga, In, Sn, As, Sb)

482-M. The Low Energy Ion Bombardment of Gold. D. G. Brandon and Piers

Bowden. Philosophical Magazine, v. 6, May 1961, p. 707-710.

Thin films of annealed Au (99.998% pure) are bombarded with Ar ions at energies to 75 ev. with electron microscopy examination of subsurface produced in the crystal lattice. Point defect production and vacancy and interstitial impurity effects are compared to irradiation damage. 9 ref. (M26s, 2-67; Au, 14-62)

483-M. (Japanese.) Study on Aluminum Alloy Slab. Pt. 2. Annular Ring-Like Structure in Grains. Tojiro Kobayashi and Hisao Otsuji. Light Metals, v. 11, Mar. 1961, p. 89-95.

The effect of cold rolling reduction and heat at 500° C. for 24 hr. on the disappearance of annular structures occurring in semicontinuous cast slab is studied by inferometric methods. Appearance of the structures is attributed to nonuniformity of the density of the solid solution. 4 ref. (M27c, M28, 2-64, 3-68; Al-b, 5)

484-M. (Japanese.) Effect of Zirconium on Aluminum and Its Alloys. Pt. 5. Hajime Yamada. Light Metals, v. 11, Mar. 1961, p. 101-106.

Formation of intermetallic compounds, with consequent impairment of solubility and increase of precipitation of Zr, in Al-50% Zr alloys by Fe, Mn and Cu impurities. Effects on recrystallization temperature, annealing curve at 20-600° C., lattice constants and solidification structures are examined by X-ray diffraction and metallographic methods. 7 ref. (M26q, M-general, N-general, 2-60, 3-69; Al-b, Zr)

485-M. High Velocity Dislocations. J. Weertman. Paper from "Response of Metals to High Velocity Deformation". v. 9. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 205-248.

Review of theory of uniformly moving dislocations. Extension of Eshelby's analysis of moving in an isotropic medium, showing that edge dislocations of like sign attract each other when the dislocations are traveling at velocities above the Rayleigh wave velocity. 24 ref. (M26b, 3-67, 3-68)

486-M. (Russian.) Lattice Imperfections in Cold Deformed Nickel and Nichrome. Ya. D. Vishnyakov and S. S. Gorelik. Fizika Metallov i Metallovedenie, v. 10, Dec. 1960, p. 841-852.

Cold deformation of Nichrome by filing and of Ni powder by grinding in a ball mill with subsequent vacuum heating and X-ray diffraction examination. Effects of deformation, heat treatment and Cr content on lattice imperfections and lattice parameters. 14 ref. (M26s, 2-60, 2-64, 3-68; Ni-b, Cr)

487-M. (Russian.) Effect of Sulphur on Surface Properties and Structure of Nickel-Carbon Alloys. R. A. Sidorenko and B. V. Tsarevskii. Fizika Metallov i Metallovedenie, v. 10, Dec. 1960, p. 866-872.

Samples of an alloy containing 2.40% C, 0.002% S and 0.0004% O are held with various quantities of a Ni-C-S alloy on a graphite plate at 1360° C. Influence of the Ni-C-S alloy additions on the sulphur content and effect of sulphur on the liquid metal-graphite plate contact angle, graphitization, macrostructure and microstructure. 22 ref. (M27, M28, N-general, 2-60, 2-61; Ni-b, C, S)

488-M. (German.) Structure of Hafnium-Aluminum. H. Boller, H. Nowotny and A. Wittmann. Monatshefte fur Chemie, v. 92, Feb. 1961, p. 330-334.

Investigation of crystal structure of HfAl using polycrystalline specimens and a needle-shaped single crystal. X-ray determination of lattice structure and pycnometric evaluation of stoichiometric composition of HfAl. (M26; Hf-b, Al, 14-61)

489-M. (German.) Investigation in the System Tungsten-Silicon-Germanium. H. Nowotny, F. Benesovsky and C. Brukl. Monatshefte fur Chemie, v. 92, Feb. 1961, p. 365-370.

X-ray measurement of lattice parameter and phase identification in sintered, pressure-sintered, arc-melted and long-time annealed specimens with construction of the ternary phase diagram. (M26, M24c; Ge-b, W-b, Ti-b)

490-M. Crystal Structures and Electrical Properties of Alkali Antimonides. Junichi Chikawa, Shunji Imamura, Kenzo Tanaka and Makoto Shiojiri. Physical Society of Japan, Journal, v. 16, June 1961, p. 1175-1180.

X-ray study and electrical measurements in vacuum on K-Sb, Na-Sb, Cs-Sb and RbSb to determine relationships between crystal structure transitions and number of excess alkali atoms. 5 ref. (M26, P15, S11q, 1-73; EG-e41, Sb)

491-M. Observation of Dislocations in Germanium Single Crystal. Masakazu Shoji, Shoji Tauchi, Tomokuni Mitsuishi and Masami Tomono. Physical Society of Japan, Journal, v. 16, June 1961, p. 1253.

Dislocation lines in Ge are observed using the Borrman method in order to compare density of etch pits with that of X-ray images. 6 ref. (M26b; Ge, 14-61)

492-M. (German.) Crystal Structure of $CaZn_2$. J. Wieting. Naturwissenschaften, v. 48, May 1961, p. 401.

X-ray measurement of lattice parameters on single crystal specimens and powder samples. (M26; Zn-b, Ca)

493-M. Concerning the Distribution Coefficient of Gold in Lead. J. T. Tubb, E. L. Holmes and W. C. Winegard. Canadian Journal of Physics, v. 36, June 1961, p. 945-947.

The value of the distribution coefficient is obtained from the published phase diagram, assuming straight solidus and liquidus lines. 9 ref. (M24b, P12, 2-60; Pb-b, Au)

494-M. (Russian.) Change in Defect Density of the Crystal Lattice During Quenching and Tempering of Low-Alloy Steels. L. M. Mirkin. Izvestiya VUZ--Chernaya Metallurgiya, Dec. 1960, p. 97-98.

Examination of defects in alloy steels containing 0.2-0.35% C, 1% Cr, 1% Mn, 0.1-0.2% Ti by X-ray diffraction. The steels were quenched from 920-1200° C. with reheating at 0-700° C. for 1 1/2 hr. Density of defects is investigated as a function of composition, initial heat treatment and reheat temperature. (M26s, M22g, N8a, 2-60, 2-61, 2-64; AY)

495-M. Temperature Dependence of Rolling Textures in High-Purity Silver. H. Hu and R. S. Cline. Journal of Applied Physics, v. 32, May 1961, p. 760-763.

A rolling texture transition from the (110) (112) is produced in Ag by changing the temperature of deformation. Rolling at 200° C. produces a texture of the (123) type, plus a cube texture component due to partial recrystallization. 12 ref. (M26c, 2-61, 3-68; Ag)

496-M. Stacking Fault Probability of Noble Metal-Zinc Alloys. L. F. Vassamillet. Journal of Applied Physics, v. 32, May 1961, p. 778-783.

X-ray diffraction examination of crystal structures of a number of alloys of Au, Ag and Cu with varying Zn content. The relative magnitudes of the stacking fault energies are deduced by measuring the stacking fault probabilities. 9 ref. (M22g, M26b, 2-60; Ag-b, Au-b, Cu-b, Zn)

497-M. First Magnetocrystalline Anisotropy Constants of Some Iron Silicon Alloys. Sigurds Arajs, Henry Chessin and D. S. Miller. Journal of Applied Physics, v. 32, May 1961, p. 857-859.

Torque magnetometer measurements on disordered alloys containing 3.6-12.4% Si and 297° K. by determining the torque exerted on (100) single-crystal disks in uniform magnetic field. Crystallographic orientation and lattice parameters are determined by Laue back reflection techniques. 29 ref. (M26, P16, 3-72; Fe-b, Si)

498-M. Textural Properties of Germanium Films. John E. Davey. Journal of Applied Physics, v. 32, May 1961, p. 877-880.

Investigations on thin films vacuum evaporated onto hot fused quartz substrates from 20-650° C. The strongest texture is the (110) obtained at substrate temperatures as low as 175° C. Between 350 and 575° C., competition for growth occurs and the texture varies principally between being powder, (110) and (111). 18 ref. (M26c, 2-61; Ge, 14-62)

499-M. (Russian.) Changes in Cohesion Forces of Solid Solutions in the Nickel-Cobalt-Vanadium System. B. G. Livshits and G. A. Rymashevskii. Izvestiya VUZ--Chernaya Metallurgiya, Mar. 1961, p. 154-160.

Investigation of interatomic cohesion in various compositions, melted in an Ar atmosphere. Determination of characteristic temperature by measuring elasticity moduli. 11 ref. (M25h; Ni, Co, V)

500-M. (Italian.) Electron Microscopy for the Study of Metals. M. Paganelli. Alluminio Nuova Metallurgia, v. 30, May 1961, p. 231-240.

Examination of the distribution of handening precipitates using the replica of anodic oxide for Al alloys and the replica of carbon or SiO for other alloys. Distribution of lattice defects is studied by thinning the metallic specimen and examining it by transmission. 9 ref. (M21e, M26)

501-M. Electrolytic Polishing of Refractory Metals. F. R. Cortes. Metal Progress, v. 80, Aug. 1960, p. 97-100.

A versatile solution, composed of small amounts of sulphuric and hydrofluoric acids in methanol, can be used to electropolish four refractory metals--Mb, W, Ta and Cb. Grinding and polishing procedures. (M20p; Mo, W, Ta, Cb, EG-d)

502-M. (Spanish.) Metallography and Spectrography of Industrial Lead-Tin Alloys. Enrique Asensi Alvarez-Arenas. Tecnica Metalurgica, v. 16, Nov-Dec. 1960, p. 215-229.

Preparation of specimens from Pb-Sb alloys containing 0.90-12.30% Sb and Pb-Sb-Sn and alloys with 2.14-23.18% Sb and 2.34-14.17% Sn to determine the effect of heat treatment and of composition by spectrographic analysis. 14 ref. (M20, S11c, 2-60, 2-64; Pb, Sb, Sn)

503-M. The Crystal Structure of Actinium Metal and Actinium Hydride. J. D. Farr, A. L. Giorgi, M. G. Bowman and R. K. Money. Journal of Inorganic and Nuclear Chemistry, v. 18, Mar. 1961, p. 42-47.

Analysis of X-ray diffraction patterns using small Ac samples (0.010 mg.) freshly separated from its radioactive daughters. (M26; Ac, 14-68)

504-M. (German.) On the Ternary System Iron-Sulphur-Tungsten. Rudolf Vogel and Horst-Heinrich Weizenkorn. Archiv fur das Eisenhuttenwesen, v. 32, June 1961, p. 413-420.

Microstructure investigation and thermal analysis of phase equilibria in the partial system Fe-FeS-WS_2-W. Phase diagram and crystallization mechanism. 18 ref. (M24c, M27, M23r, N12; Fe, S, W)

505-M. (Russian.) Temper Brittleness. L. M. Utevskii. Metallovedenie i Termicheskaya Obrabotka Metallov, June 1961, p. 35-41.

Development of temper brittleness in the presence of phosphorus that shows its highest concentration on the grain boundaries. Behavior of phosphorus enriched boundaries in micrographic etching. Transition temperature measurements with KhG2, O4KhG2, O8KhG2, KhG2R and O9KhG2r steels, heat treated after hardening at 500-650° C. for 1-45 hr. 25 ref. (M27f, 2-64, Q23r; ST, P)

506-M. (Russian.) Microstructure of Steel Manufactured From Shavings. I. N. Goncharov and K. M. Stroeva. Metallovedenie i Termicheskaya Obrabotka Metallov, June 1961, p. 48-49.

Shavings are heated in a rotary furnace or in sheet metal boxes and subsequently forged. Effect of oxidation during the storage of shavings on tensile and yield strengths, elongation, impact strength and microstructure of the steel obtained. (M27, Q-general; ST, 3-70)

507-M. Grain Boundary and "Superhigh Plasticity". Michael G. Lozinsky. Acta Metallurgica, v. 9, July 1961, p. 689-694.

Experimental data on the influence of impurities at grain boundaries in Fe, Ti and Zr on the development of "superhigh plasticity" under cyclic fluctuations of temperature including factors which result in formation of two necks in the specimens undergoing tension and heating. A tentative evaluation is given for the carbon concentration in the grain boundary of technical iron. 7 ref. (M27f, Q27h, 2-61, 3-69; Fe, Ti, Zr)

508-M. (Ukranian.) Crystal Structure of Ni_2MnIn Alloy. E. I. Hladyshevsky, and I. V. Smolyaninov. Dopovidi Akademii Nauk Ukrainskoi, Jan. 1961, p. 33-35.

X-ray determination of crystal structure of ternary ferromagnetic alloy, Ni_2MnIn and comparison with Cu_2MnAl alloy. 17 ref. (M26, 2-60; Ni-b, Mn, Al)

509-M. (German.) Influence of Tin and Arsenic on Dry Lead Refining. H. Hadamovsky. Monatsberichte der Deutschen Akademie der Wissenschaften zu Berlin, v. 2, Dec. 1959, p. 778-779.

Chemical analysis, X-ray investigation and microscopic examination of Sn dross obtained at 625° C.; examination of the PbO-SnO_2 phase diagram; investigation of oxidation rate of Pb-As alloys and of phase equilibria in the PbO-As_2O_3 system. (M24b, C-general, P13, 2-60; Pb, Sn, As)

510-M. (English.) The Relationship Between the Dissolution Shape and Solution Anisotropy in Cubic Crystals. Mikio Yamamoto. Tohoku University, Science Reports of the Research Institutes, v. 13, June 1961, p. 151-159.

Relationship between the final dissolution shape of an initially sphere cyrstal and its solution anisotropy with reference to cubic crystals. Comparison with observations on the dissolution shapes of initially sphere Ge crystals. 4 ref. (M26c; Ge, 14-61)

511-M. (English.) Growth and Dissolution Shapes of Spherical Shell Crystals and the Shapes of Etch Pits on Crystals. Mikio Yamamoto. Tohoku University, Science Reports of the Research Institutes, v. 13, June 1961, p. 168-173.

Analysis of crystal shape as affected by slow inward and outward growth and dissolution. Results indicate a polyhedron structure surrounded by planar faces normal to principal directions with outward growth and dissolution and the same structure surrounded by planar forces subtended among neighboring principal crystallographic direction with inward growth and dissolution. Al, Ge and Bi single crystals are considered. 6 ref. (M26c; Al, Ge, Bi, 14-61)

512-M. (German.) Magnetic Domains in Mn_5Ge_3. A. Wrzeciono. Monatsberichte der Deutschen Akademie der Wissenschaften zu Berlin, v. 3, Jan. 1961, p. 10-13.

Investigation of magnetic powder patterns on the surface of polished Mn_5Ge_3 specimens obtained by vacuum melting and subjected to X-ray, magnetic and microscopic analysis. (M27g, 1-54; Mn, Ge)

513-M. Basic Studies of the Metallic State (The Structure of $NbZn_2$). C. L. Vold. Report of NRL (Naval Research Laboratory) Progress, July 1961, p. 19. (Available as PB 171320 from U. S. Office of Technical Services, Washington 25, D. C.)

Progress report on the structure of $CbZn_2$. Tabulation of interatomic distances, refined atomic coordinates and isotropic temperature factors. (M25, 1-54; Cb, Zn)

514-M. Physical Metallurgy of Refractory Metals (The Removal of Interstitial Impurities From Niobium by Zinc-Niobium Compounds). R. J. Goode and R. A. Meussner. Report of NRL (Naval Research Laboratory) Progress, July 1961, p. 22-24. (Available as PB 171320 from U. S. Office of Technical Services, Washington 25, D. C.)

Report of impurity extraction studies conducted on arc-melted Cb alloys containing Ni, O and C. Effects of heat treating are tabulated for Zn-coated Cb-C alloys. (M26p, 2-64, 3-69; EG-d37, Cb, Zn, C)

515-M. (Russian.) Phase-Composition of the System Nickel-Molybdenum-Boron. P. T. Kolomytsev and N. V. Moskaleva. Atomnaya Energiya, v. 10, Mar. 1961, p. 276-277.

Investigation of the influence of long annealing periods (100 hr.) at high temperatures (1000° C.) on the phase composition and microhardness of Ni-Mo-B alloys melted in an argon atmosphere and cooled in air. (M24c, M26, Q29q, 2-64; Ni-b, Mo, B)

516-M. Lattice Imperfections in Metals, Semiconductors and Ionic Crystals. H. G. van Bueren. Philips Technical Review, v. 22, no. 11, 1960-1961, p. 362-373.

Differences in the behavior of lattice imperfections with emphasis on formation and influence on electrical and mechanical properties of the substance concerned. Examples are given for KCl, NaCl and LiF ionic crystals, Si and Ge semiconductors and Al and Au. 13 ref. (M26s, M26b, P15, Q-general; Si, Ge, Al, Au)

517-M. The Fermi Surfaces of the Noble Metals. J. F. Cornwell. Philosophical Magazine, v. 6, June 1961, p. 727-733.

The energy band structure of Au, Ag and Cu are calculated using a plane wave pseudo-potential method and the properties of the Fermi surfaces so obtained are compared with those deduced from experimental observations. 30 ref. (M25, P15, P16; Au, Ag, Cu, 10-54)

518-M. The Face-Centered Cubic Solid Solutions in Transition Metal Alloys of the First Long Period. W. Hume-Rothery. Philosophical Magazine, v. 6, June 1961, p. 769-774.

The limits of composition of the f-c-c. solid solutions in binary alloys of the elements V, Cr, Fe, Co and Ni are discussed in terms of the average group number values of the alloy or position of the transition metal in the First Long Period. Phase equilibrium diagrams and liquidus-solidus curves are drawn for alloys at 900-1508° C. 6 ref. (M24b, M25, 2-60; Co-b, Cr-b, Fe-b, Ni-b, V-b, 14-67)

519-M. The Direct Observation of Antiphase Boundaries in the Fe_3Al Superlattice. M. J. Marcinkowski and N. Brown. Philosophical Magazine, v. 6, June 1961, p. 811-813.

Transmission electron microscopy examination of domain structures in thin foils of Fe_3Al as obtained by annealing for 1 hr. at 600° C. and quenching to room temperature. Establishment of the dependence of the antiphase boundary geometry on temperature and the nature of the ordering mechanism. (M27g, M21e, N10, 2-64; Fe-b, Al)

520-M. Segregation of Solute Atoms in Copper-Aluminum Alloys. Koichi Nakazima and Shigeyasu Koda. Philosophical Magazine, v. 6, June 1961, p. 823-824.

X-ray diffraction examination of the small angle scattering of solute atom segregation and concentration on deformation stacking faults in Cu-18.3% Al specimens as caused by cold working at room temperature. 6 ref. (M26b, 2-61, 3-68, 9-69; Cu-b, Al)

521-M. (Japanese) Identification of Nonmetallic Inclusions Causing Sand Marks in Steel. Pt. 1. Zenichiro Takao, Takaaki Simose, Kiichi Narita and Atushi Miyamoto. Tetsu-to-Hagane (Iron and Steel Institute of Japan, Journal), v. 47, July, 1961, p. 907-918.

Electron diffraction, spectroscopy, optical microscopy and chemical analysis methods are used to examine the nature of nonmetallic inclusions in low and medium carbon and alloy steels prepared by various deoxidation, austenite grain refining, deoxidation and tapping and teeming practices during basic electric furnace melting to determine their relation to defects occurring during forging and rolling. 7 ref. (M-general, D-general, E25, S11, 2-60, 3-68; ST, 9-69)

522-M. (Russian.) Structure of Cast Iron After Rapid Cooling From the Liquid State. I. S. Miroshnichenko and I. V. Salli. Izvestiya Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk, Metallurgiya i Toplivo, Jan. 1961, p. 44-48.

Fe-C alloys with 2.2-5.5% C and up to 0.1% Si, 0.4% Mn, 0.04% S and 0.03% P are heated to 150-200° C. above liquidus temperature. A drop of the melt is compressed rapidly between two Cu plates to produce a cast film of 0.05-0.2 mm. thickness solidified at a cooling rate of up to 105° C. per sec. Structure testing. 7 ref. (M26, M27, N12, 3-67; CI)

523-M. (Russian.) Role of Aluminum in Phosphorus-Containing Steel. O. D. Moldavskii. Izvestiya Akademii Nauk SSSR, Otdelenie Tekhnicheskikl Nauk, Metallurgiya i Toplivo, Jan. 1961, p. 87-95.

Fe, prepared by oxide reduction, is melted with various ferrophosphorus and ferroaluminum additions in a vacuum, held for 2 hr. at 1600° C. and cooled to solidification within 4 hr. The metal obtained is subjected to structure tests and chemical analysis. Inclusions are isolated by electrolysis and analyzed. Effect of Al phosphorus liquation, quantity and composition of inclusions. 11 ref. (M27, 2-60, D8m, S11; AY, Al, P)

524-M. (Russian.) Boundaries of One-Phase and Two-Phase Areas in W-C-Co and W-C-Ni Systems. I. N. Chaporova and E. A. Shchetilina. Izvestiya Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk, Metallurgiya i Toplivo, Jan. 1961, p. 126-132.

Structure testing of alloys containing 0-70% W, 0.04-0.15% C and 0-82% Co or 0-86% Ni after sintering at 650-1450° C. Solubility of tungsten as a function of the carbon content. Please boundaries for various Co and Ni contents. 5 ref. (M26, 2-60, M24c; W-b, Co-b, Ni-b, C)

525-M The Properties of Columbium-Titanium-Tungsten Alloys. Pt. 1. Oxidation. S. T. Wlodek. Paper from "Columbium Metallurgy". v. 10. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 175-203.

The maximum in oxidation resistance in this system, which occurs at 5-15 wt.% Ti and in excess of 15 wt.% W, is associated with the formation of a Cb_2O_5 TiO_2 WO_3 type of columbate. Although alloys such as 65% Cb-7% Ti-28% W can exhibit a 50-100% reduction in the oxidation rate of pure Cb at temperatures up to 1425° C., they are sensitive to oxygen contamination. Oxidation kinetics of alloys such as 67% Cb-10% Ti-20% W-3%V and 70% Cb-7% Ti-20% W-3% Mo, which partially retain the oxidation resistance of the ternary base while exhibiting improved resistance to oxygen contamination. (M24c, R1h, 2-60, 2-61; Cb-b, Ti, W)

526-M. The Properties of Columbium-Titanium-Tungsten Alloys. Pt. 2. Structure and Mechanical Properties. W. F. Sheely and J. L. Wilson. Paper from "Columbium Metallurgy". v. 10. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 205-221.

Tensile properties of a 65% Cb-7% Ti-28% W alloy, which combines good high temperature strength and oxidation resistance. Effects on high temperature strengths of Cb-Ti-W alloys of 3% additions of Mo or V and 1-2% Zr are investigated; Mo and Zr can contribute to high temperature strength but the strengthening by V is impaired by the presence of Ti. (M24c, M27, Q27, 2-60, 2-61; Cb-b, Ti, W, V)

527-M. Columbium-Nitrogen System. Rodney P. Elliot and Steven Komjathy. Paper from "Columbium Metallurgy". v. 10. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 367-381.

Equilibrium diagram investigated in the composition range up to stoichiometric CbN and in temperatures up to the melting point of Cb. When Cb is melted in a nitrogen atmosphere or when nitrided Cb powder is melted, an alloy composition of approximately 3 wt.% nitrogen is established. Metallographic examination of the arc-melted ingots does not reveal the nature of the melt reaction but indicates the precipitation of Cb_2N from the solid solution on cooling. (M24b, N7, N15, 2-60, 2-61; Cb-b, N)

528-M. Alloying Behavior of Columbium. A. E. Dwight. Paper from "Columbium Metallurgy". v. 10. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 383-405.

Cb phase diagrams may be classified into three groups--those which exhibit liquid or solid immiscibility, those which exhibit continuous solid solubility and those which form compounds. The nature of the diagram assumed by a particular element is closely related to its position in the periodic table. Data are presented on binary systems which are representative of all three groups. The Cb-Zr-U and Cb-Ti-Mo ternary systems are used to illustrate alloy behavior trends.
(M24, P12; Cb-b, Mo, Zr, Ti, U)

529-M. Contribution to the Technology of Binary Columbium Alloys Containing Molybdenum and Tungsten. H. Braun and K. Sedlatschek. Paper from "Columbium Metallurgy". v. 10. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 539-549.

The variation of hardness, electrical properties, chemical properties and workability is determined for the complete range of compositions in the isomorphous binary systems Cb-Mo and Cb-W. Maxima in hardness and electrical resistivity are observed. A workability gap existed in both systems, in which region rolling or forging can not be accomplished. (M24b, Q-general, P15, 2-60; Cb-b, Mo, W)

530-M. The Properties of Columbium-Aluminum-Vanadium Alloys. Pt. 1. Oxidation. S. T. Wlodek. Paper from "Columbium Metallurgy". v. 10. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 553-582.

The addition of small amounts of Al and V to Cb appreciably reduces the oxidation rate while retaining the inherent low neutron cross section of Cb and improving the mechanical properties. Further complexing with Ti, Cr, Fe and Ni raises the oxidation resistance of the Cb-Al-V type of alloy to the level of stainless steel. Studies of the kinetics of oxidation in the ternary Cb-Al-V system up to a maximum solute content of 10 wt.% are presented for 800, 1000 and 1200° C. (M24c, Q-general, R1h, 2-60, 2-62; Cb-b, Al, V)

531-M. (Translation.) The Problem of Visualization of Dislocations in Germanium by Etching. V. N. Vasilevskaya and E. G. Miselyuk. Soviet Physics--Solid State, v. 3, Aug. 1961, p. 313-318. (Translation of Fizika Tverdogo Tela, v. 3, Feb. 1961, p. 317-670).

The density of dislocations on various crystallographic planes are studied as a function of etchant composition and etching time for selecting proper etching techniques for revealing crystal imperfections. (M20q, M26b, M26s; Ge)

532-M. X-ray Diffraction Microscopy Study of Imperfections in Silicon Single Crystals. G. H. Schwuttke. GT&E (General Telephone & Electronics Corp.) Research and Development Journal, v. 1, July 1961, p. 68-76.

Detection of dislocations, oxygen segregation and Cu precipitation effects by the extinction contrast method of X-ray diffraction microscopy. 19 ref. (M22g, M26b, N7; Si, 14-61, 9-69)

533-M. (Italian.) Structure and Magnetic Properties of MX Compounds of Terbium With Group V and VI Metalloids. Giorgio L. Olcese. Atti della Accademia Nazionale dei Lincei, v. 30, Feb. 1961, p. 195-200.

Valence and magnetic anomalies from 473-73° K. as functions of structure and magnetic properties of Tb compounds with Se, Te, S, P, As, Sb and Bi. (M26, M25g, P16, 2-61; Tb-b, Se, Te, S, P, As, Sb, Bi, 14-68)

534-M. (Italian.) Magnetic Susceptibility of Some Semimetallic Compounds of Samarium and Gadolinium. Aldo Iandelli. Atti della Accademie Nazionale dei Lincei, v. 30, Feb. 1961, p. 201-207.

Valency of Sm and Gd is determined by measuring magnetic susceptibility of their metallic and semimetallic compounds formed by synthesis with P, As, Sb, S, Se, Te and Bi. Effect of temperature. (M25g, P16n, 2-61; Sm-b, Gd-b, 14-68)

535-M. Optical Investigation of the Band Structure of Ge-Si Alloys. J. Tauc and A. Abraham. Physics and Chemistry of Solids, v. 20, Aug. 1961, p. 190-192.

The reflection spectra of Ge-Si alloys are measured at room temperature in the photon energy range 2-5 ev. The curve giving the dependence of the energy of the first characteristic peak in the reflection spectrum on the composition of the alloy shows a break at about 79% Si with analogous conclusions being drawn for the band structure and transition energies. 14 ref. (M25h, M-general, 2-60; Ge-b, Si)

536-M. Atomic Configurations in Ideally Flat Surfaces. Pt. 1. Construction of Models of Surfaces in Face-Centred and Body-Centred Cubic Crystals. A. J. W. Moore and J. F. Nicholas. Physics and Chemistry of Solids, v. 20, Aug. 1961, p. 222-229.

A method is described for constructing ball models of atomically flat surfaces of any orientation in f-c-c. and b-c-c. cubic crystals by stacking the balls in layers. 5 ref. (M25, M26, 17-56)

537-M. Atomic Configurations in Ideally Flat Surfaces. Pt. 2. Description of Surface for an Arbitrary Crystal Structure. J. F. Nicholas. Physics and Chemistry of Solids, v. 20, Aug. 1961, p. 230-237.

An atomically-flat surface is described in terms of the intersections of the surface with a set of parallel planes which enables a model of such a surface to be constructed. The theory is applied to develop formulas for constructing models of surfaces in crystals with f-c-c. and h-c-p. structures. (M25, M26, 17-56)

538-M. Cyclotron Resonance Measurements of the Energy Band Parameters of Germanium. B. W. Levinger and D. R. Frankl. Physics and Chemistry of Solids, v. 20, Aug. 1961, p. 281-288.

Valence band and conductance band energy parameters are measured at a frequency of 24 kMc using a microwave

bridge circuit at 1.35-1.4° K. Effective mass curves are calculated and compared with previously published data. 7 ref. (M25, P16f, 1-54, 2-63; Ge)

539-M. Stress-Induced Alignment of Anisotropic Defects in Crystals. J. W. Corbett and G. D. Watkins. Physics and Chemistry of Solids, v. 20, Aug. 1961, p. 319-320.

Method for revealing the "hidden" anisotropy of point defects, as caused by defect populations in equivalent orientations, by aligning the defects through applied uniaxial stress. Application to study of properties of defects in Si with particular reference to the absorption band at room temperature as associated with the vibration of impurity oxygen in the Si lattice. 14 ref. (M26s, 3-66, 3-72; Si, 14-61)

540-M. Texture Transition in High-Purity Silver and Its Correlation With Stacking Fault Frequency. Hsun Hu, R. S. Cline and S. R. Goodman. Journal of Applied Physics, v. 32, July 1961, p. 1392-1399.

Rolling texture of high purity Ag changes gradually from the common Ag type to the Cu type as temperature of deformation increases at 150-200° C. There is a general correlation between Ni texture transition and the change in stacking fault frequency as a function of rolling temperature. The texture transition produced by varying the temperature of deformation or by alloy additions is interpreted in terms of a change in the stacking fault energy, a change in the dislocation density, or both. 21 ref. (M26c, M26b, F23, 2-60, 2-61; Ag)

541-M. Deformation-Produced Point Defects. Howard K. Birnbaum and Floyd R. Tuler. Journal of Applied Physics, v. 32, July 1961, p. 1403-1404.

Investigation of the interaction of deformation-produced point defects with dislocations in high purity Cu. Analysis of the kinetics of the interaction and evaluation of the activation energy for diffusion of the defects in terms of the concentration of interstitials produced by plastic deformation. 6 ref. (M26s, M26b, 3-68, 3-69; Cu)

542-M. Development of Randomly Oriented Wrought Beryllium Sheet. F. M. Yans. Nuclear Metals Inc. (Wright Air Development Div.) U. S. Office of Technical Services, AD 258241, Dec. 1960, 104 p. $2.50.

Relation of specimen geometry and rolling sequence on texture development. During rolling, the basal plane population parallel to the plane of Be sheet increases with reduction in area. Rolling and annealing tests on bi-directionally rolled sheet demonstrate that when the sheet is subjected to annealing temperatures of over 950° C. the location of the basal plane peak intensity is shifted and the intensity profile changes markedly, yielding a third dimensional ductility of 1.75%. (M26c, F23, 2-64; Be, 4-53)

543-M. Quantitative Metallography. Ervin E. Underwood. Metals Engineering Quarterly, v. 1, Aug. 1961, p. 70-81.

Quantitative measurement of volume fraction based on measurement of areas, lineal intercepts and counting of points. Measurement of surface area. 16 ref. (M-general, S12)

544-M. (Ukranian.) Determination of Vacancies in Silver. O. M. Ovcharenko. Ukrainskii Fizichnii Zhurnal, v. 6, Jan. 1961, p. 139-140.

Ag samples are hardened at 1000° K. in helim and in air, followed by determination of the porosity resulting from dissolved oxygen by electroresistance, using an ohmmeter. 11 ref. (M26s, M23s, 1-53; Ag)

545-M. Radiation Damage in Steel--Considerations Involving the Effect of Neutron Spectra. A. D. Rossin. Paper from "Steel for Reactor Pressure Circuits". no. 69. Iron and Steel Institute, London SW 1, England, 1961, p. 393-409.

Mechanism of interaction between fast neutrons and atoms of a metal lattice. A cross section for the production of vacancies in Fe by neutrons, as a function of neutron energy, is derived and shown to be roughly proportional to the product of the neutron energy and the isotropic elastic scattering cross section. The vacancy production cross section is applied to several reactor spectra. (M26s, 2-67; ST)

546-M. Microstructures in Aluminized Steel. James C. Wilkins. Metal Progress, v. 80, Sept. 1961, p. 73-74.

Metallographic techniques used on Al-coated steel sheets produced by continuous hot dipping. (M27, M-general; ST, 4-53, 8-65)

547-M. Ternary Systems for Ductile Brazing Alloys. D. C. Herrschaft. Metal Progress, v. 80, Sept. 1961, p. 96-B.

Ni-Cu-Au, Pd-Ni-Cu, Pd-Au-Ni and Pd-Au-Cu diagrams extrapolated from limited data from several sources. These ternary systems have great potential as sources of ductile brazing alloys for elevated temperature service. (M24c, Q23p, 2-60; SGA-f, Ni-b, Pd-b, Cu-b, Au-b)

548-M. For a Unified Grain-Size Standard. L. L. Wyman and R. E. Penrod. Materials Research & Standards, v. 1, Aug. 1961, p. 638-639.

A brief report on the standardization of procedures for estimating the average grain size in metals using ASTM tests to locate grain boundaries and the calculation of master tables showing grain size relationships. 4 ref. (M27c, 1-54)

549-M. The Role of Transmission Electron Microscopy in Fundamental Fatigue Studies. H. G. F. Wilsdorf. Materials Research & Standards, v. 1, Aug. 1961, p. 640.

The electron microscope and micrograph are used to analyze the internal structural changes in fatigued metals. The preparation of specimens and use of diffraction contrast techniques to study single dislocations and their patterns. (M22h, Q7, 1-54)

550-M. (Book.) Chemical Crystallography. C. W. Bunn. 1961. 509 p. Oxford University Press, Amen House, London E.C. 4, England. $8.40.

Morphological, optical and X-ray crystallographic methods used for the identification of crystalline substances and for the determination of the precise atomic arrangement of crystal structures. (M26, M-general, 10-54, 11-64)

551-M. (German.) The Iron-Rich Side of the Iron-Zinc System. H. H. Stadelmaier and R. K. Bridgers. Metall, v. 15, Aug. 1961, p. 761-763.

Diffusion tests at 1200° C., microscopic investigation and high temperature X-ray examination at 770 and 820° C. of binary Fe-Zn specimens containing up to 40% Zn. Establishment of the alpha and gamma phase boundaries. (M24b, 2-60, 2-61; Fe-b, Zn)

552-M. (German.) The Ternary System Cobalt-Zinc-Carbon. H. H. Stadelmaier and J. J. Duplessis. Metall, v. 15, Aug. 1961, p. 763-764.

Microstructure, X-ray and chemical analysis of sintered and melted Co-Zn-C specimens (0-60% Zn, 40-100% Co, 0-40% C) after annealing at 850-975° C. Determination of stoichiometric composition of the ternary carbide $Co_{51}Zn_{32}C_{17}$. Survey of melting-face-projection in the Co-rich corner of the phase diagram. (M24c, 2-60; Zn-b, Co, C)

553-M. Activities of Chromium in Chromium-Molybdenum Solid Solutions. Marc Laffitte and O. Kubaschewski. Faraday Society, Transactions, v. 57, June 1961, p. 932-934.

Knudsen's effusion technique is combined with radioactive tracer analysis to determine the activities of Cr in Cr-Mo alloys containing 5-80 at. % Cr at a temperature of 1471° K. Results obtained provide evidence of a miscibility gap at lower temperatures. The approximate position of the solidus-liquidus gap is calculated. 9 ref. (M24b; Cr, Mo)

554-M. Substructure Formation in Iron During Creep at 600° C. F. Garofalo, L. Zwell, A. S. Keh and S. Weissmann. Acta Metallurgica, v. 9, Aug. 1961, p. 721-729.

Structural changes in Fe during creep under constant stresses of 176 and 550 kg. per $cm.^2$ are investigated by metallographic examination, high resolution X-ray methods and transmission electron microscopy. The subgrain size remains constant with increasing strain but the disorientation between subgrains increases and the lattice misorientation within the subgrains decreases. Gross grain deformation accounts for about 25-30% of the over-all strain indicating that grain-boundary shearing is a prominant deformation mode. 22 ref. (M26, M27, Q3, Q24, 2-61, 3-68; Fe)

555-M. Atomic Arrangements in Titanium-Molybdenum Solid Solutions. J. M. Dupouy and B. L. Averbach. Acta Metallurgica, v. 9, Aug. 1961, p. 755-763.

The short range order and size effect coefficients and the thermal and static atomic cisplacements are measured in f-c-c. solid solutions of Ti-Mo using

X-ray diffraction techniques. The solutions exhibit a strong preference for unlike near neighbors even though superlattice is not found. The size effect coefficient indicates that the Mo atoms are smaller than the Ti atoms in solution. Center to center distances between the different pairs of nearest neighbor atoms are calculated from the size effect coefficients and the lattice parameters. 23 ref. (M25, M26, N10; Mo-b, Ti-b, 14-67)

556-M. Theory and Direct Observation of Dislocations in the Fe_3Al Superlattice. M. J. Marcinkowski and N. Brown. Acta Metallurgica, v. 9, Aug. 1961, p. 764-786.

Specimen foils of Fe_3Al having various ordered structures examined by electron microscopy and diffraction to determine whether dislocations move through the lattice as superlattice dislocations or as ordinary dislocations. Theoretical analysis is made in terms of slip behavior and antiphase boundary binding according to structure and orientation. 30 ref. (M26b, N3, N10, Q24a, 3-71, 3-72; Fe-b, Al, 14-67)

557-M. Effect of Annealing Under High Pressures on Dislocations in Lithium Fluoride, Aluminum, Copper and Iron. J. E. Hilliard, J. M. Lommel, J. B. Hudson, D. F. Stein and J. D. Livingston. Acta Metallurgica, v. 9, Aug. 1961, p. 787-794.

Dislocation structures of single crystals annealed for 1 hr. at 500-600° C. under a pressure of 40 kb. are studied, before and after treatment, by the Berg-Barrett X-ray technique in Al and by etch pitting in the other materials. The high-pressure anneals produce no detectable change in the dislocation densities. The results are consistent with calculations which show that the application of pressure will reduce both the climb and glide rates of a dislocation. 23 ref. (M26b, 2-64, 3-74; Al, Cu, Fe, Li-b, 14-61)

558-M. (Italian.) Department of Metallurgy. Istituto Sperimentale dei Metalli Leggeri--Rapporto Annuale 1960, 1961, p. 67-81.

Metallography of light alloys, Ti alloys, Al and aluminum bronzes. Effect of Li, Fe, Si and Al on corrosion, wear and abrasion resistance of rolled Al, Al-Cu and Zn-Al-Cu alloys. (M-general, Q9n, R-general; EG-a39, Ti-b, Cu-s, Al-b, Cu, Zn)

559-M. Radiation Effects. Alvin E. Fein. Chapter 6 from "Thermoelectricity--Science and Engineering". Interscience Publishers, Inc., New York 1, 1961, p. 120-153.

The effects of radiation on semiconductors are studied including transmutation of atoms, ionization of electrons, fission of atoms, production of thermal or displacement spikes, creation of interstitial atoms and vacancies and ordering or disordering of the atoms. 116 ref. (M26, 2-67; EG-j31)

560-M. (English.) X-Ray Investigation of Disturbance Fields Due to Individual Dislocations in Silicon and Germanium. J. Auleytner. Acta Physica Polonica, v. 20, May-June 1961, p. 371-377.

Disturbance fields from individual dislocations on Si and Ge crystal surfaces are studied by X-ray and spectrometric methods and the mapping made by the two methods are compared. Linear dimensions of disturbance fields in Si single crystals with density of less than 10^4 dislocations for cm.^{2} are found to range from 20-120 microns. 9 ref. (M26b, M22; 14-61, Si, Ge)

561-M. (German.) Structure Changes in the Laves Phases $ZrAl_2$ and UAl_2 by Uranium and Zirconium Additions. Siegfried Steeb and Gunter Petzold. Naturwissenschaften, v. 48, June 1961, p. 450-451.

X-ray investigation by Guinier technique using monochromatic Cu-K-alpha radiation of lattice parameters of cast and 1050° C. vacuum annealed UAl_2 alloy containing 0-22% Zr and $ZrAl_2$ containing 0-11% uranium with density measurements for evaluation of number of atoms in the unit cell. (M26, M25, M22g, 2-60; Al-b, Zr, U)

562-M. Identification of Intermediate Phases in the Manganese-Titanium System. R. M. Waterstrat. Metallurgical Society of AIME, Transactions, v. 221, Aug. 1961, p. 687-690.

X-ray diffraction and metallographic examination of binary Mn-rich alloys with Ti revealing the presence of intermediate phases including a binary R phase and a phase having an alpha-Mn type structure. The X-ray pattern

of the phase $TiMn_3$ is presented and a tentative phase diagram is constructed for the Mn-rich portion of this binary system. 11 ref. (M22g, M24, M26q; Mn-b, Ti)

563-M. Technique for Determining Orientation Relationships and Interfacial Planes in Polyphase Alloys--Application to Controlled Eutectic Specimen. R. W. Kraft. Metallurgical Society of AIME, Transactions, v. 221, Aug. 1961, p. 704-711.

Design and application of a back-reflection precession-type X-ray camera for determining the crystallographic orientation of the crystallites of both phases in small areas of thick specimens of polyphase alloys. The camera technique is used with metallographic observations of interfacial angles (or habit planes or growth direction) on the same specimen to correlate crystallographic and metallographic orientations data for a unidirectionally solidified $CuAl_2$-Al eutectic specimen. 5 ref. (M22g, 1-52, M26c; Al-b, Cu)

564-M. The Evolution of Textures in FCC Metals. Pt. 2. Alloys of Copper With Phosphorus, Arsenic and Antimony. R. H. Richman and Y. C. Liu. Metallurgical Society of AIME, Transactions, v. 221, Aug. 1961, p. 720-732.

Deformation and recrystallization textures of the alpha solid solutions of alloys containing 0.004-1.70% P, 0.048-5.17% As or 0.0089-1.45% Sb are examined after homogenization at 650-900° C. for times to 266 hr., 99.1-99.3% reduction by rolling and final annealing at 400-500° C. for 0.5-1.5 hr. Texture transitions and orientation relations are dependent upon alloy composition and type of solute element. 24 ref. (M26c, N5, 2-60, 2-64, 3-68; Cu-b, P, As, Sb, 14-67)

565-M. Observations of the Structure of Aluminum Specimens Grown From the Melt. P. E. Doherty and R. S. Davis. Metallurgical Society of AIME, Transactions, v. 221, Aug. 1961, p. 737-740.

The formation of pits on the surface during cooling from elevated temperatures, attributed to the condensation of vacancies from supersaturated solution, is used as an etching technique for studying striation, cell and dendrite structures of Al single crystal specimens grown from the melt. Sub-boundaries, micropores and other imperfections are also observed. 8 ref. (M26s, M20, N12, 2-61, 3-67; Al, 14-61)

566-M. The Control of Annealing Texture by Precipitation in Cold-Rolled Iron. W. C. Leslie. Metallurgical Society of AIME, Transactions, v. 221, Aug. 1961, p. 752-758.

The textures of cold rolled and of annealed Fe are compared with those of an Fe-0.8% Cu alloy in which the amount of precipitation after cold rolling is controlled. The effects of precipitation after cold deformation are to retain the cold rolled texture after annealing, to inhibit the formation of the usual annealing texture and to produce elongated recrystallized ferrite grains. 13 ref. (M26c, N5, N7, 2-64, 3-68; Fe-b, Cu)

567-M. Zinc-Rich Corner of the Zn-Fe-Al System. E. H. Rennhack. Metallurgical Society of AIME, Transactions, v. 221, Aug. 1961, p. 775-779.

Phase equilibria of the Zn-rich portion of the system containing up to 20% Fe and Al are investigated at 20-600° C. by metallographic and X-ray diffraction techniques and differential thermal analysis. The phase relationships involve only those phases present in the three binary systems. (M24b, M-general, 2-60, 2-61; Zn-b, Al, Fe)

568-M. The Cadmium-Uranium Phase Diagram. Allan E. Martin, Irving Johnson and Harold M. Feder. Metallurgical Society of AIME, Transactions, v. 221, Aug. 1961, p. 789-791.

The Cd-U system is studied by thermal, metallographic, X-ray and sampling techniques, special emphasis being placed on the establishment of the liquidus lines. The single intermetallic phase, UCd_{11}, melts peritectically at 473° C. to form alpha uranium and melt containing 2.5% U. The Cd-rich eutectic (0.07% U) freezes at 320.6° C. Solid solubilities appear to be negligible. Between 473 and 600° C., the liquidus line is retrograde. (M24b, 2-60, 2-61; Cd-b, U-b)

569-M. The Effect of Initial Orientation on the Fiber Texture of Aluminum Rods. Carl J. McHargue. Metallurgical Society

of AIME, Transaction, v. 221, Aug. 1961, p. 812-819.

Rods of 99.99% Al with initial orientation of (001), (118), (115), (111) and random are swaged at room temperature with reductions to 96%. Changes in orientation as a function of deformation are studied on axis distribution charts which show the distribution of fiber axes with respect to the crystallographic axes in a basic triangle of a standard stereographic projection in units which are "times random". 14 ref. (M26c, 3-68, 3-72; Al-a, 4-55)

570-M. The Oriented Growth Mechanism of the Formation of Recrystallization Textures in Aluminum. M. N. Parthasarathi and Paul A. Beck. Metallurgical Society of AIME, Transactions, v. 221, Aug. 1961, p. 831-838.

The components of the recrystallization texture formed by selective growth of random nuclei in an 80% rolled, 99.997% Al crystal are related to the single component rolling texture with the relative-volume fraction being accounted for by the low mobility of twist boundaries. Results with an Al alloy crystal of the (110)(112) orientation, containing Fe, Si and Zn, show that solute contents do not impair the effectiveness of the oriented growth mechanism. 21 ref. (M26c, M27f, N3, N5, 2-64, 3-68; Al-b)

571-M. Orientation of Cast Beryllium. F. A. Crossley, A. G. Metcalfe and R. P. Elliot. Metallurgical Society of AIME, Transactions, v. 221, Aug. 1961, p. 890.

The texture method (using monochromatic Cu radiation) is used to determine the orientation of the columnar grains of vacuum induction melted and vacuum cast Be ingots. X-ray De Bye patterns show no preferred orientation due to the occurrence of a phase transformation above 1250° C. which masks the original solidification orientation. (M26c, M22g, N12, 2-61; Be-a)

572-M. Transmission Electron Microscopy of Metals--Dislocations and Precipitation. George L. Clark. Encyclopedia of Microscopy, 1961, p. 291-307.

Specimen preparation and application to the study of deformation, dislocations, forces between dislocations, stacking faults and partial dislocations, contrast due to stacking faults, condensed vacancies, workhardening, quench hardening, fatigue, precipitation, eutectic structures, radiation damage, antiphase domains, martensitic transformations and properties of thin metal films. 72 ref. (M21e, M20, M26b, N7)

573-M. (Translation-ConBur.) Investigation of the Physicochemical Properties of Alloys in the System $CiSi_2$-$MoSi_2$. V. S. Aleksashin and V. S. Mikheev. Journal of Applied Chemistry of the USSR, v. 33, Oct. 1960, p. 2185-2190.

Melting points, microhardness, hardness, electrical resistivity, microstructure and heat resistance are given for heat treated Cr-Mo alloys. 4 ref. (M24b, M27, P-general, Q-general, 2-60, 2-62, 2-64; Mo-b, Cr-b, Si)

574-M. (English.) An Electron Microscope Study of the Structure of Zinc Single Crystals. P. Kratochvil and M. Molcik. Czechslovak Journal of Physics, v. 11, 1961, p. 540-541.

Surface and lamellar structures, dislocation and etch pit densities and critical shear stress are studied by electron microscopy and interpreted in terms of impurity microsegregation. Crystals are etched in a solution of distilled water and nitric acid and chemically polished. 9 ref. (M21e, M26, 9-69, 14-61; Zn)

575-M. (Italian.) The Ternary Equilibrium Diagram of Cu-Al-Ag Alloy With High Copper Content. Panseri C. Leoni. Alluminio Nuova Metallurgie, v. 30, June 1961, p. 289-298.

Metallographic determination of the equilibrium diagram of Cu-Al-Ag alloys with Cu content over 90%. Tensile strength, ohm resistance, specific weight, point of fusion and Brinell hardness of 2496 Cu alloy which is particularly suitable for the production of deep drawn ornamental objects. (M24c, P-general, Q27a, Q29n, T9q; Cu-b, Al, Ag)

576-M. (Translation-AIP.) The Form of Martensitic Crystals and the Orientation of the Interphase Boundaries in Cu-Al-Ni Alloy. G. V. Kurdyumov, V. A. Lobodyuk and L. G. Khandros. Soviet Physics--Crystallography, v. 6, Sept-Oct. 1961, p. 165-170.

Large elastic crystals of the martensitic phase in Cu-14.4% Al-4.75% Ni alloy are produced by quenching from 900° C. The orientation of the habit plane and midrib plane of the crystals are determined by X-ray methods and related to transformation stresses. 11 ref. (M26c, N6q, 2-64, 3-66; Cu-b, Al, Ni)

577-M. (Translation-AIP.) Crystal Structures of Some Intermetallic Compounds. E. I. Gladyshevskii, P. I. Kripyakevich, M. Yu Teslyuk, O. S. Zarechnyuk and Yu. B. Kuz'ma. Soviet Physics--Crystallography, v. 6, Sept-Oct. 1961, p. 207-208.

Powder X-ray diffraction data (using Debye and Preston patterns) for lattice constants and superstructures of intermetallic compounds found in binary and ternary alloys containing Cb, Al, V, Fe, Si, Co, Ni, Ge, Mn, Ga, Ce, Cu, Mg, In, Zn, Nd, Ba, Ca, Ti, Sr, Be and Er. 11 ref. (M26q, M22g)

578-M. (Translation-AIP.) Revision of the Phase Diagram for the Bismuth-Rhodium System. R. N. Kuz'min and N. N. Zhuravlev. Soviet Physics--Crystallography, v. 6, Sept-Oct. 1961, p. 209-210.

Lattice parameters determined for alpha and beta phases in the Bi-rich section of the system using X-ray goniometry. Effect of composition and heat treatment on transformation structures. 9 ref. (M24, M26, 2-60, 2-64; Bi-b, Rh-b)

579-M. (Translation-AIP.) Detection of Edge Dislocations in Germanium by Ionic Bombardment. I. G. Sirotenko and G. V. Spivak. Soviet Physics--Crystallography, v. 6, Sept-Oct. 1961, p. 213-215.

Cathodic sputtering (ionic etching) is compared to chemical etching for revealing dislocation arrays in Ge single crystals. Specimens are deformed by indentation at 550-600° C. in nitrogen atmosphere. 4 ref. (M20q, M26b, L25h; Ge, 14-61)

580-M. Determination of the Orientation of Diffusion Submicropores in Alpha-Brass by the Method of Small Angle X-Ray Scattering. V. L. Kalikhman and Ya. S. Umanskii. Soviet Physics--Solid State, v. 3, Aug. 1961, p. 238-240. (Translation from Fizika Tverdogo Tela, v. 3, Feb. 1961, p. 317-670).

The oxide inclusions on which pores are nucleated during the evaporation of Zn from alpha brass are examined by Laue back reflection and identified as plates, surfaces of which are parallel to the (110) planes of the base metal. 8 ref. (M26c, M22g, N1, N16, 9-68, 9-69; Cu-n)

581-M. What Causes Hard Spots in Steel? James H. Adams and Donald D. Goehler. American Machinist/Metalworking Manufacturing, v. 105, Sept. 4, 1961, p. 97-99.

Specimens of high-strength steels (AISI 4330, 4340 and 300M) that have failed during machining are drilled to study source of hard spots. Fracture analysis of the microstructure around the hole shows a layer of transformed material and a series of cracks indicating that machining operations induce temperatures of 1350-1500° F. which cause a transformation of austenite to martensite. (M-general, N8, 2-62, 3-68, 9-72; ST, SGB-a)

582-M. (German.) Reactions of the Alkali Metals With Copper, Silver and Gold. Gerhard Kienast and Jitendra Verma and Wilhelm Klemm. Zeitschrift fur Angewandte und Allgemeine Chemie, v. 310, June 1961, p. 144-169.

Investigation of binary compound formation, solid solutions and alloys of Cu, Ag and Au with alkali metals Li, Na, K, Rb and Cs by thermal analysis and X-ray structure examination. Binary phase diagrams; structure of solid phases; volume changes in formation of compounds and alloys. (M-general, N-general; Cu, Au, Ag, EG-e41)

583-M. (German.) "Inverse" Nickel-Iron Films. E. Feldtkeller. Naturwissenschaften, v. 48, July 1961, p. 474-475.

Electron microscopic investigation of domain structure during magnetizing. Interpretation of interaction which hinders rotary movement of domains. (M27q, M21e; Ni-b, Fe, 14-62)

584-M. (Russian.) X-Ray Photographic Investigation of the Substructure of Thin Condensates of Aluminum by Using a "Microbeam". L. S. Palatnik, M. Ya. Fuks, B. T. Boiko and V. B. Pariiskii. Fizika Metallov i Metallovedenie, v. 11, June 1961, p. 864-869.

Characteristics of the substructure of thin polycrystalline films (60-200 Å), size of blocks of crystallites and degree of their disorientation. 10 ref. (M26n, S11p; Al, 14-62)

585-M. (Russian.) Change of Uranium Microstructure During Cyclic Heat Treatment. Pt. 2. R. I. Garber, S. Ya. Zalivadnyi and V. M. Mikhailovskii. Fizika Metallov i Metallovedenie, v. 11, June 1961, p. 889-892.

Change of grain size and shape from 100-600° C. and 2000 cycles. Recrystallization, mutual displacement of crystallites and grains and elongation. 4 ref. (M27a, M27c, N12, Q23p, 2-64; U)

586-M. (Russian.) Influence of Manganese on the Phase Composition of Siliceous Electrotechnical Steels. N. F. Dubrov, M. I. Gol'dshtein and S. G. Guterman. Fizika Metallov i Metallovedenie, v. 11, June 1961, p. 919-922.

Effect of 0.04-0.77% Mn on plasticity and behavior during rolling at high temperatures is determined by photomicrographic techniques. (M26, Q23p, 2-60, 2-68; ST, Mn)

587-M. Investigation of the System Beryllium-Boron. Clarence L. Hoenig, Carl F. Cline and Donald E. Sands. American Ceramic Society, Journal, v. 44, Aug. 1961, p. 385-389.

X-ray single crystal and powder diffraction examination, chemical analyses and Knoop microhardness measurements are made of mixtures reacted under argon at 1100-1600° C. to determine unit cell shape, hardness and melting point. An anistropic unknown phase is found which forms eutectic with Be at 972° C. and whose hardness depends on orientation. 8 ref. (M24b, M-general, 2-60, 2-61; Be-b, B-b)

588-M. (German.) Crystal Transition of Cobalt. G. M. Schwab and W. Ludwig. Pure and Applied Chemistry, v. 2, no. 1-2, 1961, p. 297-301.

Investigation of the alpha-beta transition of Co from hexagonal to cubic close packed structure using X-ray investigation (Debye-Scherrer technique) of powder specimens and of compact Co films obtained by electrodecomposition of Pt wire at temperatures from 20-800° C. (M22, M24, 1-54, 2-61; Co, 6-68, 14-62)

589-M. (German.) Crystal Structure of $HfBe_2$, $HfBe_{13}$ and HfBeSi: Partial Systems $MeBe_2$-MeB_2-$MeSi_2$ (Me = Zr, Hf). E. Rudy, F. Benesovsky, H. Nowotny and L. E. Toth. Monatshefte fur Chemie, v. 92, Mar. 1961, p. 692-700.

X-ray powder investigation (Cu-K alpha radiation) of pressure-sintered (1200-1550° C.) Hf-Be specimens and of specimens of the quasibinary systems $HfBe_2$-$HfSi_2$, $ZrBe_2$-$ZrSi_2$, $ZrBe_2$-ZrB_2, $HfBe_2$-HfB_2, $ZrSi_2$-ZrB_2 and $HfSi_2$-HfB_2. Measurement of lattice parameter as influenced by composition. (M26, M22g, 1-53, 2-60; Hf, Zr, B, Be, Si)

590-M. (German.) Crystal Structures of TiSi, Ti $(Al, Si)_2$ and Mo $(Al, Si)_2$. C. Brukl, H. Nowotny, O. Schob and F. Benesovsky. Monatshefte fur Chemie, v. 92, Mar. 1961, p. 783-788.

X-ray investigation of TiSi, $TiAl_{0.3-0.6}Si_{1.7-1.4}$ and $MoAl_{1.3}Si_{0.7}$ by the Debye-Scherrer technique using Cu-K alpha radiation. Effect of composition on lattice parameters. 13 ref. (M26, 1-54, 2-60; Ti-b, Mo-b, Al, Si)

591-M. (German.) Electron Microscopic Identification of Aluminum-Nitride in Production-Melted Structural Steels. Winfried Dahl, Paul Schwaab and Helmut Hengstenberg. Archiv fur das Eisenhuttenwesen, v. 32, July 1961, p. 475-478.

Electron microscopic recognition of Al and V nitrides and subsequent identification of structure by X-ray diffraction analysis in conventionally manufactured Al-killed steel sheets with up to 9.04% Al, 0.02% N and 0.2% V. (M21, M22g, M26q, 9-69; ST-c, 14-68)

592-M. (German.) X-Ray Investigation of Structure of Iron-Rich Alloys in the Iron-Aluminum System. Franz Lihl and Horst Ebel. Archiv fur das Eisenhuttenwesen, v. 32, July 1961, p. 483-487.

X-ray measurement of lattice parameters at 20-800° C. of Fe-Al alloy powders containing 0-50% Al using counting-tube registration in a vacuum chamber rather than conventional film registration. (M22g, M26; Fe-b, Al)

593-M. (German.) X-Ray Investigation of Structure of Iron-Rich Iron-Silicon Alloys. Franz Lihl and Horst Ebel. Archiv fur des Eisenhuttenwesen, v. 32, July 1961, p. 489-491.

X-ray measurement of lattice and thermal expansion parameter of homogenized Fe-Si filings (3.7-23.4 at.% Si) at temperatures from 20-1100° C. using

a high-temperature vacuum chamber. Construction of the Fe-rich portion of the Fe-Si phase diagram. (M22g, M24b, M26; Fe-b, Si)

594-M. (German.) Crystallographic Properties of Iron Nitride Precipitations in Ferrite. Wolfgang Pitsch. Archiv fur das Eisenhuttenwesen, v. 32, July 1961, p. 493-500.

Electron microscopic investigation (replica method) and X-ray identification of Fe-nitride needles in cold rolled Fe sheets, normalized at 950° C. and decarburized by hydrogen at 800° C. after nitriding at 580° C. by H_2/NH_3 mixtures and aging at temperatures from 20-350° C. (M26q, M21e, N7, 2-64; Fe, 14-68)

595-M. (German.) Measurement of Grain Size and Deformation Degree in Cold Worked Metals and Alloys. August Braun. Zeitschrift fur Metallkunde, v. 52, July 1961, p. 461-463.

Theoretic derivation and practical application of a microscopic method for determination of grain size and deformation in single-phase anisotropic structures. (M21, M27c)

596-M. (German.) Investigation of Equilibria in the System Tantalum-Nitrogen. Erich Gebhard, Hans-Dieter Seghezzi and Eckehard Fromm. Zeitschrift fur Metallkunde, v. 52, July 1961, p. 464-476.

Investigation of phase equilibria in the Ta-rich side (up to 30% N) of the Ta-N phase diagram in a modified Sieverts-apparatus, by resistance measurements and microscopic and X-ray investigation, at temperatures up to 2380° C. and at pressures from 5×10^{-4} Torr to 1 atm. (M-general, N15d; Ta-b, N)

597-M. (Translation-Brutcher no. 5173.) Effect of Delta Ferrite on Properties of Chrome-Nickel Stainless Steels. R. Nakagawa and Y. Otoguro. Tetsu-To-Hagane (Iron and Steel Institute of Japan), v. 47, Mar. 1961, p. 554-556.

Influence of Ni and Mo on microstructure of Cr-Ni stainless steels and of effect of delta ferrite on mechanical properties. Relationship between quantity of delta ferrite and the Ni and Mo contents; tensile strength at various temperatures as function of Ni content and of solution-treating temperature. (M27, Q-general; SS, Ni, Mo)

598-M. (English.) Etch Pits on X-Ray Damaged Rochelle Salt. Kenkichi Okada. Physical Society of Japan, Journal, v. 16, Aug. 1961, p. 1647-1648.

Effects of X-rays on the dislocation etch pit pattern and on the distribution of open-cored dislocations parallel to the c-axis are studied in order to obtain a more reliable image of the polar anisotropy centers introduced by radiation. 9 ref. (M26, 1-54, 2-67)

599-M. X-Ray Diffraction Study of the Recrystallization and Grain Growth Processes Taking Place During Sintering of the Metal Powder Compacts. R. Sharan and D. Swarup. Banaras Hindu University, Journal of Scientific Research, v. 11, Dec. 1961, p. 73-79.

Influence of compacting pressure, section thickness, sintering time and sintering temperature on recrystallization and grain growth of Al, Ni and Cu powder compacts. 8 ref. (M22g, N3, N5, 2-61, 3-67, 3-74; Al, Ni, Cu, 6-71)

600-M. (Japanese.) Some Anisotropic Properties of Rolled Uranium Plates. Ko Soeno. Atomic Energy Society of Japan, Journal, v. 3, Aug. 1961, p. 614-622.

Effects of cold and hot rolling, beta phase quenching and thermal cycling at 720° C. on anistropic properties of 99.5% uranium specimen are examined by metallography and thermal expansion coefficient measurements. Texture and preferred orientation, recrystallization grain growth and thermal expansion are related to thickness reduction, deformation and heating temperatures and rolling direction. 20 ref. (M26, M-general, N5, P11g, 2-61, 3-68, 3-72; U-a, 4-53)

601-M. (Italian.) Influence of Crystal Orientation on the Etching Process of Metallic Single Crystals. L. Peraldo Bicelli and B. Rivolta. Metallurgia Italiana, v. 53, July 1961, p. 363-369.

Investigation of attack by various acids and other solutions on (0001) and (1120) oriented Zn single crystal surfaces. Geometrical figures are usually obtained on the (0001) surface but they seldom occur on the (1120). (M20p, M20q, 3-72; Zn, 14-61)

602-M. Crystallography of the Rare-Earth Metals. Karl A. Gschneidner, Jr. Chapter 14 from "The Rare Earths". John Wiley & Sons, Inc., New York 16, 1961, p. 190-214.

Determining the effects of temperature (4.2-1773° K.), pressure and alloying on crystal structure. X-ray and neutron diffraction studies are made to determine magnetic structures and lattice constants. 60 ref. (M22, M26, M27, 2-60, 7-61, 3-74; EG-g45)

603-M. Metallography of the Rare-Earth Metals. B. Love. Chapter 15 from "The Rare Earths". John Wiley & Sons, Inc., New York 16, 1961, p. 215-224.

Various techniques used in observing crystal structures are described including sectioning, mounting, grinding, polishing and etching. Prepared specimens are examined by microscopy and photography. (M20, M21, M23; EG-g45)

604-M. Rare-Earth Phase Diagrams. C. E. Lundin. Chapter 16 from "The Rare Earths". John Wiley & Sons, Inc., New York 16, 1961, p. 224-385.

Alloying behavior is recorded by binary equilibrium phase diagrams for the 14 metals. Solubility relationships and crystallographic data are presented with a review of techniques including metallographic examination of polished and etched specimens, thermal analysis and X-ray diffraction analysis. 130 ref. (M-general, P12e; EG-g45)

605-M. Principles of the Alloying Behavior of Rare-Earth Metals. Karl A. Gschneidner, Jr., and James T. Waber. Chapter 17 from "The Rare Earths". John Wiley & Sons, Inc., New York 16, 1961, p. 386-427.

Alloying is discussed in terms of size effects, electronegativities, valences, electron numbers and thermodynamics. The classical rules proposed by Hume-Rothery and quasi-thermodynamic approaches are applied. 22 ref. (M-general, P12; EG-g45)

606-M. Materials. Power Reactor Technology, v. 4, June 1961, p. 42-46.

Topics reviewed include preferred orientation in extruded Zircaloy-2 tubing, tensile testing of unirradiated and irradiated Zircaloy-2 hot water loop tubing, corrosion of nuclear reactor materials by He impurities, decontamination of pressurized-water systems and corrosion of 1100 and 6061 Al alloy by water cooling. 5 ref. (M26c, Q27, R1, T11; Zr-b, 4-58)

607-M. Precipitation of Laves Phases in Modified 12% Cr Steels. Jaroslav Koutsky and Jaroslav Jezek. Metal Treatment and Drop Forging, v. 28, Aug. 1961, p. 302-305, 307.

Electron microscopic and X-ray study of the precipitation of the delta phase ferrite and sorbite structures in quenched and tempered high-alloy steels. Cr-C-W composition ratios are examined at 650-800° C. to determine the concentration of the alloying elements in the precipitates. 9 ref. (M26q, M-general, N7, N8, 2-60, 2-64; AY, Cr, W)

608-M. (Russian.) Phase Equilibrium in a Quasi-Triple System Ti-Ti_3Sn-Zr. V. V. Glazova and N. N. Kurnakov. Doklady Akademii Nauk SSSR, v. 138, Apr. 1961, p. 835-838.

Diagrams of isothermic sections for phase equilibriums at 850-1560° C. Microscopy. 6 ref. (M24d; Ti, Sn, Zr)

609-M. (Russian.) Movement of Dislocations in Antimony Crystals. L. M. Soifer and V. I. Startsev. Doklady Akademii Nauk SSSR, v. 138, May 1961, p. 1084-1087.

X-ray crystallography and microscopy are used to determine plastic characteristics of low density dislocations for high-purity monocrystals under stress and heat treatment. 12 ref. (M26p, M21f, 2-64, 3-66; Sb, 14-61)

610-M. (Russian.) Origination of Fatigue Fractures in Metals. V. S. Ivanova. Izvestiya Akademii Nauk SSSR--Metallurgiya i Toplivo, Mar. 1961, p. 77-81.

Microscopic study of the effect of vacancies, dislocation and coagulation in lattices of steel samples. 19 ref. (M21, M26; ST)

611-M. (Russian.) Connection Between Solidus and Liquidus Properties of Certain Semiconducting Alloys. V. M. Hlazunov and S. N. Chizhevskaya. Izvestiya Akademii Nauk SSSR--Metallurgiya i Toplivo, Mar. 1961, p. 154-156.

Viscosity and electroconductivity of GaSb, InSb, Ga_2Te_3 and In_2Te_3 are studied in both solid and liquid states. 12 ref. (M24b, P10f, P15g; EG-j31, Ga, In, Sb, Te)

612-M. The Shape of Melt-Crystal Interfaces During Float Zoning of Silicon. Remo A. Pellin and Juergen H. Braun. Electrochemical Society, Journal, v. 108, Oct. 1961, p. 969-974.

Study of the thermal environment of the interface of growth of a Si crystal during floating zone melting. The shape of the interface is observed by slot doping of n-type silicon with an excess of boron dope to give a p-n junction between n-type crystal and p-type melt outlining and interface which is decorated with a staining etchant. Effect of zone travel and power input, latent heat of fusion and high frequency induction skin heating characteristics on interface shape. 13 ref. (M27f, C28k; Si, 14-61)

613-M. Characteristics of the (111) Surfaces of the 111-V Intermetallic Compounds. Pt. 3. The Effects of Surface Active Agents on InSb and the Identification of Antimony Edge Dislocations. M. C. Lavine, H. C. Gatos and M. C. Finn. Electrochemical Society, Journal, v. 108, Oct. 1961, p. 974-980.

Influence of specific adsorption of inorganic and organic surface active agents on the dissolution rate and microstructure of InSb in oxidizing etchants and to development of etch pits identified with edge dislocation on the (111) surfaces. This result is verified by plastic deformation experiments. Electrical measurements at 78° K. suggest that Sb dislocations serve as electron donors whereas In dislocations serve as electron acceptors. 9 ref. (M20q, M26b, M26q; In-b, Sb)

614-M. (English.) Metastable Phases in the Uranium-Molybdenum System and Their Origin. K. Tangri and G. I. Williams. Journal of Nuclear Materials, v. 4, July 1961, p. 226-233.

Study of composition limits of metastable phases alpha prime and alpha double prime; changes in parameters a, b, c and angle gamma of the alpha uranium lattice with increasing Mo additions 0.67-11.39%; and effect of cooling rates in producing alternative structures. Increasing additions of Mo stiffen the uranium lattice making it more resistant to shear whereas the increasing cooling rate favors shear and carries the transformation towards completion. 14 ref. (M24, M26, N-general, 2-60, 2-64; U-b, Mo)

615-M. (English.) Thermal Etching of Beryllium. J. Williams and J. W. S. Jones. Journal of Nuclear Materials, v. 4, July 1961, p. 234-235.

Changes of surface topography as a function of vacuum annealing time (30-120 min.) at 900-975° C. is investigated for polished specimens of cast electrolytic Be. Correlation of etch pit formation and distribution within the grains and at grain boundaries with dislocation sites on the surface. (M20, M26b, M27, 2-64; Be)

616-M. Mosaic Size in Lead From X-Ray Measurements. Yosio Hiki and Ryukiti Hasiguti. Journal of Applied Physics, v. 32, Sept. 1961, p. 1647-1650.

X-ray measurements of Pb powders of 100-200 mesh sizes determine spectral intensities. These are used to calculate the mosaic size and dislocation density which are found to decrease with annealing in vacuum at 150° C. 17 ref. (M26s, M21f, 1-54, 1-73, 2-64; Pb, 6-68)

617-M. Phase Diagram for the Pseudobinary System Ag_2Te-Sb_2Te_3. J. P. McHugh, W. A. Tiller and S. E. Haszko. Journal of Applied Physics, v. 32, Sept. 1961, p. 1785.

Thermal investigation substantiated by metallographic and X-ray powder techniques to establish equilibrium phase diagram for quenched samples annealed at 300-400° C. for 48 and 200 hr. 4 ref. (M26, 1-54; Ag, Sb, Te)

618-M. (French.) Investigation of the Structure of Metallic Films by Means of X-Ray or Electron Diffraction and Electron Microscopy. Madeleine Gandais. Revue d'Optique Theorique et Instrumentale, v. 40, Mar. 1961, p. 101-115.

Evaporation of Ag, Au, Cu, Al, Sn, Bi-Sb and Zn-Cd alloys on polished quartz in a vacuum of 10^{-6}-8.10^{-6} mm., the quartz surface being held

at -90 to -40° C. Comparison of metallographic techniques for observing microstructures. 7 ref. (M22, M-general; 14-62)

619-M. (German.) Structure of Liquid Mercury. G. Voigtlaender-Tetzner. Naturwissenschaften, v. 48, Aug. 1961, p. 520-521.

X-ray investigation of the Hendus distribution curve of Hg at room temperature and evaluation of structure by statistical methods. Similarity of structure of monatomic liquids to structure of close-packed crystals. (M22g, M26, 1-53; Hg)

620-M. Phase-Equilibrium Studies in Metallurgical Systems. U. S. National Bureau of Standards, Technical News, Sept. 1961, 17 p.

Study of effects of temperature, pressure and component concentration on phase stability and chemical composition of alloy systems. Thermal analysis, nuclear magnetic resonance measurements and microscopy are employed to obtain data on reaction systems containing Ni, Pb, In, Ta, Cb, Co, U, Be, Au, Ag, Pt, Cu, Rh, Pd, Ru, Re, Zn, Hg, Sn, Sb, Fe, Cr and W. 8 ref. (M24, 2-60, 2-61, 3-74)

621-M. Vacancy Trapping in Quenched Aluminum Alloys. K. H. Westmacott, R. S. Barnes, D. Hull and R. E. Smallman. Philosophical Magazine, v. 7, July 1961, p. 929-935.

Foils of Al-based alloys containing Zn, Cu, Ag, Mg and Si are given various quenching treatments with the size and distribution of the vacancy clusters and dislocation loops being observed by electron microscopy. The solute atoms trap the vacancies and their bending energies determine both the scale of the clusters and the number of vacancies. 13 ref. (M26s, 2-60, 2-64; Al-b)

622-M. Phase Equilibria in the Binary Systems $PuCl_3$-RbCl and $PuCl_3$-CsCl. R. Benz and R. M. Douglass. Journal of Physical Chemistry, v. 65, Aug. 1961, p. 1461-1463.

Melting point, peritectic composition, polymorphic transformation temperatures, birefringence, extinction, elongation, optic axial angle and mean refractive index are revealed using metallographic examinations. 5 ref. (M24b, 1-54; Cs, Pu, Rb, 14-68)

623-M. The Systems Tantalum Pentachloride-Ferric Chloride and Niobium Pentachloride-Ferric Chloride. Charles M. Cook, Jr., and Robert B. Hand. Journal of Physical Chemistry, v. 65, Aug. 1961, p. 1467-1468.

Solid-liquid equilibria are investigated and freezing points, eutectic points and liquidus temperature are determined. (M24b, N12, 1-54; Fe, Ta, 14-68)

624-M. (German.) Microstructure of Zinc-Copper-Titanium Alloys. E. Pelzel. Metall, v. 15, Sept. 1961, p. 881-883.

Microstructure of slowly cooled or quenched, nonworked or cold and hot-worked binary Zn-Cu (0.6% Cu) and Zn-Ti (0-0.3% Ti) and ternary Zn-Cu-Ti (0.55-0.6% Cu, 0.06-0.14% Ti) alloys. Microstructure as influenced by cooling rate and degree of deformation. (M24, 2-64, 3-68; Zn-b, Cu, Ti)

625-M. (German.) Progress and Results in Investigation of Phase Diagrams. H. Spengler. Metall, v. 15, Sept. 1961, p. 883-891.

Bibliography of recent investigations on binary, ternary and multicomponent phase diagrams. Research results for the individual systems are given in abstract form. (M24, 10-54, 11-65)

626-M. (German.) Phase Equilibria in the Gallium-Lead-Cadmium System. Bruno Predel. Zeitschrift fur Metallkunde, v. 52, Aug. 1961, p. 507-511.

Investigation of phase equilibria by differential thermal analysis of quasi-binary sections of constant Ga (4-90%) content at temperatures up to 650° C. Ternary Ga-Pb-Cb phase diagram in terms of projections of isothermal transformations for all concentrations. (M23, M24c, N7c, N12; Ga-b, Pb-b, Cd-b)

627-M. (Translation.) An X-Ray Study of Packing Faults in Deformed Tantalum. L. P. Muravtsov and B. I. Smirnov. Soviet Physics--Solid State, v. 3, Oct. 1961, p. 923-925. (Translation from Fizika Tverdogo Tela, v. 3, Apr. 1961.)

Dependence of "effective" dimensions of blocks on crystallographic direction determined through study of 110, 200, 211, 220, 400 and 426 reflections in filings containing 0.63% Cb. 13 ref. (M26c, 3-68; Ta-b, Cb)

628-M. The Constitution of Bismuth-Cadmium-Tin Alloys. H. J. Bray, F. D. Bell and S. J. Harris. Institute of Metals, Journal, v. 90, Sept. 1961, p. 24-27.

A study of the binary and ternary alloys in the system at 80-300° C. by microscopic, thermal and X-ray analysis. Determination of the phase boundaries in the solid alloys including the limits of solid solubility and extent of the beta phase of the Ca-Sn system penetration into the ternary system and the effect of Bi on its decomposition temperature. 9 ref. (M-general, M24, P12e, 2-60; Bi, Cd, Sn)

629-M. Lattice Parameters of the Metastable Close-Packed Structures in Silver-Germanium Alloys. W. Klement, Jr. Institute of Metals, Journal, v. 90, Sept. 1961, p. 27-30.

The lattice spacings of the nonequilibrium f-c-c. and hcp. phases in the system are determined by X-ray diffraction techniques for 9.0-25.9% Ge alloys quenched rapidly from the melt. Transformation results are presented for some cold working and annealing experiments. 8 ref. (M26, M22g, 2-64, 3-68; Ag, Ge)

630-M. Metal Finishing Technology: A Student's Guide. Pt. 9. Crystal Structure and Related Properties. A. Alexander. Metal Finishing Journal, v. 7, Sept. 1961, p. 329-334.

Effects of crystal structure on hardness and elasticity in steel, cast iron, brass, Cu, Ni and Zn-base alloys. Techniques for controlling the crystal size and eliminating flaws during casting and electrodeposition of metals. (M26, E-general, L17a, Q-general, 2-60, 3-69; ST, CI, Cu-n, Cu, Ni, Zn-b)

631-M. (German.) Microstructure Investigation of Rails With Bearing Surfaces Grooved by Wear. Friedrich Karl Naumann. Archiv fur das Eisenhuttenwesen, v. 32, Sept. 1961, p. 617-626.

Chemical analysis of nitrogen in bearing surface, microstructure, hardness, microhardness and X-ray investigation of worn rails of basic Bessemer and openhearth steel. Groove formation as influenced by hardenability and strain-hardenability of steel. (M27, N7e, Q29, T23q; ST)

632-M. (German.) Microstructure Investigation of Ferroalloys by Evaporated Interference Films. Werner Pepperhoff. Archiv fur das Eisenhuttenwesen, v. 32, Sept. 1961, p. 651-653.

Comparative investigation of microstructure by conventional polishing and etching and after evaporation of thin layers of TiO_2 which amplify the optical anisotropy in polarized light. FeCr, FeV, FeTi, FeB, FeSi, SiCr and FeMoSi are examined. (M-general, 1-54; Fe, Si, B, Cr, Si, V)

633-M. (German.) Phase Equilibria of the Iron-Rich Side of the Iron-Zinc Phase Diagram. Rudolf Vogel and Rolfdieter Gerhard. Archiv fur das Eisenhuttenwesen, v. 32, Sept. 1961, p. 655-659.

Investigation of phase equilibria in the Fe-Zn system in the concentration range 0-30% Zn for temperatures up to liquidus temperature by thermal analysis of Fe-Zn alloys under a Zn-partial pressure of 1 atm. Phase equilibria as influenced by pressure. (M24, 2-60, 2-62, 3-74; Fe, Zn)

634-M. (German.) Properties of Spherical Metal Crystals With Untouched Surfaces. E. Menzel. Metalloberflache, v. 15, Sept. 1961, p. 265-268.

Electron and X-ray diffraction investigation of bright and oxidized metal spheres (Cu, Ag, Au, Pb) obtained by assymetric cooling on resistance-heated conductor strip (W, Mo or graphite) in high vacuum or in oxidizing atmosphere. Crystal structure and orientation and surface structure are investigated. (M22, M26, M28, 1-54; Ag, Au, Cu, Pb)

635-M. (German.) Rolling and Recrystallization Textures of Thin Tungsten Sheet With and Without Alloying Additions. Erwin Roeder and Gerard Daniel Rieck. Zeitschrift fur Metallkunde, v. 52, Sept. 1961, p. 572-576.

Rolling and recrystallization textures of cold rolled tungsten sheets annealed at 1220-2520° C. under hydrogen with and

without small additions of $AlCl_3$ and potassium silicate. Investigation by X-ray diffraction techniques and examination of microstructure with data given in terms of pole figures. (M26c, N5, 2-60, 2-64, 3-68; W, 4-53)

636-M. (Czech.) Effect of Molybdenum and Copper on the Properties of Stainless Chromium Steels. Miloslav Vyklicky, Karel Lobl, Adolf Kabrhel, Hanus Tuma, Vladimir Cihal and Milan Prazak. Hutnicke Listy, v. 16, Aug. 1961, p. 553-560.

Samples containing 0.06-0.11% C, 0-6.11% Cu, 14.58-26.60% Cr and 0-3.91% Mo are tested in the cast and heat treated state for microstructure, mechanical properties, corrosion resistance in HCl, $NaHSO_3$ solution, H_2SO_3, oxalic acid, tartaric acid, lactic acid, citric acid, acetic acid and H_3PO_4 and weldability. 12 ref. (M27, Q-general, R-general, K9s, 1-54, 2-60; SS, Cr, Cu, Mo)

637-M. (Czech.) Effect of Oxygen on Surface Tension. Karel Mazanec and Emilie Kamenska. Hutnicke Listy, v. 16, Aug. 1961, p. 561-565.

Samples of 30KhN2MA alloy steel containing 0.016% oxygen are homogenization treated at 1000° C. for one week, polished and micrographically etched in a vacuum of 3×10^{-3} to 1×10^{-3} mm. pressure at 1050° C. for 2-48 hr. to study the correlation between surface profile and crystallographic planes. The formation of slip lines on fractured surfaces is studied on samples austenitized at 1100° C. for 1 hr. and water quenched. 14 ref. (P13h, M-general, 2-60, 3-71; AY, EG-q)

638-M. (Japanese.) Texture and Anisotropy of Annealed Aluminum Sheet. Pt. 2. Toshio Amitani. Sumitomo Light Metals Technical Reports, v. 2, July 1961, p. 47-52.

Investigation of cube texture, recrystallized grain size and anisotropy and directionality changes in rolled Al sheet, containing various metallic impurities, as a function of annealing time and temperature (280-360° C. for 1/2-48 hr.), by deep drawing tests and metallographic examination. 8 ref. (M26c, M27c, G4b, 2-61, 2-64; Al, 4-53)

639-M. Substructures and Dislocations Produced During Solidification of Aluminum. Heraldo Biloni. Canadian Journal of Physics, v. 39, Oct. 1961, p. 1501-1507.

Study of substructure changes produced during polycrystalline solidification of 99.99% Al using the decanting method for interruption of solidification. Metallographic examination of chemical etching, electrolytic polishing and application of thin epitaxial layers of aluminum oxide. Results indicate grain growth, macrosegregation and distribution of dislocation impurities and their relation with segregated cases. (M-general, L13p, N3, 9-69; Al)

640-M. A Note on Nickel Hydride. T. Boniszewski and G. C. Smith. Physics and Chemistry of Solids, v. 21, Oct. 1961, p. 115-118.

X-ray back reflection and front reflection examination of Ni strip specimens showing existence of a f-c-c. nickel hydride obtained at room temperature by saturating with hydrogen using cathodic charging in an aqueous solution H_2SO_4. (M26q; Ni-b, 14-68)

641-M. (English.) Incorporation of Slip Dislocation in Mechanical Twins. Pt. 1. A. W. Sleeswyk and C. A. Verbraak. Acta Metallurgica, v. 9, Oct. 1961, p. 917-927.

The transformation matrices pertaining to dislocation incorporation in a twin either by gliding across the twin boundary or by being engulfed by a growing twin are derived for (112) (111) twinning in the b-c-c. lattice with a discussion of the products of the transformations in terms of a dislocation model. 17 ref. (M26b, Q24b)

642-M. (English.) High Pressure Equilibria in the Iron-Nickel System and the Structure of Metallic Meteorites. Larry Kaufman and A. E. Ringwood. Acta Metallurgica, v. 9, Oct. 1961, p. 941-944.

Calculation of phase equilibria in the system indicating miscibility gap formation and eutectoid decomposition in Fe-Ni alloys at pressures exceeding 60 kb. This behavior is related to the origin of the plessite microstructure, which is an intimate lamellar mixture of low Ni kamacite b-c-c. and high Ni taenite f-c-c.,

found in metallic meteorites. 12 ref. (M24b, 3-74; Fe, Ni)

643-M. (French.) The Nature of Point Defects Created by Dislocation Intersections. G. Saada. Acta Metallurgica, v. 9, Oct. 1961, p. 965-966.

A model in which mobile dislocation on a glide plane under exterior constraint cross fixed dislocations in a dislocation forest is used to derive a formula for creation of point defects in terms of orientation relative to Burgers vectors and dislocation repulsion and attraction interaction. (M26b, M26s)

644-M. (English.) Dislocation Densities in Cold-Worked Copper-Silicon Alloys. R. J. Tainsh, G. K. White and P. G. Klemens. Acta Metallurgica, v. 9, Oct. 1961, p. 966-968.

Lattice, thermal and electrical conductivities are measured at 2-90° K. on deformed and 700° C. annealed polycrystalline rod specimens containing 2.25-4.5% Si with dislocation density, as a function of deformation, being derived from resistivity curves. 7 ref. (M26b, P15g, 2-60, 3-68; Cu-b, Si)

645-M. (English.) Atom Movements and Dislocation Structures in Some Common Crystals. M. L. Kronberg. Acta Metallurgica, v. 9, Oct. 1961, p. 970-972.

Review of theory and analyses for the structural nature of dislocations responsible for slip and twinning deformation systems in crystals including Hg, Sn, In, As, Sb, Bi, U, PbS, Mg, Al_2O_3, Zn, Fe_2O_3, Fe_3O_4, Cd and Zr. Relation of atom position in the volume interface and atom movement on deformation modes occurring during the shear process. 10 ref. (M25, M26b, Q24, 3-68; 14-61)

646-M. (English.) Annealing Twins and Stacking Faults in Niobium. R. L. Segall. Acta Metallurgica, v. 9, Oct. 1961, p. 975-976.

Transmission electron microscopy and selected area diffraction are used to examine twin boundaries and stacking faults in zone refined, rolled and recrystallized specimens after annealing at 900-1325° C. for various times. Interfacial energy for twin formation and stacking fault energy are affected by impurity segregation to dislocations as a function of purity. Use of vacuum during annealing and annealing temperatures. (M27e, 2-61, 2-64, 3-69; Cb)

647-M. (Russian.) Investigation of Attractive Forces in Solid Solutions of Nickel-Molybdenum on the Basis of the Fine Structure of X-Ray Absorption Spectra. V. A. Trapeznikov. Izvestiya Akademii Nauk SSSR--Seriya Fizicheskaya, v. 25, Aug. 1961, p. 994-996.

Measurement of the K absorption edge of Ni in alloys containing 0-16% Mo and relation to bonding forces with a general consideration of these forces in Ni-Mo alloys. 14 ref. (M25, M26, P17c; Ni-b, Mo)

648-M. (Russian.) X-Ray Spectral Investigation of Intermetallic Bonding in the System Copper-Zinc. V. A. Batyrev. Izvestiya Akademii Nauk SSSR--Seriya Fizicheskaya, v. 25, Aug. 1961, p. 997-998.

Determination of K absorption edges for Cu and Zn in the pure states, beta phase (CuZn), gamma phase (Cu_5Zn_8) and epsilon phase ($CuZn_3$). 7 ref. (M25h, M-general; Cu-b, Zn-b)

649-M. Derivation of Phase Diagram for the Silicon-Oxygen-Carbon System. W. A. Krivsky and R. Schuhmann, Jr. Metallurgical Society of AIME, Transactions, v. 221, Oct. 1961, p. 898-904.

A general method is presented for the derivation of ternary phase diagrams under various conditions of temperature and pressure from existing thermodynamic data. This method has been found useful for analysis of complex commercial reduction reactions giving an understanding of the process not readily available by other means. For purposes of illustration, the system Si-O-C is chosen over the temperature range of interest to the process metallurgist and at pressures ranging from 0.01 to 5 atm. 9 ref. (M24c, 2-61, 3-74; Si-b, O, C)

650-M. A Reinvestigation of the Systems Ti-Cr and Ti-V. Felix Ermanis, Paul A. Farrar and Harold Margolin. Metallurgical Society of AIME, Transactions, v. 221, Oct. 1961, p. 904-908.

The systems Ti-Cr and Ti-V are reinvestigated at up to 40% alloying addition using both conventional and rapid quenching techniques with metallographic examination of recrystallization microstructures. The eutectoid temperature, solubility of Cr and V in alpha titanium and the beta transus are determined with the phase diagram as a

function of temperature and composition. 19 ref. (M24b, M-general, N-general, 2-60, 2-61; Ti-b, Cr, V)

651-M. Lattice Strains and X-Ray Stress Measurement. Matthew J. Donachie, Jr., and John T. Norton. Metallurgical Society of AIME, Transactions, v. 221, Oct. 1961, p. 962-967.

Residual lattice strains produced in 2024 Al and ingot Fe by uni-axial tensile deformation are measured on the original surface and with depth below the surface. The strains conform approximately to those from a macroscopic stress distribution but are not truly macroscopic in nature, the grain behavior being dependent on internal stress. 19 ref. (M26, Q24, Q25, Q27, 3-68; Al-b, Fe-a)

652-M. Determination of Number of Particles Per Unit Volume From Measurements Made on Random Plane Sections: The General Cylinder and the Ellipsoid. R. T. DeHoff and F. N. Rhines. Metallurgical Society of AIME, Transactions, v. 221, Oct. 1961, p. 975-982.

The problem of determining the number of particles of a phase distributed randomly in unit volume of an opaque matrix from measurements made on random plane sections is investigated with a formalized derivation for the general case being applied to specific types of dispersed aggregates including circles, particles with flat circular ends, cylinders and constant shape aggregates of ellipsoids of revolution. 6 ref. (M-general)

653-M. The Constitution Diagram Niobium (Columbium)-Rhenium. Bill C. Giessen, Rolf Nordheim and Nicholas J. Grant. Metallurgical Society of AIME, Transactions, v. 221, Oct. 1961, p. 1009-1013.

The binary system Cb-Re is examined at 19.1-99.6% Re utilizing pure metals, arc melting techniques and heat treatments at 600-2600° C. Metallographic and X-ray methods are used for phase identification. The composition limits and mode of formation of the intermetallic compounds sigma and chi are determined with solidus points. 12 ref. (M24b, M26q, 2-60, 2-61, 2-64; Cb-b, Re-b)

654-M. The Zirconium-Rich Corners of the Ternary Systems Zr-Co-O and Zr-Ni-O. M. V. Nevitt and J. W. Downey. Metallurgical Society of AIME, Transactions, v. 221, Oct. 1961, p. 1014-1017.

The phase boundaries for the 950° C: isothermal sections in the systems are determined for compositions of 50-100% Zr. The two systems show very similar phase relations, having no extensive solid solution phase fields. Each contains a ternary phase which is apparently isostructural. Some aspects of the phase relations are discussed in terms of the alloying behavior of transition metals. 14 ref. (M24c, 2-60, 2-61; Zr-b, Co, Ni, O)

655-M. Sigma Phases With Aluminum. K. P. Gupta. Metallurgical Society of AIME, Transactions, v. 221, Oct. 1961, p. 1047-1049.

X-ray diffraction and metallographic examination of binary specimens, 40% Al-Ta, 35% Al-Mo and 30-50% Al-Cb alloys after quenching and annealing treatments at 1175-1250° C. to determine the existence of Al-rich sigma phases and the presence of ordering. Phase field boundaries, lattice parameters and order schemes are presented with microstructural aspects and composition ranges. 5 ref. (M26q, M-general, N10, 2-60, 2-61, 2-64; Al-b, Ta-b, Mo-b, Cb-b)

656-M. Orientations of Large Grains in Tungsten Wire. A. J. Opinsky, J. L. Orehotsky and L. L. Seigle. Metallurgical Society of AIME, Transactions, v. 225, Oct. 1961, p. 1083-1084.

Preferred orientation direction and recrystallization texture and nature of grain elongation as a function of heating temperature are examined by Laue back reflection technique for Si-Al doped W specimens annealed in H and N atmospheres and in vacuum at 1000-3300° C. and for undoped specimens strain annealed at 1400-1600° C. 7 ref. (M26c, N3, N5, 2-62, 2-64; W-b, 4-61)

657-M. Ternary Laves Phases With Transition Elements and Silicon. D. I. Bardos, K. P. Gupta and Paul A. Beck. Metallurgical Society of AIME, Transactions, v. 221, Oct. 1961, p. 1087-1088.

Review of laves phase formation in binary alloys of transition metals such as Ni, Fe, Co, Ti, V, Sc, Y or Cr group

elements as a function of electron concentration and size. X-ray diffraction study of Si stabilization of laves and sigma phase formation in 1000-1200° C. annealed specimens of Ti_2Ni_3Si, $V_4Ni_5Si_3$, Cb_2Ni_3Si, Ta_2Ni_3Si, Mo_2Ni_3Si, W_2Ni_3Si, $V_4Co_5Si_3$, Mo_2Co_3Si, W_2Co_3Si, $W_{40}Fe_{50}Si_{10}$, $Ti_{30}Mn_{50}Si_{14}$, $Mo_{25}Mn_{47.5}Si_{27.5}$ and W_2Mn_3Si alloys. 10 ref. (M26q, M24c)

658-M. Phase-Equilibrium Studies in Metallurgical Systems. Technical News Bulletin (National Bureau of Standards), v. 45, Oct. 1961, p. 170-176.

The conventional two-component diagram (temperature versus composition) is studied and revised to develop a theory of alloying that can predict behavior for various compositions under various experimental conditions. Systems studied include binary combinations of Fe, Cr, Mo, U and semiconductor materials. (M24b, M24e; Fe, Cr, Mo, U, EG-j31)

659-M. (Ukranian.) Ternary Laves-Phase in the System Manganese-Cobalt-Beryllium. P. I. Krip'yakevich. Dopovidi Akademii Nauk Ukrains'koi RSR, Aug. 1961, p. 1042-1044.

X-ray determination of a cubic $MgCu_2$ type phase in the system after 400° C. heat treatment for various times. Data are given for lattice parameters and microstructure. 7 ref. (M26; Mn-b, Co-b, Be-b)

660-M. (Ukranian.) Crystal Structure of the Alloy $MgInCu_4$. M. Yu. Teslyuk and P. I. Krip'yakevich. Dopovidi Akademii Nauk Ukrains'koi RSR, Aug. 1961, p. 1039-1040.

X-ray determination of lattice parameters and space group of a ternary intermetallic compound. 7 ref. (M26q; Cu-b, In-b, Mg-b)

661-M. Metal Surfaces...How They Look and How They Behave. Digest from "Sixth Regional Seminar on Properties of Metallic Surfaces, held Apr. 20, 1961, at Illinois Institute of Technology in Chicago by the Chicago-Western Chapter of ASM. M. V. Nevitt. Metal Progress, v. 80, Nov. 1961, p. 126-138.

A variety of experimental techniques, ranging from field ion microscopy to magnetic measurements, are being employed to learn how surface structure affects properties. Review of instruments currently used to probe the structure of metal surfaces. (M-general, 1-53)

662-M. (Russian.) The Iron-Hafnium Composition Diagram. V. N. Svechnikov and A. K. Shurin. Doklady Akademii Nauk SSSR, v. 139, Apr. 1961, p. 895-898.

Determination of the Fe-Hf composition diagram through differential thermal analysis and dilatometric measurements. X-ray measurement of epsilon phase lattice parameter as a function of composition. 13 ref. (M24b, M-general, 2-60; Fe-b, Hf-b)

663-M. (Russian.) Distribution of Electrons on the Basis of States in Metals of the Iron Transition Group. N. D. Borisov and V. V. Nemoshkalenko. Izvestiya Akademii Nauk SSSR--Seriya Fizicheskaya, v. 25, Aug. 1961, p. 1002-1006.

Measurement of the CrK-beta 5, K-beta 5 and CoK-beta 5 lines in pure Cr, Fe and Co. Relation of K-beta 5 intensity to atomic number and relative number of outer electrons. 8 ref. (M25, P17c; Cr, Co, Fe)

SECTION N

TRANSFORMATIONS and RESULTING STRUCTURES

1-N. The Atomic Diffusion of Platinum in Gold. A. J. Mortlock, A. H. Rowe and A. D. LeClaire. Philosophical Magazine, v. 5, Aug. 1960, p. 803-814.

Measurement of the diffusion of Pt at tracer concentrations in Au at 800-1000° C. Calculation of activation energy and diffusion coefficient. 18 ref. (N1; Au, Pt)

2-N. (French.) Determination of Gamma Grain by Syncrystallizable Alloy Condensation. The Effect of Aluminum Nitride on Grain Coarsening. G. Vigneron. Memoires Scientifiques de la Revue de Metallurgie, v. 57, Sept. 1960, p. 705-720.

Polished samples of Armco iron, Cr steel and carbon steel are heated to 850-1100° C. An Fe-Ni alloy, pure Ni or Cu is evaporated and deposited on the surface. The deposit assumes and preserves the shape of gamma grain and is used for micrography. Study of coarse grain formation in a carbon steel with traces of aluminum nitride by the above method. 19 ref. (N3, M27c; CN)

3-N. (French.) Effect of Low Chromium, Iron or Molybdenum Additions on Transformations in Uranium During Hardening and Tempering. Jean Delaplace. Memoires Scientifiques de la Revue de Metallurgie, v. 57, Sept. 1960, p. 721-727.

Pure uranium and uranium containing 0.05-0.50 at.% Cr, 0.34 at.% Fe or 2.8 at.% Mo are cooled at various rates from 775-735° C. to 600-400° C. to study the effects of additions and cooling rate on the gamma-beta and beta-alpha transformations. 8 ref. (N-general, 2-60, J-general; U, Cr, Fe, Mo)

4-N. The Structure and Mechanical Properties of Uranium-Titanium Martensites. D. L. Douglass. American Society for Metals, Transactions, Preprint no. 200, v. 53, 1961, p. 307-319.

Small amounts of Ti were very effective in increasing the strength of martensitic uranium. The strengthening effect saturated at about 2 at.% Ti and was not due to the presence of a second phase. Lattice parameter changes with composition were continuous, both a_o and c_o increased with increasing solute, whereas b_o decreased. The measured changes were greater than those calculated on the basis of size differences alone. 19 ref. (N6q, 2-60; U-b, Ti, 14-67)

5-N. Effect of Rolling Procedure on the Kinetics of Recrystallization of Cold-Rolled Iron. J. T. Michalak and W. R. Hibbard, Jr. American Society for Metals, Transactions, Preprint no. 202, v. 53, 1961, p. 331-348.

Effect of straight-rolling, cross-rolling, time of recrystallization, temperature of recrystallization, apparent nucleation frequency, growth rate and preferred orientation. 16 ref. (N5f, F23; Fe)

6-N. Isothermal Transformation of Ti-13V-11Cr-3Al. L. E. Tanner. American Society for Metals, Transactions, Preprint no. 206, v. 53, 1961, p. 407-414.

Transformation kinetics investigated for a heat treatment that consisted of water quenching from a beta solution anneal at 788° C. (1450° F.) and reheating to aging temperatures between 350-700° C. (662 and 1292° F.) A TTT diagram was constructed from

metallographic, hardness and X-ray diffraction data. 6 ref. (N7c, 2-64; Ti-b, V, Cr, Al)

7-N. The Morphology of Proeutectoid Cementite. R. W. Heckel and H. W. Paxton. American Society for Metals, Transactions, Preprint no. 215, v. 53, 1961, p. 539-554.

Three hypereutectoid, plain carbon steels containing 1.20, 1.48 and 1.72 wt.% carbon were solution treated to give a large austenite grain size and subsequently isothermally transformed for various lengths of time between 550° C. and the A_{cm} temperature. The specimens were examined metallographically in order to observe the effect of experimental variables (carbon concentration, transformation temperature and transformation time) on the morphology of the precipitated proeutectoid cementite. 16 ref. (N8k; CN)

8-N. The Occlusion of Hydrogen by Annealed Hypoeutectoid Iron-Carbon Alloys. Michael Kotyk and H. M. Davis. American Society for Metals, Transactions, Preprint no. 222, v. 53, 1961, p. 653-661.

Unworked iron-carbon alloys of five carbon contents involving three carbide forms were equilibrated with hydrogen gas at temperatures from 40-550° C. Minima in certain occlusion curves are resultants of decaying exothermic occlusion and increasing endothermic occlusion. The mechanism of the exothermic process is thought to be sorption at carbide-ferrite or pearlite-ferrite interfaces. 15 ref. (N15d; Fe-b, C, H)

9-N. The Effect of Aluminum on Strain Aging and Internal Friction in Low Carbon Steel. F. H. Laxar, J. W. Frame and D. J. Blickwede. American Society for Metals, Transactions, Preprint no. 224, v. 53, 1961, p. 683-696.

Internal friction results indicate that carbon and Al atoms interact. This is evidenced by three abnormal peaks in the internal friction curves of these steels which increase in size at the expense of the normal peak as Al content increases. The equilibrium solid solubility of carbon in ferrite at 700° C., as measured by the sum of the peak maxima, decreases with increasing Al content. 13 ref. (N7e, Q22, 2-60; CN-g, Al)

10-N. Diffusion of Carbon in Thorium. David T. Peterson. American Society for Metals, Transactions, Preprint no. 230, v. 53, 1961, p. 765-773.

The rate of diffusion of carbon in Th was determined by measuring the fractional saturation of Th cylinders at various times. The activation energy for diffusion is 38 kcal. per mole. Evidence of a change in the diffusivity with concentration is observed. 4 ref. (N1; Th, C)

11-N. The Mechanism of Occlusion of Hydrogen by Cold-Worked Hypoeutectoid Iron-Carbon Alloys. J. E. Werner and H. M. Davis. American Society for Metals, Preprint no. 237, v. 53, 1961, p. 853-869.

Equilibration of gaseous hydrogen with cold worked iron-carbon alloys between 250-400° C. reveals the existence of both an exothermic and an endothermic mechanism of occlusion, to which processes the total occluded volume of hydrogen could be apportioned. Both mechanisms are shown to be fully reversible. 20 ref. (N15d; Fe-b, C)

12-N. Analysis of Diffusion Couples by X-Ray Absorption. Robert E. Ogilvie. Paper from "Advances in X-Ray Analysis", v. 1. Plenum Press, Inc., New York, N. Y., 1960, p. 439-453.

Diffusion zones in thin sections of Ni-NiAu, Fe-Cr and Ni-Cr diffusion couples are scarred with a monochromatic X-ray beam. Zone composition and phase diagrams are determined from the measured intensity of the transmitted X-rays and the absorption coefficients of the component elements. (N1, S11p)

13-N. Ordered Phases With Long Period in the Gold-Zinc Alloy System. Pt. 1. Survey of Crystal Structures and Calorimetric Measurement. Hiroshi Iwasaki, Makoto Hirabayashi, Kunio Fujiwara, Denjiro Watanabe and Shiro Ogawa. Physical Society of Japan, Journal, v. 15, Oct. 1960, p. 1771-1783.

Study of Au-Zn single crystals by X-ray and electron diffraction. Phase diagrams, orientation distribution of the ordered crystals and transition behavior of the alloys with changing temperature. 18 ref. (N10a, 2-61, M24b, M22, M26; Au-b, Zn, Zn-b, Au)

14-N. (German.) Spherulite Formation in Metal Melts. Hans H. Stadelmaier.

Zeitschrift fur Metallkunde, v. 51, Oct. 1960, p. 601-604.

Growth of spherulites in melts composed of Fe-Sn-C, Ni-C, Co-C and Fe-Ni_2Mg is traced by microscopic examination in polarized and nonpolarized light. (N8q, M21; Co-b, Fe-b, Ni-b, C, Mg, 14-60)

15-N. (German.) Investigation of Transition Behavior of Titanium-Molybdenum and Titanium-Vanadium Alloys. Willy Knorr and Herbert Scholl. Zeitschrift fur Metallkunde, v. 51, Oct. 1960, p. 605-612.

Isothermal and nonisothermal damping measurements on heat treated binary TiV and TiMo bars of varying composition at 0-700° C. Evaluation of phase relations from modulus of elasticity and damping capacity measurements. (N-general, M24b, Q8g, Q21a, 2-60, 2-61; Ti-b, Mo, V, 4-55)

16-N. (German.) Anisotropy of Grain Growth in Recrystallization of Aluminum Single Crystals. G. Czjzek and F. Haessner. Zeitschrift fur Metallkunde, v. 51, Oct. 1960, p. 567-572.

Al single crystals, obtained by a recrystallization method from cold rolled Al (99.99%) foil, are hand stretched annealed at 390-510° C. and electrolytically etched. Effect of deformation structure and grain-matrix orientation on anisotropy of grain growth is measured microscopically. (N3, 3-68, 3-72; Al, 14-61)

17-N. Polygonization Capacity of Zone Melted Copper. Jacques LeHericy, Francoise Bourelier, Jean Montuelle and Georges Chaudron. Comptes Rendus, v. 251, Oct 24, 1960, p. 1779-1781.

Microscopic inspection of zone melted Cu after tensile deformation and subsequent holding at 1050° C. to determine extent of polygonization. 6 ref. (N4, N5, 3-68, M21' Cu-a)

18-N. (French.) New Carbide Formed During Transformation of Carbon-Silicon Steels. J. Pomey, J. Deliry, M. Wintenberger, R. Lafont, P. Lesage and A. Diament. Comptes Rendus, v. 251, Oct. 10, 1960, p. 1507-1508.

Formation of a carbide with hexagonal structure and Curie point near 370° during bainitic transformation of carbon silicon steel at 350-450° C. Isothermal decomposition of austenite around 400° occurs in two successive stages with ferrite developing during carbon enrichment of austenite and the remaining austenite decomposing to form ferrite and the new carbide. (N8r; CN, Si)

19-N. (Japanese.) Application of Atomalloy Treatment to Die Steel and Its Effects. S. Ohwaku, K. Hachiya, H. Nakagami and H. K. Ashikari. Metals, v. 30, Aug. 15, 1960, p. 57-61.

Activated fine grained WC or Mo_2C is adsorbed on an activated die and diffuses over the steel surface during heating to form a hardened tough skin. Hardness testing. Applications. (N1h, J28, Q29n; TS)

20-N. High-Pressure Research in Metallurgy. John E. Hilliard. American Society of Mechanical Engineers, Paper no. 60-WA-271, 1960. 9 p. $1.

Effect of ultra-high pressure and temperature on phase transitions, grain growth, diffusion, crystal structure and defect concentration, thermodynamics and mechanical properties of alloys. 33 ref. (N-general, M26, P-general, Q-general, 3-74)

21-N. (French.) Simultaneous Cementites Substitution for Chromium, Molybdenum and Manganese in Low Carbon, Low Alloy Steels. L. Backer, R. Bigot and E. Herzog. Comptes Rendus, v. 251, Oct. 3, 1960, p. 1388-1390.

Evolution of substitutional cementites are studied after different heat treatments to determine limits of solubility of Cr, Mo and Mn. Carbides are isolated by electrolytic separation and analyzed chemically and by X-ray diffraction. 3 ref. (N8k, N8r, M26p; AY, C, Cr, Mo, Mn)

22-N. Kinetics of the Martensite Transformation in Iron Alloys. W. S. Owen and A. Gilbert. Iron and Steel Institute, Journal, v. 196, pt. 2, Oct. 1960, p. 142-149.

Types of martensite in Fe alloys and driving force required for martensitic transformations. Nucleation theories. 64 ref. (N8p, N2; Fe-b)

23-N. Cooling Transformation Diagrams for A. I. S. I. 8620 and 8640. Metal Progress, v. 78, Dec. 1960, p. 100B.

Data presented in two diagrams. (N-general; CN)

24-N. (Russian.) Some Self Diffusion Variables and Distribution of Elements in

Alloys. P. L. Gruzin. Metallovedenie i Termicheskaya Obrabotka Metallov, Oct. 1960, p. 5-13.

Study of atomic migration in solid bodies. Dependence of diffusion coefficient upon temperature, structural factors and grain size. Diffusion of carbon in ferrite as influenced by Si, Ni and Mo concentrations. (N1e, N8, 2-59, 2-60, 2-61)

25-N. (Russian.) Pearlite in Iron-Carbon-Silicon Systems. Ya. N. Malinochka, N. G. Osada and G. Z. Koval'chuk. Metallovedenie i Termicheskaya Obrabotka Metallov, Oct. 1960, p. 19-21.

Microscopic study of honeycomb pearlite formed with laminar pearlite in rapidly cooled castings composed of posteutectoid Si steel and low carbon and high Si cast iron. (N8h, M24c; CI, ST, Si, 5)

26-N. Annealing Texture in a Rolled and Artificially Nucleated Aluminum Single Crystal. S. Kohara, M. N. Parthasarathi and Paul A. Beck. Paper from "Advances in X-Ray Analysis", v. 2. Plenum Press, Inc., New York, 1960, p. 7-21.

The effect of random nuclei on recrystallization texture and relative grain boundary mobilities in various orientations between a deformed (99.98% pure) Al single crystal and recrystallized grains growing in it in well deformed lattice orientation relationships are studied by X-ray back reflection of specimens with nucleation caused by abrasion and annealing. 21 ref. (N2, N3, N5, M26C, M22g, 2-64; Al, 14-61)

27-N. On the Mechanism of Recrystallization of Aluminum. Sigmund Weissmann. Paper from "Advances of X-Ray Analysis", v. 2. Plenum Press, Inc., New York, 1960, p. 47-70.

Recrystallization and grain growth of 99.998% Al by methods combining metallographic techniques with X-ray microscopy and diffraction and analysis. The recrystallized grains are the product of preferential subgrain growth whereby subgrains subtending large disorientation angles with respect to their neighbors exhibited the highest velocity of growth. 28 ref. (N5, N3, M21, M22g; Al)

28-N. Recrystallization Studies of High Purity Aluminum Single Crystals. Robert A. McCune and H. P. Leighly, Jr. Paper from "Advances in X-Ray Analysis", v. 2. Plenum Press, Inc., New York, 1960, p. 341-359.

Laue back reflection and transmission and X-ray diffraction study of recrystallization growth rates in strain-annealed Al single crystals deformed in tension. Correlation of growth rates with relative orientations of the matrix and the recrystallized grain suggesting a compromise between the theories of oriented growth and oriented nucleation in the recrystallization mechanism. Effect of residual stress on rupture of the coherent bond between the embryo and the matrix allowing nuclei formation; and partial stress relief occurring through polygonization permitting recrystallization. 7 ref. (N5, N2, M22g, 2-64, 3-66, 3-68; Al-a, 14-61)

29-N. Analysis of Aluminum-Nickel Diffusion Couples by X-Ray Absorption. Paul Lublin. Paper from "Advances in X-Ray Analysis", v. 3. Plenum Press, Inc., New York, 1960, p. 1-10.

X-ray determination of diffusion zone concentration gradients, phase compositions, porosity and layer growth. The technique employs a monochromatic X-ray beam which impinges on a very fine slit aligned with the diffusion zone. 4 ref. (N1, S11p; Al-b, Ni-b)

30-N. A High-Temperature Study of Phase Precipitation in Superalloys. John F. Radavich. Paper from "Advances in X-Ray Analysis", v. 3. Plenum Press, Inc., New York, 1960, p. 365-375.

Electron microscopy, electron diffraction and X-ray diffraction and fluorescence analysis of grain boundary precipitation in V-57 and A-286 Fe-base alloys at 1950-2150° F. Effect of process temperature on grain boundary thin film (TiC) formation and subsequent embrittlement. 5 ref. (N7, 2-62, M21, M22; SGA-h)

31-N. (German.) Changes of Microstructure and of Properties of Cast Iron in the Solid State. Werner Jellinghaus. Stahl und Eisen, v. 80, Nov. 10, 1960, p. 1695-1700.

Dilatometric and microstructural investigations on die and sand cast specimens of cast iron with varying

carbon (1.1-3.0% C) and silicon (0.4-2.7% Si) content after isothermal austenite transformation, hardening and annealing. Role of Si in microstructural changes. (N8, M27, Q29n, 2-60, 2-64; CI, Si, 5)

32-N. (Spanish.) Influence of Boron on the Hydrogen Content of Steel. R. Suarez Acosta. Instituto del Hierro y del Acero, v. 13, July-Sept. 1960, p. 778-790.

Presence of boron retards diffusion of hydrogen in steels and facilitates formation of martensite during hardening treatments. Addition of boron to Al-killed carbon steel is advised. In alloy steels containing Ni, boron addition is not necessary as Ni has same retarding effect on diffusion of hydrogen as does boron. 9 ref. (N1, N8p, 2-60; AY, CN, B, H)

33-N. (French.) Curie Point of Hexagonal Iron Carbides. Comptes Rendus, v. 251, Sept. 19, 1960, p. 1220-1222.

Effect of Si and Fe concentration on the stability and Curie point of iron carbides formed in steel. (N8r, P16d, 2-60; ST)

34-N. (German.) Influence of Chromium, Molybdenum, Tungsten and Manganese on the Transformation of 1% C Steels. Karl Bungardt and Otto Mulders. Stahl und Eisen, v. 80, Oct. 27, 1960, p. 1603-1618.

Construction of TTT diagrams for steels with 1-3% Cr, 0.2-2% Mo, 0.4-2.3% W, or 0.3-1.9% Mn. Magnetic measurement and microscopic and X-ray examination of effect of alloying additions, based on activation energies of the phase transformations. 50 ref. (N-general, 2-60; ST, W, Cr, Mo, Mn)

35-N. (Japanese.) Carbides in High-C High-V High-Speed Steel. Sadae Koshiba, Shin Kimura and Hideki Harada. Japan Institute of Metals, Journal, v. 24, July 1960, p. 437-440.

Composition, crystal structure and shape of carbides electrolytically isolated from several high-speed steels after heat treatment as determined by chemical and X-ray analysis and electron microscopy. Effect of heat treatment on carbide content and relation of carbide content to cutting durability of the steels. 10 ref. (N8r, 2-64, M-general; TS-m)

36-N. (Japanese.) Carbides in Molybdenum Steels (Continued). Tomo-o Sato, Taiji Nishizawa and Koreaki Tamaki. Japan Institute of Metals, Journal, v. 24, July 1960, p. 469-473.

Carbides existing at equilibrium with austenite in Mo steel studied by electrolytic isolation and by subsequent chemical and X-ray analysis; after austenitizing and tempering. Data are given for crystal structure and composition. 10 ref. (N8r, M-general, 2-64; AY, Mo)

37-N. (Japanese.) Carbide Reactions, Secondary Hardening and Volume Change Occurring in the Fourth Stage of Tempering of Alloy Steels. Tomo-o Sato and Taiji Nishizawa. Japan Institute of Metals, Journal, v. 24, July 1960, p. 473-477.

X-ray, dilatometric and chemical analysis of carbides isolated electrolytically from Cr, Mo, W and V steels tempered at 400-730° C. 16 ref. (N8r, J29, M-general, P10d, 2-60; AY, Cr, Mo, V, W)

38-N. Gas Solubility in Iron-Base and Nickel-Base Alloys. M. J. Trzeciak and F. W. Boulger. Paper from "Electric Furnace Proceedings, 1959", v. 17. American Institute of Mining, Metallurgical and Petroleum Engineers, Inc., New York, 1960, p. 203-223.

H, O and N contents in liquid melts of Fe and Ni alloys. Effect of alloying elements, melt temperature and gas pressure on the gas solubility. 9 ref. (N16m, 2-60, 2-61, 3-74; Fe-b, Ni-b, H, N, O)

39-N. Aging Characteristics of Aluminum Alloys. Industrial Heating, v. 27, Nov. 1960, p. 2366.

Electron microscope study of the aging in high-purity Al alloys containing Mg, Zn and Cu and in commercial D.T.D. 687 alloys. Factors influencing distribution of precipitates. (N7a, M2le; Al-b, Cu, Mg, Zn)

40-N. (Polish.) The Rate of Martensitic Transformation. W. Cias. Prace Instytutow Hutniczych, v. 12, Apr. 1960, p. 181-191.

Literature review of crystallographic and kinetic aspects of martensitic transformation and various methods of rate determination. 40 ref. (N8p, 11-65)

41-N. Continuous Cooling Transformations in a 0.6% C-Cr-Mo-V Steel. Tatsuro Kunitake. Sumitomo Metals, v. 12, Apr. 1960, p. 400-414.

Transformation behavior and resultant microstructure, hardness, tensile and impact properties of a 0.6% C, 1% Cr, 0.5% Mo, 0.2% V steel as influenced by continuous cooling from 850-450° C. are investigated by dilatometric and metallographic methods. 17 ref. (N-general, M-general, Q-general, 2-61, 2-64; AY)

42-N. (Japanese.) Mechanism of Age-Hardening of Au-Cu-Ag Alloys. Tomotsune Abo, Hideo Miyashita and Masayuki Uda. Japan Institute of Metals, Journal, v. 24, Aug. 1960, p. 511-514.

X-ray diffraction analysis and hardness measurements of ternary Au-Cu-Ag alloys and of specimens electroplated with Au-Cu-Ag alloys after aging at 200-500° C. in vacuum, solution treatment and electrodeposition. Effect of ordering and phase precipitation on age hardenability. 8 ref. (N7a, 2-4; Au-b, Cu-b, Ag-b)

43-N. (Japanese.) Strain Age-Hardening of Carbon Steel. Pt. 1. Kazuyoshi Nishino and Kiyoharu Takahashi. Japan Institute of Metals, Journal, v. 24, Aug. 1960, p. 514-518.

Two stage hardening mechanism observed in 0.1-0.9% carbon steel during annealing after cold working, the first stage taking place within the ferrite phase at 100° C., with the second occurring at 150-340° C. as a function of carbon content, removal of the Bauschinger effect and the arrangement, shape and size of cementite particles. Torsion and tensile test data given for stress-strain relations and mechanical properties. 13 ref. (N7a, Q-genera; CN)

44-N. (Japanese.) Some Phenomena Related to Strain Age-Hardening of Carbon Steel. Pt. 2. Kazuyoshi Nishino. Japan Institute of Metals, Journal, v. 24, Aug. 1960, p. 518-522.

Relation of strain age-hardening, as a result of annealing and mechanical deformation, to secondary work-hardening and to destruction of deformation structures which exhibit a marked anisotropy in anelastic effect. Influence of internal stress, thermal diffusion, cold work and heat treatment on properties. 10 ref. (N7a, 2-64, 3-68; CN)

45-N. (Translation-ConBur.) Investigation of Structural Changes of Some Magnetic Alloys by the Method of True Specific Heat. Yu. D. Tret'yakov and K. G. Khomyakov. Russian Journal of Inorganic Chemistry, v. 5, Feb. 1960, p. 196-198.

Measurement of true specific heat and coercivity of magnetic ANKO-1 and ANKO-2 alloys after hardening and tempering. Effects of temperature. Tempering of the hardened magnetic alloys is associated with a number of exothermic and endothermic effects. 12 ref. (N11h, P12r; SGA-n)

46-N. (Translation-Brutcher no. 4905.) Effect of Vibrations of Ultrasonic Frequency on Crystallization Pattern of Weld Puddles. A. A. Erokhin. Izvestiya Akademii Nauk SSSR, OTN, Jan. 1958, p. 140-142.

Effect of ultrasonic vibrations in weld puddles of creep-resisting austenitic steel or 0.3% C steel upon crystallization. Macrostructure of argon-arc weld metal with and without vibration treatment during its solidification. (N12, 1-74; ST, 7-51)

47-N. (Translation-Columbia.) Investigation of the Causes of Selective Disintegration of Alloys by a Spark Discharge. I. Grikit. Academy of Sciences of the USSR, Bulletin, Physical Series, v. 23, Sept. 1959, p. 1083-1084.

Samples of pure Ni and Armco iron, metal-ceramic alloys composed of tungsten and TiC and artificial heterogeneous alloys of Armco iron, Ni, Cu, Al, Mg, Sn and Zn containing pressed-in carbides are disintegrated by a spark discharge to determine the cause of selectivity in spark contacts. 6 ref. (N16n; Fe-a, Al-b, Cu-b, Mg-b, Ni-b, Sn-b, Zn-b, NM-a35)

48-N. A Method of Growing Dislocation Free Germanium Crystals. B. Okkerse. Philips Technical Review, v. 21, no. 11, 1959-1960, p. 340-345.

Ge crystals without discloations are produced by a modified pulling method in which the diameter of the crystal grown from the seed is reduced to 1 or 2 mm. initially, for a length of about 20 mm. and then raised to the desired value. No dislocations appear because of the absence of sources. (N3r; Ge)

49-N. (French.) Austenite Transformation and Formation of Cold Cracks in Fusion Welded Steels. N. N. Rykaline and M. K. Chorchorov. Soudage et Techniques Connexes, v. 14, Sept-Oct. 1960, p. 335-347.

Weldability and changes in structure of base and weld metal studied by reproduction of thermal cycles in heat affected

zone on tubular and notched specimens of a carbon steel and four low alloy steels (Soviet grades 23 G, 20 H GS, 35 H GS A, 40 H and St 45). Influence of rate of heating and cooling in A_c1-A_c3 temperature range on homogenization of austenite, grain growth and formation of cold cracks. (N8, N-general, K9s, 9-72; AY, CN, 7-51)

50-N. (German.) Inhibition of Strain Aging of Unalloyed Low-Carbon Structural Steels by Phosphorus. F. Erdmann-Jesnitzer, W. Precht and G. Wunsche. Bergakademie, v. 12, Oct. 1960, p. 559-567.

Aging of openhearth steel and electro steel samples in oil at 75° C. for varying aging times after 10% tensile stressing. Measurement of mechanical properties to evaluate influence of phosphorus on aging. Macrostructure to show phosphorus segregation. (N7e, Q-general, M28p, 2-60; ST)

51-N. (Russian.) Effect of Impurities on Saturation of Solid Solutions in Some Aluminum Alloys. V. M. Vozdvizhenskii. Tsvetnaya Metallurgiya, May 1960, p. 116-120.

Determination of solid solution concentrations by measurements of electrical resistivity in Al-Si and Al-Cu alloys with various amounts of Fe and Si additions. Effect of annealing temperature and composition on resistivity. 19 ref. (N12p, P15g, 3-69; Al-b, Cu, Si)

52-N. (Russian.) Radiographic Study of Recrystallization Processes in Hard Alloys Containing Tungsten, Titanium and Tantalum Carbides. S. S. Gorelik, E. I. Mozzhukhin and V. I. Elyutina. Tsvetnaya Metallurgiya, May 1960, p. 121-125.

Radiographic determination of constitution diagram for WC-Tic-Tac and solubility of WC in Tic-Tac solid solution at 1450-2200° C. Determination of recrystallization temperature and reverse precipitation of carbide phase occurring during heat treatment in some alloys. 4 ref. (N5, N12p, M23m, M24c, 2-61, 2-64; SGB-q, W-b, Ti-b, Ta-b, 14-68)

53-N. (Japanese.) Solidification Phenomena in Hypo and Hyper-Eutectic Iron and the Effect of Manganese and Sulphur on the Process. Goro Ohira and Katsuya Ikawa. Japan Institute of Metals, Journal, v. 24, Sept. 1960, p. 588-592.

Thermal and micrographic analysis of specimens quenched from 1240° C. Data for eutectic solidification reactions; flake, nodular and granular graphite separation, austenitic gamma dendrite, ledburite, cementite formation; and distribution of gray, white and mottled structures. 10 ref. (N12, 2-60; Fe-b, Mn, S)

54-N. (Japanese.) Study of Carbides in Commercial Special Steels by Electrolytic Isolation. Pt. 10. Tomo-o-Sato, Taiji Nishizawa and Koreaki Tamaki. Tetsu-to-Hagane (Iron and Steel Institute of Japan, Journal), v. 46, Nov. 1960, p. 1549-1554.

Chemical and X-ray analysis of carbides electrolytically isolated from as-annealed, as-quenched and as-tempered structure of H_{11}, H_{12}, H_{13} and D_2 hot work steels. Effect of Cr, Mo, V and W concentrations on carbide composition, structure and equilibrium reaction. 15 ref. (N8r, M-general, 2-60, 2-64; TS-k)

55-N. (Japanese.) Study of Carbides in High Speed Steels by Electrolytic Isolation. Pt. 4. Sadao Koshiba, Shin Kimura and Hideki Horado. Tetsu-to Hagane (Iron and Steel Institute of Japan, Journal), v. 46, Nov. 1960, p. 1554-1558.

Composition and crystalline structure of carbides electrolytically isolated from heat treated specimen determined by electron microscopy, X-ray diffraction and chemical analysis. Influence of tempering time and repetition of tempering on carbide precipitation. 9 ref. (N8r, M-general, 2-64; TS-m)

56-N. (Russian.) Investigation of Primary Stages of Aging in Aluminum-Zinc Alloys. M. I. Zakharova and I. I. Eliseeva. Fizika Metallov i Metallovedenie, v. 10, Apr. 1960, p. 560-563.

Pattern etching and X-ray analysis of monocrystals and polycrystals aged at 100-150° C. Aging process in Al alloy with 10% Zn is accompanied by elastic disorientation of atomic blocks in some parts of the matrix. Angular value of disorientation increases with aging time to the individual maxima in different crystals. (N7a; Al-b, Zn)

57-N. (Russian.) Effect of Stresses and Deformation on Self Diffusion. A. V. Savitskii. Fizika Metallov i Metallovedenie, v. 10, Apr. 1960, p. 564-571.

Measurements of self diffusion in Ag and Fe between 460-800° C. under

monoaxial stress by means of radioactive isotope absorption. Considerable increase of self diffusion coefficient for Fe in low carbon steel is observed during exposure to a tensile load. 19 ref. (N1d, 3-66, 3-68; Ag, Fe)

58-N. (Russian.) Carbide Formation During Tempering of Hardened Alloy Steels. V. N. Shcherbakov, V. V. Kubatkina, L. M. Motova, G. N. Tsvetkova and A. N. Yarochkina. Fizika Metallov i Metallovedenie, v. 10, Apr. 1960, p. 622-627.

Data on structural changes of carbide phase in V, Mo, W, Mn and Cr alloy steels (C up to 1%) during tempering at 200-680° C. based on radiographic study of electrolytically separated powders. Mechanism of Fe_3C phase changes in relation to alloying degree. (N8r, 2-60, J29; AY)

59-N. (German.) Evaporation of Liquid Metals at Reduced Pressure. Bernhard Ilschmer and Jean Humbert. Zeitschrift fur Metallkunde, v. 51, Nov. 1960, p. 626-632.

Al and Ag are evaporated at 1050-1250° C. in an argon atmosphere at a pressure of 10^{-5} to 10^{3} Torr. Effect of temperature and pressure on evaporation. 24 ref. (N16n, 2-61, 3-74; Ag, Al)

60-N. (German.) Motion of Impurities During Recrystallization. Tivadar Millner, Laszlo Bartha and Janos Prohaszha. Zeitschrift fur Metallkunde, v. 51, Nov. 1960, p. 639-642.

AgCl is precipitated from agneous $AgNO_3$ solutions containing radioactive Ag^{110} atoms and dried. The AgCl is placed in a crucible and spectrographically pure molten Sn is added and covered with charcoal powder. Autoradiographs and micrographs are made from samples in the cast state and after heat treatments for 0-24 hr. at 200-210° C. with and without previous cold rolling to study the position of Ag in the crystallites and on the grain boundaries. 9 ref. (N5f, 2-64, 3-68; Sn, Ag)

61-N. (German.) Martensitic Nucleation. Cornelis Antonius Verbraak. Zeitschrift fur Metallkunde, v. 51, Nov. 1960, p. 646-649.

Changes of orientation occurring during the recrystallization of rolled Cu sheet. Reorientation according to Rowland's model previous to the formation of the final cube-texture is assumed. 11 ref. (N5, M26c, N2; Cu, 4-53)

62-N. (German.) Secondary Recrystallization in Double and Multiple Metallic Layers. Hans Gunter Baer. Zeitschrift fur Metallkunde, v. 51, Nov. 1960, p. 650-655.

Sheets of Fe containing 2-3% Si, Cu and Ni, Ni with 20% Cr, Ni with 50% Fe and NiSi alloys in the rolled and primary or secondary recrystallized state are brought into close contact forming groups of two and more sheets, heated to above recrystallization temperature and held for 10-20 hr. Radiographic testing of crystal orientation. Effect of contacting structure on secondary recrystallization. 8 ref. (N5, M26c, 1-54; Fe-b, Ni-b, Cr, Si)

63-N. (Rumanian.) Effect of the Mechanical Failure of Iron Carbide Particles on Curie Point and X-Ray Diffraction. Alois Masin and Olga Bakalikova. Studii si Cercetari de Metalurgie, v. 5, Mar. 1960, p. 313-319.

Wires of high-purity Fe-C alloys containing 0.2% C are drawn through a die which reduces the original diameter. Specimens are prepared by mechanical and electrolytic polishing, etched in 1% HNO_3 and studied by radiography and magnetic testing. (N8r, F28, M22g, P16d; Fe-b)

64-N. (Rumanian.) Isothermal Austenite Decomposition in Ball Bearing Steels. Butu Rotenstein and Nicolae Dragan. Studii si Cercetari de Metalurgie, v. 5, Mar. 1960, p. 321-342.

Steels containing 0.93-1.05% C, 0.19-0.55% Si, 0.32-1.1% Mn, 0.54-1.54% Cr, 0.013-0.017% P, 0.008-0.017 S, 0.067-0.17% Cu, 0.017-0.12% Ni, 0.012-0.05% Mo and traces of Ti are austenized and subsequently held at 200-700° C. Samples are then subjected to thermomagnetic, micrographic and hardness testing to determine austenite composition as a function of holding time. 11 ref. (N8g, 2-64; SGA-c, ST)

65-N. Steel Yields More of Its Secrets. Mechanical World and Engineering Record, v. 140, Dec. 1960, p. 503-504.

Effect of heat treatment and removal of metal from the surface on the retained austenite in hardened steel. Effect of alloy segregation on the amount, kind and form of banding in preferred regions. Use of radioactive tracers to determine the distribution of impurities in steel. (N8, 2-64, 1-59; ST)

66-N. (Russian.) Phase Transformation in Kh17N7Yu Stainless Steel. E. G. Feld

Gandler and M. V. Pridantsev. Metallovedenie i Termicheskaya Obrabotka Metallov, Nov. 1960, p. 2-7.

Samples are vacuum heat treated at 1050° C., then tempered at 300-750° C. for 3 hr. Secondary phase segregation during low temperature tempering and alpha-gamma transformations are studied by radiographic analysis. Data are given for effect of Ni and Al concentrations and temperature on hardness and electrical resistivity. 11 ref. (N-general, Q29n, P15g, 2-60, 2-61; SS, Al, Ni)

67-N. (French.) Study of Seeds in Metals and Alloys by Thermal Analysis of Granules. Claude Mascre. Fonderie, June 1960, p. 254-258.

New method for studying seeds in metals and alloys comprising thermal analysis of fragments or granules smaller than the normal grain. Application to Al and Al alloys with addition of 0.01% Ti, effect of undercooling, remelting on growth activity and regeneration. (N2, N3, M23r; Al-b)

68-N. Discontinuous Mode of Dissolution of a Beta Phase Precipitate Into Alpha Cu-Cd Solid Solutions. M. S. Sulonen. Acta Metallurgica, v. 8, Oct. 1960, p. 669-676.

Metallographic and X-ray studies of 1.82-4.21 Cd-Cu alloys after homogenization, solution and precipitation annealing at 250-650° C. and rolling. Relation of grain boundary diffusion to discontinuous mode of solid phase dissolution and precipitation. 7 ref. (N-general, M-general, 2-64; Cu-b, Cd)

69-N. Diffusion in the System Uranium-Titanium. Y. Adda and J. Philibert. Acta Metallurgica, v. 8, Oct. 1960, p. 700-710.

Intermetallic diffusion studied at 650-1050° C. using metallography, microhardness and micro-analyzer techniques on U-Ti diffusion coupler. Data are given for diffusion coefficient, activation energies, frequency factor and relation of evidenced Kirkendall effect. 19 ref. (N1; Ti-b, U-b)

70-N. Precipitation in Gold-Platinum Alloys. Pt. 1. Thermodynamics. L. J. Van Der Toorn and J. J. Tiedema. Acta Metallurgica, v. 8, Oct. 1960, p. 711-714.

An expression is derived for the increase in the Gibbs' free energy which arises from the mixing of a total amount of 1 mole of the components of a binary system. The six constants of these expression are calculated for the Au-Pt system from experimental data and are applied to calculation of the spinodal curve to study its influence on precipitation. 9 ref. (N7, P12; Au-b, Pt)

71-N. Precipitation in Gold-Platinum Alloys. Pt. 2. Influence of the Spinodal Curve on the Rate and Mechanism of the Precipitation Process. L. J. Van Der Toorn. Acta Metallurgica, v. 8, Oct. 1960, p. 715-727.

X-ray studies of homogenized single crystal and polycrystal specimens annealed at 500-700° C. Comparison of theories predicting precipitation phenomena in solid solutions at compositions and temperatures above the spinodal curve, with attention to the influence of lattice imperfections on the result. 19 ref. (N7, M26, 2-60, 2-61; Au-b, Pt)

72-N. Hydrogen and Austenite Stabilization. E. G. Ramachandran and C. Dasarathy. Acta Metallurgica, v. 8, Oct. 1960, p. 729-730.

Effect of hydrogen on deactivation of strain embryos in austenite during heat treatment, resulting in austenite stabilization, is discussed in terms of hydrogen build up and migration as a function of temperature and solubility. 9 ref. (N8, 2-61; ST, H)

73-N. Identification of the Diffusion of Iron Ions in Magnetite Employing Markers. D. Fuller. Acta Metallurgica, v. 8, Oct. 1960, p. 743-744.

Observation of oxide-atmosphere interface lines in Fe_2O_3 layer after oxidation of FeO in pure steam at 600-1200° C. Fe ion diffusion in magnetite is determined as a function of initial Fe saturation, rather than oxygen, in the layer and as a function of time and temperature. 6 ref. (N1; Fe)

74-N. (Japanese.) Nitrogen-Bearing 13% Chromium Stainless Steels. Masazo Okamoto and Takeshi Naito. Japan Institute of Metals, Journal, v. 24, Oct. 1960, p. 633-637.

The effect of nitrogen additions 0.018-0.183% on specimens after various heat treatments is investigated by microscopic and dilatometric analysis and hardness,

tensile and corrosion tests with heating at 0-1300° C. Data are given for transformation temperature and mechanisms, microstructure and mechanical properties. 7 ref. (N-general, M-general, Q-general, R-general, 2-60, 2-64; SS, N)

75-N. (Japanese.) Shift of the Magnetic Transformation Temperature Caused by Annealing at and Over 600° C. in Iron-Chromium Alloys. Kenzaburo Kumada. Japan Institute of Metals, Journal, v. 24, Oct. 1960, p. 658-662.

Thermomagnetic analysis, hardness, thermal expansion and magnetization curve measurements and microscopic observation at 100-600° C. of 35.10-63.94% Cr-Fe alloy specimens after annealing at 600-900° C. 4 ref. (N-general, M-general, P16, 2-64; Fe-b, Cr)

76-N. (Japanese.) Magnetic Study of the Sigma Transformation Rate of Cr-Fe Alloys. Kenzaburo Kumada. Japan Institute of Metals, Journal, v. 24, Oct. 1960, p. 662-665.

The magnetic transformation temperatures of residual Cr-Fe ferrites during sigma transformation of 35-60% Cr-Fe alloy specimens are investigated by thermomagnetic analysis at 20-500° C. Sigma phase composition is determined by measurement of saturated intensity of magnetization of ferrite and as a function of annealing. 4 ref. (N6p, M23a, M26p; Fe-b, Cr)

77-N. (Russian.) Investigation of Iron Recrystallization Using Radioactive Isotopes. S. Z. Bokstein, M. A. Gubareva, S. T. Kishkin and L. M. Moroz. Zavodskaya Laboratoriya, v. 26, Oct. 1960, p. 1110-1114.

Behavior of the grain boundary atoms during plastic deformation and subsequent recrystallization is studied to show that the mechanism of grain boundary dislocation and grain growth resulting from recrystallization is not of the diffusional character. 15 ref. (N5, N3, N1a; Fe)

78-N. (German.) Influence of Phosphorus on Strain Aging of Basic Bessemer Steel. Friedrich Erdmann-Jesnitzer and J. Karl. Neue Hutte, v. 5, Nov. 1960, p. 660-665.

Impact and tensile test specimens of 0.048-0.17% P basic Bessemer steel with the same carbon (0.035-0.045%) and nitrogen (0.013-0.016%) content are stretched at 20° C. and subsequently aged at 75° C. Yield point, hardness and notch impact strength are measured as a function of composition. (N7e, Q24c, Q29n, Q6, 2-60; ST)

79-N. Some Trace Elements Influence Malleable Iron Graphitization. G. Sandoz, B. F. Brown and W. A. Pennington. Modern Castings, v. 39, Jan. 1961, p. 93-103.

Effects of trace amounts of Bi, Sb, Sn, Pb, Cd and Zn on the kinetics of each of the three graphitization reactions critical to the malleabilization of irons. Effects are determined in irons with both low and high Mn-S ratios to detect possible interactions with sulphur. 17 ref. (N8s, 2-60; CI-s, Bi, Sb, Sn, Pb, Cd, Zn)

80-N. (Japanese.) Influence of Carbon, Silicon, Manganese, Phosphorus and Sulphur on the S-Curve in Molybdenum Copper Cast Iron. Youichi Tokunaga. Imono (Japan Foundrymen's Society, Journal), v. 32, Oct. 1960, p. 713-722.

Isothermal austenite decomposition after austenization at 900° C. for 30 min. is investigated by microscopic examination in the pearlite transformation range and by dilatometric measurement in the bainite range. 4 ref. (N8g, 2-60, M21, M23b; CI, Cu, Mo)

81-N. (Czech.) Precipitation of Phases in Modified 12% Cr Steels. Jaroslav Koutsky and Jaroslav Jezek. Hutnicke Listy, v. 15, Nov. 1960, p. 864-867.

Two ingots are forged into bars which are hardened at 1050° C., oil quenched and tempered at 670-770° C. for 1 hr. and subsequently held at 650-800° C. for 100-1500 hr. Effect of heat treatments on the precipitation of $M_{23}C_6$, M_6C type phases, Fe_2Mo, Fe_2W and Cr_2N. 9 ref. (N7, 2-64; SS, Cr)

82-N. (Japanese.) Grain Boundary Reaction in Age Hardenable Alloys. Pt. 1. University of Tokyo, Engineering Research Institute, Annual Report, v. 19, Sept. 1960, p. 186-193.

Phenomenon where a new, strain-free region with coarser precipitate arrangement extends from a boundary into an adjacent grain on either side or into adjacent grains on both sides of the boundary. The driving force of this extension or growth is thought to

be caused by the difference in strain energy between the new region and the old matrix grain. Methods of metallographic observation. 15 ref. (N7a)

83-N. Self-Diffusion in Alpha Iron. Richard J. Borg and C. Ernest Birchenall. Metallurgical Society of AIME, Transactions, v. 218, Dec. 1960, p. 980-984.

The self diffusion coefficients for alpha Fe are determined at 980-1167° K. using Fe^{55} as the tracer. With decreasing temperature, the diffusivity is found to decrease more rapidly than predicted by the Arrhenius equation in the region of the Curie temperature. 21 ref. (N1d, 1-59; Fe-a)

84-N. Diffusion in the Iron-Chromium System. H. W. Paxton and T. Kunitake. Metallurgical Society of AIME, Transactions, v. 218, Dec. 1960, p. 1003-1109.

The self diffusion coefficient of Cr in various alloys in the Fe-Cr system is measured at 1275° C. using autoradiographic and sectioning techniques. A variation in D_0 from 10^{-4} for pure Cr to a maximum of 10^2 near 60% Cr appears with a range of activation energy from about 50-80 K. cal. per mol. 26 ref. (N1d, 2-60; Cr-b, Fe-b)

85-N. Recrystallization of Cold-Drawn Sintered Aluminum Powder. E. J. Westerman and F. V. Fenel. Metallurgical Society of AIME, Transactions, v. 218, Dec. 1960, p. 1010-1014.

The recrystallization behaviors of two extruded and cold drawn experimental sintered Al powder alloys, containing 1.75 and 3% Al_2O_3 by weight, are compared with that of extruded and cold drawn commercially pure Al. The kinetics of recrystallization and nucleation and growth rate are semiquantitatively determined. 6 ref. (N2, N3, N5; Al-b, 6-72)

86-N. Growth of (110) (001) Oriented Grains in High-Purity Silicon Iron-A Unique Form of Secondary Recrystallization. J. L. Walter and C. G. Dunn. Metallurgical Society of AIME, Transactions, v. 218, Dec. 1960, p. 1033-1038.

Secondary recrystallization to the (110) (001) texture in high-purity silicon Fe occurring when low-oxygen material is annealed in a nonoxidizing atmosphere, departure from these conditions resulting in a growth of (100) oriented grains. The nature of the matrix and recrystallization structure and textures and the nature of grain boundary interactions during growth show that the low gas-metal interfacial energy of the (110) surface provides the driving force for growth. 17 ref. (N3, N5, N15, M26c; Fe-b, Si)

87-N. The Growth Rate of Bainite. G. R. Speich and Morris Cohen. Metallurgical Society of AIME, Transactions, v. 218, Dec. 1960, p. 1050-1059.

The growth rate of lower bainite has been determined by hot stage metallography at 180-320° C. in five hypereutectoid high-purity iron-carbon, Fe-C-Cr and Fe-C-Ni alloys. The growth rate is independent of time at constant temperature but both the edgewise and sidewise growth rates increase with increasing temperature. 38 ref. (N8m, 2-61; Fe-b, C, Cr, Ni)

88-N. The Aging Characteristics of Cu-Ti. G. T. Murray. Metallurgical Society of AIME, Transactions, v. 218, Dec. 1960, p. 1059-1064.

The aging behavior of a Cu-Ti (3.2 at.% Ti) alloy determined by electrical resistivity, hardness and metallographic changes at 175-675° C. The resistivity data indicate two principal processes, the first being associated with the formation of heterogeneous submicroscopic nuclei causing a sharp decrease in resistivity and the second, which occurs over a long period of time, being homogeneous precipitation causing a smaller rate of decrease. 15 ref. (N7a, M-general, P15g, Q29n, 2-65; Cu-b, Ti)

89-N. A Metallographic Study of Precipitation of Copper From Alpha Iron. E. Hornbogen and R. C. Glenn. Metallurgical Society of AIME, Transactions, v. 218, Dec. 1960, p. 1064-1070.

Electron microscopy and diffraction examination of Fe-1.23% Cu alloys after homogenization, gamma phase quenching and aging at 500-1000° C. Cu precipitates as F-C-C epsilon phase without formation of intermediate compounds, spherical particles being formed at a high rate in the first stage and at a rate given by Zener's equation in the second stage, with rod shaped particles growing in the third stage. 19 ref. (N7, M-general; Fe-b, Cu)

90-N. The Effect of Dilute Transition Element Additions on the Recrystallization

of Iron. E. P. Abrahamson, II, and B. S. Blakeney, Jr. Metallurgical Society of AIME, Transactions, v. 218, Dec. 1960, p. 1101-1104.

The effect of the transition elements in binary solid solution additions upon the recrystallization temperature of Fe annealed at 300-700° C. is investigated by metallography and hardness measurements. A correlation is noted between the rate of rise of recrystallization temperature with atomic percent solute and the electron configuration of the solute element. 6 ref. (N5, M25, 2-60, 2-61; Fe-b)

91-N. The Diffusivity of Hydrogen in Alpha Iron. E. W. Johnson and M. L. Hill. Metallurgical Society of AIME, Transactions, v. 218, Dec. 1960, p. 1104-1112.

The diffusivity determined at 25-780° C. from hydrogen evolution rates. Anomalous evolution from air-melted Fe is attributed to residual hydrogen, which is interpreted as a hydrogen compound that decomposes at a strongly temperature-dependent rate above 500° C. 26 ref. (N1, 2-61; Fe-a, H)

92-N. Carbide Precipitation and Evolution and Depletion of Matrix in Heat Resisting Steels and Alloys Treated in Carburizing Atmospheres. Metallurgical Society of AIME, Transactions, v. 218, Dec. 1960, p. 1129.

Discussion of paper by G. Pomey (AIME Transactions, vol. 218, p. 310). Existence and structural characteristics of orthorhombic Cr_3C_2 carbide phase in equilibrium with M_7C_3 phase. 8 ref. (N8r, N7, M26q, 2-64; SGA-h, SS)

93-N. (Russian.) Investigation of Aging Process in Duralumin Using Nuclear Magnetic Resonance. V. S. Pavlovskaya, V. N. Poddyakov and B. N. Finkelshtein. Fizika Metallov i Metallovedenie, v. 10, Mar. 1960, p. 346-358.

Measurement of width, shape and intensity of nuclear magnetic resonance absorption lines of quenched specimens after natural and artificial aging at 50-300° C. for 1-8 hr. Evaluation of changes in lattice distortions resulted from atomic rearrangement occurring during decomposition of supersaturated solid solutions. Influence of quadrupole effect on parameters of the resonance lines. 10 ref. (N7a, P16f; Al-b)

94-N. (Russian.) Effect of Third Component Additions on the Aging of Aluminum-Silver Alloy. R. R. Zakharova and N. I. Buinov. Fizika Metallov i Metallovedenie, v. 10, Mar. 1960, p. 375-381.

Effect of Cu, Mg, Si and Zn additions on aging of Al-Ag studied by X-ray diffraction, electronic microscopy and hardness measurements. Distribution of the third component and its influence on the stability of Guiner-Preston zones. 7 ref. (N7a, M-general, 2-60; Al-b, Ag)

95-N. (Russian.) Investigation of Phase Recrystallization in Titanium. V. D. Sadovsky, G. N. Bogacheva, L. V. Smirnov, I. P. Sorokin and N. A. Kompaneitsev. Fizika Metallov i Metallovedenie, v. 10, Mar. 1960, p. 397-403.

Metallographic and dilatometric study of phase transformation and evaluation of resulting internal strains, in Ti samples heat treated at 800-1200° C. Effect of heat treatment on structure and lattice parameters. 11 ref. (N-general, M-general, 2-64; Ti)

96-N. (Slovakian.) Transformations of Brass During Heating. Pavel Slysko. Zvaracsky Sbornik, v. 9, Mar. 1960, p. 304-324.

Brass of various composition is heat treated at 100-850° C. for 0-2 hr. and welded with and without filler metal. Effect of heat treatment and welding on structure and hardness. 4 ref. (N-general, Q29n, 2-64, K-general; Cu-n)

97-N. (French.) Self-Diffusion of Beta-Phase Zirconium With a Cubic Lattice. Dimitri Volokoff, Serge May and Yves Adda. Comptes Rendus, v. 251, Nov. 21, 1960, p. 2341-2343.

Two cylindric Zr samples are butt welded, inserting a Zr foil of approximately 5 micron that was previously neutron irradiated for 8 days at a radiation intensity of 10^{12} n. sq. cm. S^{-1}. The weldments are heat treated at 900-1240° C. for 5-24 hr. in a vacuum of less than 5.10^{-6} mm. Hg pressure. Amount of diffusion occurring is determined by measuring the gamma radiation activity of slices cut normally to the cylinder axis. 5 ref. (N1a, 1-59, 2-64; Zr)

98-N. (French.) Effect of Cu and Mg Additions on the Recrystallization of Zone Melted Aluminum. Colette Frois and Omourtague Dimitrov. Comptes Rendus, v. 251, Nov. 21, 1960, p. 2344-2346.

Samples containing 30 x 10^{-6}% Cu or 1 x 10^{-6}-96 x 10^{-6}% Mg are rolled to a deformation of 97% at liquid nitrogen temperatures and held subsequently at 14° C. to study the effect of additions on recrystallization velocity and grain growth. (N5f, N3m; Al, Cu, Mg, AD-p)

99-N. The Behavior of Inert Gases in Metals. C. E. Ells. Canadian Mining and Metallurgical Bulletin, v. 53, Nov. 1960, p. 885-892.

Review of diffusion experiments on inert gas-metal combinations and fundamental aspects of bubble growth in neutron irradiated Be, stainless steel and Al. Effect of bubble formation on mechanical properties. 32 ref. (N15d; Al, Be, SS, EG-m)

100-N. (French.) Application of a Practical Method for Measuring the Diffusion of Hydrogen Through Thin Mild Steel Sheet. P. E. Lagasse and L. Lilet. Memoires Scientifiques de la Revue de Metallurgie, v. 57, Oct. 1960, p. 729-740.

Cracking and blistering defects and deterioration caused by hydrogen diffusion during working and use of sheet. Technique and apparatus for accurate, reproducible measurement of permeability to hydrogen. Influence of work-hardening and grain size on permeability. 24 ref. (N1, P10m, Q-general; CN, 9-72, H)

101-N. (French.) Structural Evolution During Heat Treatment After Workhardening of High Purity Zone-Refined Aluminum. Pt. 1. Omourtague Dimitrov. Memoires Scientifiques de la Revue de Metallurgie, v. 57, Oct. 1960, p. 787-807.

Electrical resistivity measurements, metallographic techniques and X-ray diffraction used to study recrystallization times, temperatures and structures of specimens cold worked as much as 97% at temperatures ranging from 20° C. down to that of liquid H. (To be continued.) (N-general, M-general, 2-63, 2-64; Al-a)

102-N. (German.) Effect of Zinc, Magnesium, Silicon, Copper, Iron, Manganese and Titanium on Primary Crystallization of Al_2Cr. H. Zoller. Schweizer Archiv, v. 26, Nov. 1960, p. 437-448.

Investigation of the influence of alloying elements on liquidus line in the Al-rich section of the Al-Cr phase diagram at 660-800° C. (equilibrium melt with Al_7Cr) by crystallization of Al_7Cr from the melt and by thermal analysis. Evaluation of peritectic reaction solid solution - Al_7Cr in the presence of alloying elements. Microhardness and lattice parameter of Al_7Cr crystals. (N12r, M24b, M-general, 2-60; Al-b, Cr)

103-N. (German.) Strain Aging of Zinc Containing Traces of Magnesium. Friedrich Erdmann-Jesnitzer. Bergakademie, v. 12, Nov. 1960, p. 598-608.

Aging of Zn (99.9903%) specimens containing 0.0018% Mg at 22-200° C. for varying times after 1-6% cold tensile deformation and annealing at 150° C. Investigation of static and dynamic mechanical properties, electrical conductivity, microstructure and substructure. Comparison with properties of pure Zn. (N7e, M-general, Q-general, P15g, 2-60; Zn-b)

104-N. (German.) Magnetic Structure of Small MnBi Alloy Single Crystals. Ja. S. Schur, Je. W. Stolz and W. I. Margolina. Physikalische Abhandlungen aus der Sowjetunion, v. 3, Feb. 1960, p. 96-103.

Microscopic examination of powder figures on magnetized cylindrical specimens, consisting mainly of monocrystalline grains of sizes from a few to 1000 microns. Influence of temperature cycling from +20 to -196° C. and back to 20° C. and grain size on magnetic structure. (N11h, 2-59, 2-61, M21; Mn-b, Bi, 14-61)

105-N. A Magnetic Study of Precipitation in a Gold-Cobalt Alloy. P. Gaunt. Philosophical Magazine, v. 5, Nov. 1960, p. 1127-1145.

The precipitation kinetics of air and water quenched specimens of an Au-1.5% Co alloy are followed by measuring the saturation magnetization of the precipitated Co, remanent magnetization, coercive force and field to reduce remanence to zero. Results are compared with current theories and discussed in terms of the single magnetic domain model, the magnetic properties being compared to those

of the Au-Ni system. Effect of particle shape on the anisotropy in the Au-Co system. (N7b, P16; Au-b, Co)

106-N. The Influence of Solutes on Self-Diffusion in Metals. A. B. Lidiard. Philosophical Magazine, v. 5, Nov. 1960, p. 1171-1180.

Derivation of a statistical theory showing the effect of solutes on solvent self-diffusion in dilute alloys, based on the vacancy model used previously by Hoffman, Turnbull and Hart and considering two limiting cases, one in which the vacancies attach themselves strongly to solute and the jump frequencies differ greatly. Results are illustrated on Ag alloys. (N1d; Ag-b)

107-N. (English.) Effect of Zirconium on the Austenitic Grain Size in Steel. Akira Adachi, Kujoshi Mizukawa, Hirokazu Omoto and Noboru Hiraoka. Osaka University, Technology Reports, v. 10, Mar. 1960, p. 471-480.

Grain refining and grain coarsening temperatures in electrolytic Fe and low carbon rimmed steel, as a function of Zr additions and O and N concentration, are studied for specimens melted in vacuum and various atmospheres. Grain growth is measured as a function of composition and temperature. 5 ref. (N3, M27c, 2-60, 2-61; Fe-b, ST, Zr)

108-N. (French.) Direct Observation by the Electron Microscope of the Phenomena Accompanying the Return to Equilibrium of a 1.2% Si-Al Solid Solution During Tempering Treatments Subsequent to Quenching. Adrien Saulnier. Comptes Rendus, v. 251, Nov. 14, 1960, p. 2160-2162.

Precipitation of vacancies and formation of dislocation loops after quenching; resorption of loops during treatment at 60-170° C.; nucleation and growth of Si particles between 150-350° C. Effect of vacancies still in supersaturation in lattice following quenching on nucleation. 4 ref. (N-general, M26, M21e, 2-64; Al-b, Si)

109-N. (French.) Two-Stage Recrystallization of Cold Worked 70/30 Brass. J. Herenguel, D. Whitwham and R. Leguet. Comptes Rendus, v. 251, Nov. 14, 1960, p. 2163-2165.

Uneven work hardening of different areas in same specimen and evolution of microstructure of areas during annealing between 250 and 700° C. Early recrystallization characterized by fine, stable grains growing to a size of 2-4 microns occurs in harder areas. Less hard sections then recrystallize with a slow but steady growth which progressively replaces the first. 4 ref. (N3, N5, Q23r, 2-64, 3-68; Cu-n)

110-N. (Japanese.) Effect of Zirconium on Aluminum and Its Alloys. Pt. 4. Precipitation Phenomenon of $ZrAl_3$ and the Effect of Si and Mg on the Recrystallization Temperature of Al-Zr Alloys. Hajime Yamada. Light Metals, v. 10, Sept. 1960, p. 322-329.

X-ray diffraction data for specimens containing 0.15-0.45% Zr, 0.43-1.07% Si and 0.28-0.96% Mg after fast and slow solidification from 500° C., with $ZrAl_3$ and $ZrSi_3$ precipitating from the supersaturated solid solution. 7 ref. (N5, N7, N12, M22g, 2-60; Al-b, Zr)

111-N. Intermetallic Diffusion in Gold-Lead Systems. A. Ascoli and E. Germagnoli. Pure and Applied Chemistry, v. 1, no. 1, 1960, p. 139-141.

Diffusion coefficient for intermetallic diffusion of Au in Pb at 120-372° C. and the diffusion activation energy are determined by a radioactive tracer technique. (N1a, 1-59; Pb-b, Au)

112-N. (German.) Gases in Ferro Alloys. Roger Limpach and Borut Marincek. Archiv fur das Eisenhuttenwesen, v. 31, Nov. 1960, p. 639-643.

Gas content (oxygen, hydrogen and nitrogen) of Fe alloys containing Si, Mn, Ca, V, Ti, P and Zr is measured by vacuum hot extraction (up to 2000° C. extraction temperature) with automatic recording. Influence of particle size (mesh size), composition and storing time on gas content. (N15, 2-60; Fe-b)

113-N. (German.) Gas Content and Type of Compound of Gases in Ferro Alloys. Alfons Fuchs and Johannes Niebuhr. Archiv fur das Eisenhuttenwesen, v. 31, Nov. 1960, p. 645-649.

Measurement of hydrogen and oxygen content in Fe alloys with Cr, Mn, Mo, W, Cb, Ti and V and in pure metals Cr, Co, Mn, W, V and Ni by vacuum hot extraction (1500-2100° C.). Microscopic and X-ray examination to determine the chemical form in which the gas is present in metal. (N15, 2-60, M-general; Fe-b)

114-N. (German.) Influence of Deformation Aging on Reactions in Alternating Stressing of Steel. Hermann Schénck, Eugen Schmidtmann and Hans Kettler. Archiv fur das Eisenhuttenwesen, v. 31, Nov. 1960, p. 659-669.

Alternating stressing under oil cooling at 3100 revolutions per second of 190° C. aged unkilled 0.22% C openhearth steel. Measurement of damping and modulus of elasticity at various numbers of load alternations. Interpretation of results in terms of dislocation theory. (N7e, Q21, Q8g, 3-66; ST-e)

115-N. (German.) Precipitation of Carbon in Iron. Otto Krisement. Archiv fur das Eisenhuttenwesen, v. 31, Nov. 1960, p. 677-686.

Interpretation of microcalorimetric measurements of reaction energies for the precipitation of carbon in gamma Fe, alpha Fe and martensite. Influence of deformation on carbon precipitation and migration of carbon atoms into dislocations. (N7, N-general, 3-68; Fe-b, C)

116-N. (German.) Microstructure and Hardness of Iron Alloys Containing Small Amounts of Carbon and Nickel. Rudolf Vogel and Giancarlo Volpato. Archiv fur das Eisenhuttenwesen, v. 31, Nov. 1960, p. 687-690.

Microscopic investigation and hardness measurements on Fe alloys with 0.1-0.6% C and 0-4% Ni before and after annealing at 550-650° C. Correlation between the test results and the Fe-C-Ni phase diagram. Influence of C and Ni on ferrite and carbide formation in annealing. (N8, M-general, Q29n, 2-64; Fe-b, C, Ni)

117-N. (German.) Electrical Investigation of Ordering Processes in Nickel-Copper-Zinc Alloys. Wolfgang Schule and Hans Peter Kehrer. Zeitschrift fur Metallkunde, v. 51, Dec. 1960, p. 711-715.

Electrical resistance measurements at -183 to 700° C. of recrystallized cold rolled foils (95% deformed) and drawn (42-60% deformed) wires of Ni-Cu-Zn alloys of varying composition in the range of the intermetallic compound Cu_2NiZn. Temperature dependence of resistance and degree of order. (N10, P15g, 2-61; Cu-b, Ni, Zn)

118-N. (Japanese.) Effect of Zirconium on Aluminum and Its Alloys. Hajime Yamada. Light Metals, July 1960, p. 39-46.

Formation of $ZrAl_3$ precipitates in Al alloys is studied during solidification and preheating. Results show that a fine $ZrAl_3$ precipitate delays recrystallization while a coarse precipitate has a minor effect. (N5f, N7, 2-60; Al-b, Zr)

119-N. (Japanese.) Grain Size in Aluminum Sheet. Takashi Ikeno and Shibata Kizo. Light Metals, July 1960, p. 47-53.

Effect of rolling on the recrystallization grain size, softening curve during annealing and elongation of Al. (N5, M27c, Q23p, J23, 3-68; Al, 4-53)

120-N. (Japanese.) Study of Casting Structure. Takashi Ikeno and Kizo Shibata. Light Metals, July 1960, p. 54-59.

Effect of preheating, Mg additions and cooling rate on the recrystallization grain size of cast Al. (N5, M27c; Al, 5)

121-N. Pitting of Aluminum at Grain Boundaries After Aging. G. A. Bassett and C. Edeleanu. Philosophical Magazine, v. 5, Dec. 1960, p. 1217-1220.

Thin electropolished foils of pure Al develop surface pits along grain boundaries during aging at 20° C. It is suggested that pits are formed by a vacancy mechanism and are associated with the initiation of etch attack at grain boundaries. 8 ref. (N7a, 9-71; Al, 4-56)

122-N. Hydrogen in Zircaloy-2. Its Distribution and Heat of Transport. A. Sawatzky. Journal of Nuclear Materials, v. 2, Dec. 1960, p. 321-328.

An equation is developed giving the hydrogen concentration in the two phase (alpha plus hydride) region as a function of time and temperature. On the basis of this equation, a model for the over-all hydrogen distribution under the influence of a temperature gradient is proposed. The model predicts that for hydrogen pickup on the hot surface (as a failure of a fuel rod sheath) maximum hydriding will occur at some position displaced from the cold surface. 9 ref. (N15d; Zr-b, H)

123-N. Growth From the Vapor of Large Single Crystals of Lead Selenide of Controlled Composition. A. C. Prior. Electrochemical Society, Journal, v. 108, Jan. 1961, p. 82-87.

Single crystals of lead selenide are grown by sublimation. A measure of composition control is achieved by control of the partial pressure of Se during growth. 12 ref. (N15g; Pb, 14-61)

124-N. (German.) Effects of Heat Treatment on Structure Stability and Age Hardening of Titanium Alloy Ti_3Al_5Cr. H. Wiegand and K. H. Illgner. Metall, v. 15, Jan. 1961, p. 23-29.

Mechanical testing and microscopic, electron microscopic and X-ray diffraction investigation of end quenched and subsequently aged Jominy specimens at 200-500° C. Influence of cooling rate on aging and of aging on mechanical properties and structure. (N7a, M27, Q-general, 2-64, M22g, M21; Ti-b, Al, Cr)

125-N. Fast Heating Accomplishes Uniform Spheroidizing of Heading Stock. John Tschapp. Industrial Gas, v. 39, Jan. 1961, p. 2-3.

Spheroidization of pearlite in 1038, 1041 and several low alloy steels for use in headed products using a continuous pusher type furnace. (N8q; ST)

126-N. (Czech.) Transformations in Heat Treatment of 13% Cr Steels. Stanislav Drapal. Hutnicke Listy, v. 15, Dec. 1960, p. 961-971.

Various stainless steels are hardened at 800-1250° C. for 0-16 hr. Effects of carbon content on transformation temperatures and carbide precipitation in cooling and of austenization temperatures and times on the grain size. Austenite decomposition and eutectoid formation. 17 ref. (N8, J-general, 2-60, M27c; SS)

127-N. Magnetic Measurement of Low Temperature Recovery After Plastic Deformation. C. A. J. Ammerlaan, H. J. Hofer and G. W. Rathenau. Solid State Physics in Electronics and Telecommunications, Proceedings of the International Conference, Brussels, Belgium, June 2-7, 1958, v. 3. Magnetic and Optical Properties, Pt. 1, 1960, p. 231-234.

Ballistic measurements of the rate of recovery of magnetic properties in annealed and cold drawn Ni strip at -196° C. as affected by the annihilation of point defects such as lattice vacancies. 7 ref. (N4, P16, 1-67, M26s; Ni, 4-53)

128-N. (Japanese.) Effect of Lithium on the Recrystallization Temperature of Aluminium-Magnesium-Zirconium Alloy. Shiro Terai and Yoshio Baba. Sumitomo Light Metals, Technical Reports, v. 1, Oct. 1960, p. 246-253.

Alloys in the Al-Mg-Li and Al-Mg-Zr-Li systems containing 2-3% Mg, 0-0.26% Zr and 0-2.79% Li are subjected to various heat treatments at 20-550° C. before cold rolling. Recrystallization temperature and mechanical properties are determined as a function of Li and Zr content. 4 ref. (N5, Q-general, 2-60; Al-b, Mg, Zr, Li)

129-N. The Carbide Constitution and Tempering Behavior of Chromium-Vanadium-Niobium Steels at 700° C. K. C. Mills, B. B. Argent and A. G. Quarrell. Iron and Steel Institute, Journal, v. 197, Jan. 1961, p. 9-21.

Measurement of carbide content, structure and phase boundries by electrolytic extraction, centrifugal separation, X-ray examination and electron metallographic examination. It is suggested that Cb additions reduce the carbon available for combination with Fe, Cr and V and that these changes in the effective carbon content cause movement of the carbide phase boundaries. (N8a, M27f, M22g, M21e; ST, Cb, Cr, V)

130-N. An Electron Microscopical Investigation of the Tempering of 18-4-1 High Speed Steel. C. H. White and R. W. K. Honeycombe. Iron and Steel Institute, Journal, v. 197, Jan. 1961, p. 21-28.

Electron microscope examination of the structures which occur during tempering at 200-800° C. of high speed steel containing 18% W, 4% Cr and 1% V. Influence of tempering time and temperature, precipitation of an alloy carbide ($M_{23}C_6$) and amount of retained austenite on hardness. (N8a, Q29n, 2-61, M27, M21e; TS-m, W, Cr, V)

131-N. Kinetics of Later Stages of Clustering in Al-Cu Alloy. D. Turnbull and R. L. Cormia. Acta Metallurgica, v. 8, Nov. 1960, p. 747-750.

Resistometric investigation of secondary clustering reactions in Al-1.75% Cu alloys as a function of holding time

and temperature (0-80° C.) after various thermal treatments. Relation of clustering to vacancy trapping by highly curved dislocation loops and solute clusters. 15 ref. (N3, M26b, M26s, P15g, 2-64; Al-b, Cu)

132-N. Dispersion Hardening. W. H. Meiklejohn and R. E. Skoda. Acta Metallurgica, v. 8, Nov. 1960, p. 773-780.

The increase in yield strength of solid Hg due to dispersed Fe particles is experimentally determined to be proportional to particle diameter and spacing between particle centers and therefore a function of volume fraction of precipitate. Temperature dependence of yield strength at 77° K. is related to the melting point of Hg matrix and precipitation hardening phenomena is related to coherency as a function of dislocation movement in stress fields. 12 ref. (N7a, M-general, Q23b, 2-61; Hg-b, Fe)

133-N. A Theory of Diffusion of Impurities in Pure Silver. J. M. Tobin. Acta Metallurgica, v. 8, Nov. 1960, p. 781-787.

A new ionic model for the determination of activation energy and diffusion constants by the method used by Lazarus is used to obtain values for period V elements in Ag. With the same model, the difference in ion core size and effective nuclear charge is used to calculate these values in periods IV and VI. 18 ref. (N1, 9-51; Ag)

134-N. Migration Energies in Quenched and Deformed Gold. M. Meshii and J. W. Kauffman. Acta Metallurgica, v. 8, Nov. 1960, p. 815-816.

Activation energies as determined by slope intersection method are measured for the recovery of residual resistivity in Au quenched from 1000° C. and plastically deformed at -195.8° C. to study the physical nature of the interactions between point defects and dislocations. (N3, M26, P13a, P15g, 2-61, 2-64, 3-68; Au)

135-N. Cooling Transformation Diagrams for AISI 9620 and 4047. R. C. Hess and D. J. Blickwede. Metal Progress, v. 79, Feb. 1961, p. 100-B.

Cooling curves at indicated distances from quenched end. (N-general; AY)

136-N. The Morphology of Martensite. P. M. Kelly and J. Nutting. Iron & Steel, v. 33, Dec. 19, 1960, p. 652-657.

Morphological analysis of martensite formed from Fe-Ni-C steel, plain carbon steel and 18-8 stainless steel. Effects of internally twinned crystals and single-crystal needles on deformation and hardness. (N8p, M-general, Q-general; ST)

137-N. The Kinetics of the Martensite Transformation in Iron Alloys. W. S. Owen and A. Gilbert. Iron & Steel, v. 33, Dec. 19, 1960, p. 657-660.

Nucleation and growth of martensite are examined theoretically in terms of driving force, interface energy, embryo elastic and dilatation strain energy, strain and plastic deformation in the austenite lattice, thermal activation and dislocation generation. T-T-T diagrams and transformation rate equations are derived for alloys containing various amounts of Cr, Ni, C, Mn and Si at -196 to 500° C. (N8p)

138-N. The Effect of Composition on the Structure and Properties of Martensite. K. J. Irvine, F. B. Pickering and J. Garstone. Iron & Steel, v. 33, Dec. 19, 1960, p. 660-665.

Hardness, microstructure, transformation reactions, ductility, hardenability and impact properties of martensite in carbon, alloy and stainless steel as affected by the carbon alloying elements, content, tempering temperature and warm working. (N8p, P-general, Q-general, 2-64, 3-68; ST)

139-N. (Ukrainian.) Substructural Changes of Hardened High-Speed Steel on Tempering. P. M. Yushkevich. Dopovidi Akademii Nauk Ukrains'koi RSR, Aug. 1960, p. 1064-1068.

Multiple tempering of the alloyed, high speed steels to determine crystallic transformation and red hardness at various temperature intervals. Study of decomposition of martensite into Cr carbide at 380-450° C. and into ferrito-carbide at 520-540° C. and of emergence of vanadium-carbide and tungsten-carbides at 540-620° C. Determination of the changing lattice sizes by ionic refractometry. 9 ref. (N8, M26; TS-m)

140-N. (Ukrainian.) Kinetics of Eutectic Crystallization of Iron-Carbon Alloys. K. P. Bunin and L. T. Kalinina. Dopovidi Akademii Nauk Ukrains'koi SSR, Sept. 1960, p. 1231-1235.

Eutectic crystallization of white cast iron during continuous cooling in 1120-1000° C. temperature range. Specific temperatures for transformation to austenite, graphite and cementite. (N8; CI-p)

141-N. The Nature of Strengthening Magnesium Alloys of the System Mg-Mn-Al-Co at Elevated Temperatures. A. A. Bochar, M. E. Drits and Z. A. Sviderskaya. Paper from "Contemporary Problems of Metallurgy". Consultants Bureau, Inc., New York, 1960, p. 445-453.

Effect of alloy composition on hardening and softening processes and resultant creep and heat resistance. Mechanical properties, microstructure and lattice parameters are determined after quenching, aging, tempering and stabilizing at 50-600° C. for various times. 8 ref. (N7a, J-general, M-general, Q-general, 2-60, 2-64; Mg-b, Mn, Al, Ca)

142-N. The Nature of Martensitic Transformations. G. V. Kurdvumov. Paper from "Contemporary Problems of Metallurgy". Consultants Bureau, Inc., New York, 1960, p. 454-461.

Review of theoretical and experimental determinations of the temperature dependence of martensite transformations in steels and nonferrous metals. The rate of formation and growth of martensite nuclei, as the contributing factor in the transformation, is determined to be a value of the thermal fluctuation needed for a given supercooling and the mean kinetic energy of the atoms during displacement. Transformation data are given for 23% Ni and 3.5% Mn steels, Cu-Al, Cu-Sn and Cu-Zn alloys tested at -200 to 200° C. 46 ref. (N6q, N8p, 2-61, 10-54; Cu-b, SS-e)

143-N. (Translation-ConBur.) Intensification of Red Lead Production. A. A. Ravdel and N. V. Agarev. Journal of Applied Chemistry of the USSR., v. 33, Jan. 1960, p. 67-72.

The diffusion coefficient of oxygen in red Pb and the activation energy of the process are calculated from the general theory of diffusion phenomena. 9 ref. (N1a, P13a; Pb, O)

144-N. (Translation.) Distribution Coefficient of Tin in Selenium. D. M. Chizhikov and V. M. Edel'shtein. Soviet Physics--Solid State, v. 2, Nov. 1960, p. 790-792.

Radioactive Sn is used to determine Sn distribution in Se after zone recrystallization. (N1a, N5; Se-b, Sn)

145-N. (Translation.) Transformations of the Solid State in Alloys of the Copper-Zinc System in the Range of Alpha-Solid Solution. A. T. Grigor'ev, E. M. Sokolovskaya and V. N. Pyatnitskii. Journal of Inorganic Chemistry, USSR., v. 2, July 1957, p. 154-160.

Cu-Zn alloys are prepared under slags of $BaCl_2$, $CaCl_2$, LiCl and KCl, annealed and tested by differential thermic analysis, electrical resistance and hardness measurements and X-ray analysis to study transformations in the range of alpha-solid solution. 8 ref. (N-general, 2-64, M23r, Q29, P15g, M22g; Cu-b, Zn-b)

146-N. (German.) Study of Deformation Aging in Mild Unalloyed Steels by Tensile Strength and Damping Measurements. Wilhelm Heller and Mathias Nacken. Archiv fur das Eisenhuttenwesen, v. 31, Dec. 1960, p. 723-730.

Annealed and tensile deformed wire specimens of electro steel, basic Bessemer steel and air-refined special steel containing 0.009-0.0185% C are tensile deformed and aged at 20-250° C. Aging is studied by stress-strain curves, damping measurements to determine carbon precipitation and coercive force measurements. (N7e, Q27, Q8; CN, 4-61)

147-N. (German.) Evaluation of Diffusion Coefficients in Iron-Chromium Alloys. Theo Heumann and Heinz Bohmer. Archiv fur das Eisenhuttenwesen, v. 31, Dec. 1960, p. 749-754.

Diffusion annealing at 823-1440° C. of Fe-Cr (0-22 at.% Cr) alloy plates welded against pure Fe and of Fe-Al (17.6% Al) plates to measure diffusion coefficients of Fe and Cr and to evaluate influence of Al on diffusion. (N1, J23, 2-60; Fe-b, Cr, Al)

148-N. (Russian.) Electrical Resistivity Anomaly in Brass and Aluminum Bronze.

A. A. Presnyakov, L. I. Dautova and Yu. F. Klyuchnikov. Fizika Metallov i Metallovedenie, v. 10, May 1960, p. 676-679.

Kinetics of ordering process occurring in Cu-Zn and Cu-Al alpha solid solutions. Changes of specific electric resistivity are studied in quenched samples tempered at 100-600° C. 14 ref. (N10b, P15g, 2-64; Cu-b, Al, Zn)

149-N. (Russian.) Formation of Martensite During High Velocity Deformation. A. P. Gulyaev and A. S. Shigarev. Fizika Metallov i Metallovedenie, v. 10, May 1960, p. 691-697.

Hardened KH15N9Yu and KH12F1 alloy steel are exposed to impact and explosive loading at deformation rate of 150 m. per sec. Effect of deformation rate on the mechanism of austenite-martensite transformation and hardness. 15 ref. (N8p, Q29n, 3-68; AY)

150-N. (Russian.) Effect of the Ordering Process Occurring in Alpha-Phase on the Alpha-Gamma Transformation in Fe-Co-V Alloy. I. L. Aptekar' and V. I. Gorbunov. Fizika Metallov i Metallovedenie, v. 10, May 1960, p. 710-713.

Dilatometric and X-ray study of structure and kinetics of alpha-gamma transformation in alloys containing 2.5-3% V and 52% Co during tempering. Ordering process in alpha-phase precedes and facilitates gamma phase segregation and provides more uniform structure. 4 ref. (N10b, M22g, M23b; Fe-b, Co-b, V)

151-N. (Russian.) Ordering Process in Hardened Fe_3Al Alloy During Low Temperature Tempering. Ya. P. Selisskii. Fizika Metallov i Metallovedenie, v. 10, May 1960, p. 714-719.

Measurements of changes in electric resistivity and lattice spacing in samples quenched in He from 800-825° C., cooled at varying rates and subsequently tempered at 200-250° C. 6 ref. (N10b, P15g, M26, 2-64; Fe-b, Al)

152-N. (Russian.) Effect of Iron and Nickel Additions on Self Diffusion in Alpha Zirconium. V. S. Lyashenko, V. N. Bykov and L. V. Pavlinov. Fizika Metallov i Metallovedenie, v. 10, May 1960, p. 727-731.

Determination of diffusion coefficients in alloys containing up to 4% Fe and Ni at 650-830° C. using Zr^{95} radioactive isotope. 9 ref. (N1d, 2-60; Zr-b, Fe, Ni)

153-N. (Russian.) Recrystallization of Pure Metal Powders. V. I. Iveronova and N. N. Osipenko. Fizika Metallov i Metallovedenie, v. 10, May 1960, p. 736-742.

Comparative study of polygonization and recrystallization processes in deformed and annealed Al and Cu samples in powdered or solid form. Recrystallization as a function of polygonization, mosaic block size and second order stresses. 5 ref. (N4, N5, 3-66, 3-71; Al, Cu, 6-68)

154-N. (Russian.) Selfdiffusion Mechanism in Zirconium Base Binary and Ternary Alloys. V. S. Lyashenko, V. N. Bykov and L. V. Pavlinov. Fizika Metallov i Metallovedenie, v. 10, May 1960, p. 755-762.

Diffusion coefficient determined at 900-1200° C. in Zr-Cb alloy with and without Sn, Cr or Mn additions using Zr^{95} radioactive isotope. Activation energy and diffusion coefficient as a function of composition. 4 ref. (N1d, 2-60; Zr-b, Cb, Cr, Mn, Sn)

155-N. (Russian.) Effect of Plastic Deformation on Phase Composition of Chromium-Manganese Steels. B. A. Apaev and Yu. A. Sysuev. Fizika Metallov i Metallovedenie, v. 10, May 1960, p. 767-771.

Study of phase transformations in alpha phase and cementite structures in cold plastic deformed and tempered SHKh15 and 10G12 steels. Phase composition as dependent on plastic deformation, initial structure and steel composition. 8 ref. (N8k, 2-60, 3-68, 3-71; ST, Cr, Mn)

156-N. (Russian.) Effect of Carbon on Phase Composition in Fe-Cr-Ni Base Austenitic Alloys. I. G. Ivantsov, V. A. Finkel', Fizika Metallov i Metallovedenie, v. 10, May 1960, p. 780-782.

Phase composition of high vacuum melted and heat treated Fe-Cr-Ni alloys containing 0.2-0.02% C. Dependence of sigma phase upon carbon content and aging temperature. Dissolution of carbon in gamma solid solution as dependent upon amount of sigma phase. 13 ref. (N8, 2-60, 2-65; SS-e)

157-N. (Russian.) Effect of Vanadium Ore Phase Transformations in Manganese-Steel. V. R. Golik, V. A. Dubrov, N. I.

Sandler and V. V. Kukol'. Fizika Metallov i Metallovedenie, v. 10, May 1960, p. 786-790.

Data on kinetics of solid solution decomposition and temperature intervals for formation and dissolution of carbides in Mn-steel containing vanadium. Additions are obtained by measurements of coercive force, hardness, specific electric resistivity and X-ray diffraction lines. 7 ref. (N8r, N12p, 2-60, Q29n, P15g, P16a, M22g; ST, Mn, V)

158-N. (French.) Structural Phenomena in Hot Rolling of Rimming Steel Sheets. U. Berrati, S. Michelluci and G. Odone. Revue de Metallurgie, v. 57, Nov. 1960, p. 1031.

Recrystallization and grain growth in steel sheets during rolling and subsequent annealing. Effect of low coiling temperatures and normalization on work hardening. (N3, N5, F23, Q23a, 2-64; ST-d, 4-53)

159-N. Physical Metallurgy of Refractory Metals (The Kinetics of $CbZn_2$ Formation on Columbium in Zinc Vapor). G. Sandoz and T. C. Lupton. Report of N. R. L. (Naval Research Laboratory) Progress, Dec. 1960, p. 30-31. $1.25. (Available as PB 161288 from U. S. Office of Technical Services, Washington 25, D. C.)

Growth characteristics of $CbZn_2$ on Cb sheet specimens as a function of time, 1-10 hr., and temperature, 1895-1927° F., of exposure in Zn vapor are studied to determine thickness control in the deposition of protective CuZn coatings on Cb. Data are given for coating thickness, microstructure and diffusion controlled formation rate. (N15g, N1, 2-61, 3-67; Cb, EG-d37, Zn)

160-N. (Japanese.) Improvement of Various Properties of 20% Cr-Ni-Fe Alloys by Nitrogen-Absorption Treatment. Masazo Okamoto and Ami Miyakawa. Tetsu-to-Hagane (Iron and Steel Institute of Japan, Journal), v. 47, Jan. 1961, p. 43-52.

Study of nitrogen-bearing austenite formation in alloys containing up to 10% Ni after nitrogen-absorption. Data are given for corrosion resistance, hardness and spring properties at elevated temperatures. 17 ref. (N8f, R-general, Q29n, Q21; Fe-b, Cr, Ni)

161-N. The Use of Heat and Mass Transfer Model Studies in the Evaluation of the Rates of Deposition of Metals in Complex Systems. G. H. Kesler, J. H. Oxley and C. E. Dryden. Metallurgical Society of AIME, Transactions, v. 221, Feb. 1961, p. 9-13.

Rates of heat and mass transfer from Al rods to recirculating air are determined on a one-quarter scale model of a metal deposition bulb for studying vapor deposition rate of Ti from Ti tetra-iodide. The dependence of local and averaged rates of transfer and consequent metal transport upon outlet geometry, number of rods, position upon a rod and air flow rate is established for flow patterns created by radial and tangential air inlets. 4 ref. (N15g, P11k; Al, Ti)

162-N. Redetermination of the Chromium and Nickel Solvuses in the Chromium-Nickel System. C. J. Bechtoldt and H. C. Vacher. Metallurgical Society of AIME, Transactions, v. 221, Feb. 1961, p. 14-18.

Homogenized, aged and quenched alloys, prepared by powder metallurgical techniques are examined by microscopic and X-ray diffraction methods. The compositions (5-95% Ni) and heat treatments are chosen so that the Cr and Ni solvuses can be determined and a range of composition and temperature, in which a eutectoid has been reported, can be explored in small intervals. 16 ref. (N9m, N12p, M24b, 2-64; Cr-b, Ni-b)

163-N. Intragranular Precipitation of Intermetallic Compounds in Complex Austenitic Alloys. H. J. Beattie, Jr., and W. C. Hagel. Metallurgical Society of AIME, Transactions, v. 221, Feb. 1961, p. 28-35.

Seven austenitic alloys of Fe, Ni and Co base compositions and minor alloy additions are solution treated, aged systematically at 1200-1800° F. and examined by X-ray and electron metallography. Intergranular precipitations of eta, laves, sigma, gamma prime and chi phases are observed as a function of composition and aging time and temperature. Phase solubility limits are determined within 100° F. intervals. 27 ref. (N7, N-general, M-general, 2-60, 2-65; Co-b, Fe-b, Ni-b)

164-N. Self Diffusion of Aluminum in $CaO-SiO_2-Al_2O_3$ Melts. John Henderson, Ling Yang and G. Derge. Metallurgical Society of AIME, Transactions, v. 221, Feb. 1961, p. 56-60.

Self diffusion coefficients of Al as a function of Al_2O_3 concentration and temperature are measured by the capillary reservoir technique in liquids of the system containing equimolar portion of CaO and SiO_2 at 1400-1520° C. using radioactive Al-26 in the capillary and inactive Al in the reservoir. Activation energies are calculated and a concept of the constitution of these melts is developed. 13 ref. (N1d, P13a, 1-59, 2-60, 2-61; Al)

165-N. Self Diffusion of Copper in Molten Copper. John Henderson and Ling Yang. Metallurgical Society of AIME, Transactions, v. 221, Feb. 1961, p. 72-73.

Self diffusion coefficients of Cu in molten Cu are measured by the capillary reservoir method at 1140-1260° C. using Cu-64 as the radioactive tracer. Equations are derived for the diffusion constant and energy of activation with correlation between the diffusivity and coefficient of viscosity. 7 ref. (N1d, 1-59; Cu)

166-N. The Isothermal Transformations of Ti-2.5Al-16V and Ti-4Al-3Mo-1V. L. E. Tanner. Metallurgical Society of AIME, Transactions, v. 221, Feb. 1961, p. 74-83.

T-T-T diagrams constructed from metallographic examination and hardness testing data and by X-ray diffraction, electrical resistivity and dynamic elastic modulus determinations for sheet alloys after step quenching to aging temperatures from a beta solution anneal and water quenching from an alpha + beta solution anneal followed by reheating to aging temperatures. 13 ref. (N7c, M-general, 2-64; Ti-b, Al, Mo, V)

167-N. Strain Aging in Silver Base Al Alloys. A. A. Hendrickson. Metallurgical Society of AIME, Transactions, v. 221, Feb. 1961, p. 103-107.

Investigation of the tensile properties of Ag-based Al alloy single crystals for studying strengthening effect due to Suzuki locking with minimum complications. Yield drops are observed in all alloy crystals (1, 2, 3, 4 and 6 at.% Al) after strain aging at room temperature. The yield effects are attributed to Suzuki locking but the major portion of the solid solution strengthening to other mechanisms. 16 ref. (N7e, Q27; Ag-b, Al, 14-61)

168-N. Heterogeneous Nucleation in the Liquid-to-Solid Transformation in Alloys. B. E. Sundquist and L. F. Mondalfo. Metallurgical Society of AIME, Transactions, v. 221, Feb. 1961, p. 157-164.

The undercooling associated with the nucleation of the secondary phase from the liquid by the solid primary phase is studied in 60 binary alloys with a hot stage microscope. In a system of alpha and beta, alpha usually nucleates beta at low undercoolings, but beta does not nucleate alpha, except possibly at undercoolings approaching homogeneous nucleation. Relation to relative interfacial energies and crystallographic disregistry as a minor factor in heterogeneous nucleation from metallic liquids. 22 ref. (N2, N-general)

169-N. The Structure of Bainite in Hypoeutectoid Steels. S. J. Matas and R. F. Hehemann. Metallurgical Society of AIME, Transactions, v. 221, Feb. 1961, p. 179-185.

The existence of two distinct forms of bainite, upper and lower bainite, in hypoeutectoid steels is confirmed by carbide extraction and lattice parameter study of the structure of the product resulting from this mode of austenite decomposition. The transition between these two forms occurs at about 650° F. regardless of the alloy content of the steel and their structural differences are interpreted in terms of the kinetics of carbide precipitation from supersaturated ferrite. 44 ref. (N8m, N7, M26; ST)

170-N. The Anomaly in the Rate of Strain Hardening of Zinc Single Crystals. A. Deruyttere, E. Van den Bergen, J. Van der Planken and M. Laurent. Metallurgical Society of AIME, Transactions, v. 221, Feb. 1961, p. 204-205.

Reversible temperature dependence of the decreases and increases in strain hardening rate is determined by tensile tests at -183 and -73° C. in liquid air and solid CO_2. 4 ref. (N7e, 2-61; Zn, 14-61)

171-N. Study of Copper Precipitation Behavior in Silicon Single Crystals. G. H. Schwuttke. Electrochemical Society, Journal, v. 108, Feb. 1961, p. 163-167.

Precipitation behavior of Cu in Si at 900-1300° C. as influenced by temperature and oxygen content of Si. Application of the precipitation method to determination of dislocation density. 5 ref. (N7b; Si, Cu, 14-61)

172-N. Structure and Growth of Iron and Chromium Electrodeposits on Copper Single-Crystal Faces. A. K. N. Reddy and H. Wilman. Institute of Metal Finishing, Transactions, v. 36, 1958-1959, p. 97-106.

Growth stages, as characterized by predominant orientation and structure of body-centered cubic metals, Cr and Fe deposited at 20-45° C. on face-centered cubic Cu crystals, are examined by electron diffraction. Epitaxial (two-degree), out growth (one degree) and multiple orientations with or without random polycrystalline structure formation and twinning and rotational displacements are noted as a function of temperature, current density, codeposition of Fe $(OH)_2$, deposit thickness and stress due to lattice misfit. 28 ref. (N3, L17, M26c; Cu, Cr, 8-62, 14-61)

173-N. Detection of Zinc Diffusion Into Tin Coatings on Brass. S. C. Britton and M. Clarke. Institute of Metal Finishing, Transactions, v. 36, 1958-1959, p. 230-232.

Corroding potentials measured in 0.001 NaCl solution are used to detect Zn diffusion in Sn coatings after flow brightening and storage. Effect of corrosion product formation caused by the Zn and moisture condensation on solderability of the coatings is tested using solder spreading methods. 4 ref. (N1h, K7, 17-52, R-general; Cu-n, Sn, Zn, 8-62)

174-N. (Translation.) Low Temperature Recyrstallization of Copper. R. I. Garber, I. A. Gindin, B. G. Lazarev and Ya. D. Starodubov. Soviet Physics, Solid State, v. 2, Dec. 1960, p. 991-993. (Translation of Fizika Tverdogo Tela, v. 2, June 1960, p. 1033-1360.)

Recrystallization at room temperature following deformation at 4.2° K. and 20° K. is studied by a new method based on the fact that some of the new grains grow across the boundary of contact between two surfaces of the deformed specimen. 6 ref. (N5f, 2-61, 3-67; Cu)

175-N. Hydrogen in Carbide Steel. T. G. Owe Berg. American Ceramic Society Bulletin, v. 40, Feb. 1961, p. 78-79.

Evidence that retained hydrogen is held in carbide phases in steel is confirmed by direct analysis and used to suggest a role for the carbide phase in fish-scaling of enameled steel. (N8r, Q10c; ST, 8-71)

176-N. (Japanese.) Determination of Hydrogen in Cast Iron. Pt. 1. Evolution of Hydrogen From Fe-C-Si Alloy and Cast Iron at Room Temperature. Eiichi Kato. Japan Institute of Metals, Journal, v. 24, Nov. 1960, p. 703-707.

Time, temperature and composition effects on hydrogen evolution are measured for small, chill cast specimens of steel and malleable and cast iron containing 0.4-4.43% C and 0.14-3.65% Si at -78 to 20° C. in test tubes filled with Hg or evacuated. In general, the specimens having higher C and Si content or at lower temperature show slower evolution rates. 5 ref. (N15e, 2-60, 2-61; CI, ST, H)

177-N. (Japanese.) Isothermal Transformation of the Eutectoid and the Hypo-Euctectoid Composition in Cu-Al Binary Alloys. Hiroyasu Mitani and Norihiko Nakanishi. Japan Institute of Metals, Journal, v. 24, Nov. 1960, p. 748-751.

T-T-T diagrams are constructed for 11.44 and 12.18% Al-Cu specimens at 420-560° C. in an examination of the beta to ordered beta transformation as a transition reaction in the beta to beta prime martensite transformation or eutectoidal precipitation proceeding at temperature below the critical temperature for the beta to ordered beta transition. 12 ref. (N7c, N6q; Cu-b, Al)

178-N. (Japanese.) Isothermal Transformation of the Hyper-Eutectoid Compositions in Cu-Al. Hiroyasu Mitari and Norihiko Nakanishi. Japan Institute of Metals, Journal, v. 24, Nov. 1960, p. 752-755.

T-T-T diagrams are constructed for specimens near the ideal Cu_3Al composition, containing 12.49-12.96% Al, to re-examine the beta to ordered beta to

beta prime martensite transformation. 6 ref. (N7c, N6q; Cu-b, Al)

179-N. (Japanese.) Studies on Pure Chromium. Pt. 4. Recrystallization of High Purity Chromium. Susumu Yoshida, Yukio Ohba and Noria Nagata. Japan Institute of Metals, Journal, v. 24, Nov. 1960, p. 760-764.

Specimen of pure Cr produced by electrolysis of chromic acid are melted to 6-82% reduction with annealing at 800-1100° C. for various times. Activation energies for recrystallization are measured isothermally, with recrystallization structure, including grain growth due to boundary migration, being observed by X-ray back reflection methods. 9 ref. (N5, N3, M22g, 2-64, 3-68; Cr-a)

180-N. (Russian.) Investigation of the Graphitization Theory of White Iron. N. M. Pronman. Liteinoe Proizvodstvo, Nov. 1960, p. 37-41.

X-ray study of graphitization processes in annealed and in quenched cementite shows that centers of graphitization during the quenching process develop as a result of decomposition of the cementite at 1100° C. and lower. It is thought that hardening speeds the graphitization process. 22 ref. (N8s; CI-p)

181-N. (French.) X-Ray and Electron-Microscopic Study of the Precipitation in an Aluminum-Zinc Alloy With 40% Zinc. Rene Graf and Bernard Genty. Comptes Rendus, v. 251, Nov. 28, 1960, p. 2517-2519.

Identification of an intermediary phase during precipitation. Relation of this phase with pre-precipitation and development of pre-precipitation zones during annealing. 8 ref. (N7, 2-64, M21; Al-b, Zn)

182-N. (Russian.) Investigation of Cementite in Nongraphite Alloys. N. Z. Pozdnyak and E. K. Ponomarenko. Metallovedenie i Obrabotka Metallov, Dec. 1960, p. 39-41.

Influence of amount and form of the free cementite on wear resistance and anti-frictional properties of sintered alloy ball bearings. (N8k, Q9, T7d; Fe-b, C, 6-72, 17-57)

183-N. (French.) Role of Holes in Supersaturation for the Kinetics of Structural Hardening. Claude Leymonie. Metaux-Corrosion-Industries, v. 35, Dec. 1960, p. 474-487.

Theories concerning the kinetics of structural hardening, including hardening at low temperatures; role of short circuits of diffusion; the formation of holes during supersaturation and the interaction between holes and dislocations. 52 ref. (N-general, M26b)

184-N. Study on Carbides in Iron and Steel by Electrolytic Isolation Method. Report 2. Partition of Alloying Elements Between Carbides and Ferrite in Annealed Steels. Tomo-o Sato and Taiji Nishizawa. Tohoku University, Technology Reports, v. 25, Jan. 1960, p. 65-75.

The influence of alloying element concentration and C content on the partition of Ni, Co, Mn, Cr, Mo, W, V and Si between cementite and ferrite in low alloy steels and the composition and structure of carbides in high alloy Cr, V, Mo and W steels. (N8r, 2-60; AY)

185-N. (Japanese.) Anomalous Softening and Structure Change of Cu-2% Be Alloys Due to Discontinuous Precipitation. Takuichi Morinaga, Takeo Goto and Tsuneo Takahashi. Japan Institute of Metals, Journal, v. 24, Dec. 1960, p. 777-781.

Hardness changes with aging times at 310° C. after solution treatment at 760-810° C. is observed in commercial Cu-Be alloys of similar composition by microscopy with examination of discontinuous precipitation by electron micrography. Overaging is related to initial hardening rate, subsequent softening anomaly, grain boundary and matrix nodule formation and spheroidization. 17 ref. (N7, M-general, N-general, 2-64; Cu, Be)

186-N. (Japanese.) The Structure Dependence of 0.68% Carbon Steel on the Austenizing Process. Genjiro Mima, Shigenori Hori and Akikozu Nakagiri. Japan Institute of Metals, Journal, v. 24, Dec. 1960, p. 805-809.

Specimens having structures with lamellar and spheroidized pearlite and spheroidized pearlite with nodular graphite are austenitized at 600-800° C. for various times at rapid heating rates. The course of the austenite transformation and structural characteristics are investigated by hardness

measurement, electron microscopy and dilatation methods. 17 ref. (N8, 2-64; CN)

187-N. (Japanese.) Ni-Cr Alloys. Pt. 2. Structural Changes of Ni-Cr Alloys Containing About 45% Cr. Masazo Okamoto, Katsuro Suenaga and Isao Masaaka. Japan Institute of Metals, Journal, v. 24, Dec. 1960, p. 814-818.

Differential dilation curves and metallographic data for phase and structure changes during isothermal transformation of Ni-Cr alloys containing 35-51% Cr observed during various stages of quenching and holding treatments at 800-1250° C. Investigation of solubility or eutectoidal change in the Ni-rich solid solution, resulting in the precipitation of a fine granular and a coarse lamellar structure. 21 ref. (N7c, N12p, M23b; Ni-b, Cr)

188-N. (Russian.) Polygonization in Metals. I. A. Oding, P. V. Zubarev and Z. G. Fridman. Metallovedenie i Termicheskaya Obrabotka Metallov, Jan. 1961, p. 2-9.

Discussion of the nature of polygonization based on dislocation theory. Polygonization in steels and metals of various purity, its rate and development during creep, tensile stress and crystallization. Effect of polygonization on the mechanical properties of deformed and heat treated materials. 56 ref. (N4, N5)

189-N. (Russian.) Carbon Diffusion in Iron. S. Z. Bokshtein, M. A. Gubareva, I. E. Kontorovich and L. M. Moroz. Metallovedeni i Termicheskaya Obrabotka Metallov, Jan. 1961, p. 10-14.

Study of carbon diffusion process at 550-950° C. in alloyed and nonalloyed iron exposed to C^{14} isotope. Depth and rate of diffusion and distribution of carbon in separate grains is determined as a function of alloying iron composition and temperature. 11 ref. (N1a; Fe-b, C)

190-N. (Russian.) Fine Crystalline Structure During Martensitic Transformation. E. L. Vinogradskaya and G. A. Molchanova. Metallovedenie i Termicheskaya Obrabotka Metallov, Jan. 1961, p. 20-25.

Structural investigation of gamma and alpha phases in hardened Fe-base alloy during direct and reverse martensitic transformation. Maximum lattice distortion and transformation temperature as dependent on plastic deformation before or after cooling to -194° C. 10 ref. (N8p, M27, 3-68; Fe-b)

191-N. (Russian.) Influence of Plastic Deformation on Graphitization in Steel. A. A. Baranov. Metallovedenie i Termicheskaya Metallov, Jan. 1961, p. 25-28.

Graphitization mechanism is studied in two openhearth silicon steels with laminar pearlite and pearlite-cementite structures. Samples are subjected to graphitization annealing at 680° C. with subsequent upsetting at 20-1100° C. to show effect of microcracks, porosity and heterogeneity of deformation on graphitization. 3 ref. (N8s, 3-68; ST)

192-N. (Russian.) Structure and Recrystallization of Austenite in High-Speed Toolsteel. V. D. Sadovskii. Metallovedenie i Termicheskaya Obrabotka Metallov, Jan. 1961, p. 50-57.

Metallographic study of structural changes occuring during recrystallization of R18 steel quenched from 1280° with subsequent repeated heating to 1280-1300° C. Mechanism and factors governing the development of large size grains during the secondary heating. 13 ref. (N5, M27c; TS)

193-N. On the Determination of Diffusion Coefficients in Chemical Diffusion. R. W. Balluffi. Acta Metallurgica, v. 8, Dec. 1960, p. 871-873.

Equations describing chemical diffusion in the general case where the partial molal volumes of the diffusing components may differ and may vary with composition are reviewed to determine exactness and ease of application. Relations for obtaining chemical and intrinsic diffusivities are derived which are suggested for replacing the standard Darken equation and Boltzmann-Matano analysis whenever there is any possibility that differences and variations of the partial molal volumes are of significance. 10 ref. (N1)

194-N. Growth Substructures in Weld Metal. F. A. C. Calvo, K. P. Bentley and R. G. Baker. Acta Metallurgica, v. 8, Dec. 1960, p. 898-900.

Cell or corrugation structures on the surface of weld pools in low carbon

steel and dendritic growth in weld pools in a 18Cr-12NiCb stainless after melting and rapid cooling, using an argon tungsten arc spot welding torch. Influence of the positive liquid temperature gradient resulting from a build-up of the solid-liquid interface on substructure formation. Effect of degree of consitutional supercooling on type of structure developed. 3 ref. (N12, N3; ST, 7-51)

195-N. Electron Microscopic Investigation of the Phase Transformation of Thin Cobalt Samples. E. Votava. Acta Metallurgica, v. 8, Dec. 1960, p. 901-904.

Co in bulk form shows at 417° C. a reversible phase transformation from the hexagonal to the f-c-c. form. This transformation is observed in the electron microscope by heating to 800° C. and cooling recrystallized and electrolytically thinned Co samples in a special sample holder. The transformation is attributed to stacking fault formation and coalescence into and movement with dislocation as a function of stress and temperature. 4 ref. (N-general, M21e, M26b, 2-61, 3-66; Co)

196-N. (Translation-ConBur.) Some Features of the Crystallization of Alloys of the Eutectic Type at High Rates of Cooling. I. V. Salli and I. S. Miroshnichenko. Academy of Sciences of the USSR, Proceedings, Physical Chemistry Section, v. 132, May-June 1960, p. 557-559.

Metallographic examination and X-ray diffraction studies of alloys containing Al, Si, Pb, Sn, Bi, Ni, C, Co and Cr to determine relationships between free energy, eutectic temperature, phase diagram and solubility. (N12, M22g, M24b; Al-b, Co-b, Cr-b, Ni-b, Pb-b, Sn-b)

197-N. Surface Self Diffusion Measurements on Nickel by the Mass Transfer Method. J. M. Blakely and H. Mykura. Acta Metallurgica, v. 9, Jan. 1961, p. 23-31.

Surface self diffusion constants D_s for nickel heated in vacuum at 800-1200° C. are calculated from interferrometric measurements on the rate of smoothing of scratches. D_s is found to depend strongly on surface orientation, the effect being greatest at the lower temperatures. This is ascribed largely to orientation dependent impurity adsorption. 23 ref. (N1d, 3-69, 3-72; Ni)

198-N. Strain-Hardening and Crystalline Fracture of Polycrystalline Iron. A. W. Sleeswyk. Acta Metallurgica, v. 9, Jan. 1961, p. 32-39.

The influence of prestraining tensile specimens of Armco iron at room temperature on their yield and fracture stresses at lower temperatures and the influence of strain rate on the fracture stress at liquid-nitrogen temperature. The plastic deformation obeys an equation of state, the observed fracture stresses being explained by assuming that the crystal grains and the microcracks they contain are deformed in conformity with the bulk of the material. 39 ref. (N7e, Q26p, 3-68, 3-73; Fe-a)

199-N. Quench-Hardening for Relatively Low Vacancy Concentration. T. Mori, M. Meshii and J. W. Kauffman. Acta Metallurgica, v. 9, Jan. 1961, p. 71-72.

Vacancy coagulation is determined as the dominant mechanism in Au for the annealing out of vacancies during quenching at 1030-700° C. Yield stress and resistivity values are plotted against aging time and quenching temperature as part of the study to prove that quench hardening operates by the same mechanism throughout the temperature range. 7 ref. (N7, M26s, 2-61, 2-64, 2-65; Au)

200-N. (German.) Isothermal Austenite Transformation Below the Martensite Temperature. O. Schaaber. Radex Rundschau, Dec. 1960, p. 335-342.

Analysis of austenite transformations in heat treatable and ball bearing steel by dilatometric measurement below martensite temperature to investigate reaction mechanism of martensite formation. (N8p)

201-N. Influence of Aluminum and Titanium on the S-Curve in Molybdenum Copper Cast Iron. Youichi Tokunaga. Imono (Japan Foundrymen's Society, Journal), v. 32, Nov. 1960, p. 759-764.

Isothermal transformation in 0.2-1.2% Mo, 0.5-2.3% Cu cast irons containing 0.26-0.87% Al and 0.12-0.26% Ti additions is determined by metallographic and dilatometric methods and by Brinell hardness measurement. The S-curve movement in bainite,

pearlite and martensite ranges is determined as a function of temperature. 10 ref. (N8g, 2-60; CI, Al, Ti)

202-N. The Crystallography of Martensitic Transformations. B. A. Bilby and J. W. Christian. Iron and Steel Institute, Journal, v. 197, Feb. 1961, p. 122-131.

Crystallographic analysis showing effect of strain and deformation element on microstructure, lattice parameters and dilatation parameters. Verification of theory by thin-film electron microscope studies on steel, Fe-Ni, In-Tl, Au-Cd, Cu-Au and Cu-Be alloys. 64 ref. (N6q, M26)

203-N. The Effect of Austenite Grain Size and Temperature on the Rate of Bainite Formation. J. Bradford and W. S. Owen. Iron and Steel Institute, Journal, v. 197, Feb. 1961, p. 146-151.

Measurements of electrical resistivity of wire specimens of Fe-Mn-C alloys to determine effects of austenitizing conditions on subsequent isothermal transformations at 1000-1250° C. Nucleation of upper and lower bainite at the austenite grain interface. (N8m, N8g, N5, P15g, 2-59, 2-64; Fe-b, Mn, C)

204-N. (French.) Tempering of Quenched High Speed Steel. J. Papier, G. Pomey and A. H. Michel. Memoires Scientifiques de la Revue de Metallurgie, v. 57, Nov. 1960, p. 829-844.

Contraction, expansion and magnetic stages in the austensite-martensite transformations occurring during tempering quenched high-speed steel in a differential dilatometer or in a thermomagnetometer above 500° C. Relation to composition of matrix obtained by austenitization. (N8a, M23b; TS-m)

205-N. (French.) Influence of Alpha Forming Elements on Diffusion of Copper in Gamma Iron. F. Sirka. Memoires Scientifiques de la Revue de Metallurgie, v. 57, Nov. 1960, p. 879-887.

Diffusion of pure Cu and Cu alloyed with P, Be and Si into pure Fe (750° C.), mild and austenitic steel and ferritic steel with 25% Cr or 4% Si. Effect of alpha forming elements (Cr, Sn, Sb) on intergranular wetting. 3 ref. (N1, 2-60; Fe-b, Cu)

206-N. (German.) Influence of Neutron Irradiation on Phase Transformation in Chromium Steels. B. Weiss-Hollerwoger and R. Mitsche. Radex Rundschau, Dec. 1960, p. 318-322.

Establishment of austenite-martensite transformation curves between -200 and 800° C. of an austenitic 5.4% Cr steel after exposure to 0-10^{18} n/cm^2 neutron irradiation at 25° C. Measurement of amount of martensite by permeability and hardness measurements. Influence of irradiation on martensite temperature. Interpretation of results by "strain-embryo theory". (N8f, 2-67; SS)

207-N. (German.) Transformations in Solid Bodies With Particular Emphasis on Martensite Formation. R. Mitsche. Radex Rundschau, Dec. 1960, p. 332-334.

Interpretation of isothermal martensite, pearlite and intermediate structures by two and three dimensional plots for unalloyed, medium-alloyed and high-alloyed steels. (N8)

208-N. (German.) Grain Boundary Structure and Recrystallization. Kurt Lucke. Zeitschrift fur Metallkunde, v. 52, Jan. 1961, p. 1-12.

Review of measurements of properties of large angle grain boundaries such as plasticity, energy and diffusion. Theoretical models (island model and undercooled liquid model) used to interpret structure of small and large angle boundaries. Interpretation of recrystallization in terms of grain boundary properties and structures. (N5, M27f, 3-72)

209-N. (German.) Movement of Large Angle Grain Boundaries in Recrystallization. Paul A. Beck. Zeitschrift fur Metallkunde, v. 52, Jan. 1961, p. 13-19.

Review of factors influencing movement of large angle grain boundaries during recrystallization such as surface tension, interface tension and lineage tension of dislocations; temperature; foreign atoms in solution and dispersion of inclusions; size, lattice and grain orientation of the sample. (N5, N3, M26b, 3-69, 3-72)

210-N. (German.) Process of Nucleation in Recrystallization. Wilhelm Gerard Burgers. Zeitschrift fur Metallkunde, v. 52, Jan. 1961, p. 19-26.

Review of theories and models of the nucleation reaction mechanism and growth of nuclei in recrystallization including R. Becker's nucleation theory

(formation of nuclei caused by thermic fluctuations), "lattice block theory", deformed structure model, polygonization theory, theory of martensitic nucleation, mechanism of the (111)-(112) shearing process to explain nucleation, Rowland transformation, secondary recrystallization and the concept of stimulated twin crystals. (N2, N5, 10-54)

211-N. (German.) Interpretation of Technical Recrystallization. Klaus Detert. Zeitschrift fur Metallkunde, v. 52, Jan. 1961, p. 27-34.

Theoretical investigation of recrystallization mechanisms in terms of "primary recrystallization", steady increase in grain size and "secondary recrystallization" as a function of alloying, annealing and deformation conditions. Review of technical recrystallization in annealing of brass sheets; recrystallization of Al deep drawing sheets, grain oriented magnet sheets containing 50% Ni and grain oriented magnet sheets containing 3% Si. Relation of resultant structural changes to mechanical and physical properties. (N5; Ni-b, Al, Cu-b)

212-N. (German.) Texture Formation in Primary Crystallization. Hein-Peter Stuwe. Zeitschrift fur Metallkunde, v. 52, Jan. 1961, p. 34-44.

Classification of recrystallization textures into three groups according to relationship between orientation and deformation textures (i.e., "gray textures", "retained textures" and textures with new orientation). Models are used in oriented nucleation, growth selectivity and recrystallization "in situ" studies to interpret the classification. Application of derived conclusions to Al sheets and wire textures. (N5, M26c, 3-68, 3-72; Al, 4-53)

213-N. (German.) On the Theory of Recrystallization. Ulrich Dehlinger. Zeitschrift fur Metallkunde, v. 52, Jan. 1961, p. 44-47.

Interpretation of reaction mechanism based on X-ray investigation of 99.9% rolled Ag and Cu sheets, in terms of preformed nuclei, which are less deformed lattice areas caused by inhomogeneities during deformation. Formation of large-angle grain boundaries by dislocation clouds surrounding the less deformed lattice areas. Correlation between orientation of nuclei and nuclei growth. (N5, N2, M26b, 3-68, 3-69, 3-72)

214-N. (German.) Decomposition of Iron-Molybdenum and Iron-Tungsten Solid Solutions. Erhard Hornbogen. Zeitschrift fur Metallkunde, v. 52, Jan. 1961, p. 47-56.

Investigation of decomposition of supersaturated alpha-Fe with 8-29.5% Mo or 26.65% W after 1440-1500° C. homogenization and 500-1000° C. aging by X-ray, microstructure and microhardness examination. Continuous and discontinuous decomposition is observed depending on aging temperature, the reaction mechanism being the growth of fine dispersed aggregate of the equilibrium phase into the solid solution. (N12p, N3, M-general, 2-65; Fe-b, Mo, W)

215-N. (German.) Kinetics of Precipitation Processes in Supersaturated Aluminum-Zinc Solid Solutions. Volkmar Gerold and Werner Schweitzer. Zeitschrift fur Metallkunde, v. 52, Jan. 1961, p. 76-85.

X-ray investigation using filtered Cu radiation to evaluate small-angle X-ray scattering in aging at 20-50° C. of 15-24.5% Zn containing cast, 450° C. annealed and cold rolled specimens, after quenching from 250-500° C. to room temperature. Mechanism and kinetics of precipitation. Determination of activation energy. (N7, M22g, 2-65, 3-68; Al-b, Zn, 14-67)

216-N. (Russian.) Growth of Metallic Single Crystal Under High Hydrostatic Pressure. L. F. Vereshchagin, Yu. N. Ryabinin, A. Ya. Preobrazhenskii and V. A. Stepanov. Doklady Akademii Nauk, SSSR, v. 135, Jan. 1960, p. 45-47.

Growth of cylindrical Al and Zn single crystals in argon and nitrogen atmosphere under 10,000 atm. pressure and with moving heat front at crystallization temperature. (N3r; Al, Zn)

217-N. (Russian.) Distribution and Form of Carbon in Molten Pig Iron. A. A. Bertman and A. M. Samarin. Doklady Akademii Nauk, SSSR, v. 134, Apr. 1960, p. 629-631.

Centrifuging of molten pig iron to investigate vertical distribution of C as a function of specimen length, rotational velocity and time of rotation. Determination of C particle size. 8 ref. (N8r)

218-N. (Russian.) The Autocatalytic Character of Martensite Transformation. O. P. Maksimova, N. P. Saboleva and E. I. Estrin. Doklady Akademii Nauk, SSSR, v. 134, Apr. 1960, p. 871-874.

Review of literature on martensite transformation in Fe-Ni-Mn and Fe-Cr-Ni, relating amount of martensite to cooling and heating. Investigation of martensite formation in Fe-Ni-Mn at -30 to -196° C. Relation of transformation rate to amount of martensite present before heating. (N8p; Fe-b, Ni, Mn)

219-N. (English.) The Mode of Precipitation in Aluminum-Magnesium Alloys. Shigeru Matsuo. National Research Institute for Metals, Transactions (Japan), v. 2, Feb. 1960, p. 84-88.

Microscopy and X-ray examination of continuous and discontinuous precipitation along grain boundaries and slip bands as a function of cold deformation and heat treatment in specimens containing 7-10% Mg, after solution treatment, aging at 170-250° C. and cold swaging. 8 ref. (N7, M-general, 2-64, 3-68; Mg-b)

220-N. (English.) Continuous Cooling Transformation Diagrams of Steels for Welding and Their Applications. Michio Inagaki and Horujiro Sekiguchi. National Research Institute for Metals, Transactions (Japan), v. 2, Feb. 1960, p. 102-122.

Compilation of CCT diagrams for high strength and mild steel specimens heated at rapid rates to 1350° C. Effect of continuous cooling on microstructure, hardness and other properties of the heat affected zone. Application to determination of weldability under various arc welding conditions and prediction of weldment strength as a function of alloy composition. 24 ref. (N8, K9s, Q-general, 2-60, 2-64; ST)

221-N. (German.) Measurement of Self-Diffusion of Cobalt-60 in Alpha-Iron. Werner Lange, Alfred Hassner and Erwin Dahn. Neue Hutte, v. 6, Jan. 1961, p. 33-44.

Thin foils of Armco-Fe are electrolytically coated with Fe-59 or Co-60 and annealed under protective Ar atmosphere at 746-905° C. Evaluation of diffusion parameters as influenced by temperature using the thin foil and absorption methods. Theoretical discussion of the two methods. (N1a; Fe-a)

222-N. (German.) Methods for Studying Aging of Carbon Steel. Friedrich Erdmann-Jesnitzer and Ralf Laschimke. Neue Hutte, v. 6, Jan. 1961, p. 44-52.

Brinell hardness, microhardness and warm hardness (testing temperature 25-250° C.) testing and X-ray investigation of 100-300° C. aged 5-15% cold tensile deformed basic Bessemer and openhearth unalloyed steel of similar composition to evaluate most significant testing method to reveal aging behavior. (N7a, Q29, M22g; CN)

223-N. (Russian.) Thermodynamic Method for Determination of the Conditions of Analysis of Gases in Metals and its Use for Development of Analytical Methods. Yu. A. Klyachko and E. M. Chistyakova. Zavodskaya Laboratoriya, Dec. 1960, p. 1335-1338.

Determination of the content of O, H and N in metallic Mn (up to 30% of Mn) with the aid of Ni, Cu and Fe baths with extraction of gases during vacuum melting. Equations are derived for displacement energy and molar temperature of displacement for binary alloys Mn-Cu, Mn-Ni and Mn-Fe. 8 ref. (N15d, P12, 1-54, S11r, 1-73; Mn, O, H, N)

224-N. (Polish.) Undercooled Austenite Transformation in Low Carbon Bainitic Steels During Continuous Cooling. W. Cias. Prace Instytutow Hutniczych, v. 12, May 1960, p. 223-237.

Metallographic and dilatometric study of Cr-Mo, Cr-Ni-Mo, Mn-Cr-Mo and Mn-Cr-Ni-Mo steels with boron additions. The bainitic-ferritic transformation and critical cross section as a function of cooling rate, time, temperature and composition. 16 ref. (N8f, M23b; CN-g)

225-N. (Russian.) Liquidus-Solidus Curves of the Tantalum-Vanadium System. V. N. Eremenko, L. A. Tretyachenko and R. I. Yahimovich. Zhurnal Neorganicheskoi Khimii, v. 5, Oct. 1960, p. 2290-2293.

Investigation of Ta-V alloys by X-ray, metallographic and microhardness measurements. Determination of melting temperature, lattice parameters and microhardness. (N12p, P12n, M26, Q29q; Ta-b, V-b)

226-N. Solidification of a Eutectic Made From Zone-Refined Lead and Tin. J. P. Chilton and W. C. Winegard. Institute of Metals, Journal, v. 89, Jan. 1961, p. 162-164.

Melt grown single crystals from high purity specimen alloys are examined by Laue back reflection X-ray method after unidirectional solidification to determine whether a eutectic made from pure material solidifies with a cellular interface and to observe the structure as a function of freezing rate. A lamellar eutectic is observed with the cellular interface growing only in the presence of an impurity. 15 ref. (N12q, 3-67, 3-69; Pb-b, Sn-b, 14-61)

227-N. The Diffusion Coefficient for Oxygen in Alpha-Zirconium. M. Davis, K. R. Montgomery and J. Standring. Institute of Metals, Journal, v. 89, Jan. 1961, p. 172-174.

Zr sheet specimens are exposed to gaseous O and O-bearing Na at 400-800° C. after vacuum heating for hydrogen removal. The diffusion coefficient for oxygen is determined by microhardness measurements. 5 ref. (N1, Q29q, R1h; Zr-a, O, 4-53)

228-N. Diffusion of Gold in Lead Single Crystals. A. Ascali. Institute of Metals, Journal, v. 89, Feb. 1961, p. 218-220.

Diffusion coefficients of Au in pure Pb single crystals are measured using radioactive-tracer method and sectioning technique during annealing at 94-325° C. Comparison with polycrystalline specimens in terms of grain-boundary diffusion taking place in the system above 106° C. The activation energy obtained for the diffusion 9.35 kg-cal. per mole is compared with that reported in the literature for self-diffusion in Pb, 28 kg-cal. per mole. 8 ref. (N1, 1-59; Pb, Au)

229-N. Eutectic Structure in Cast Iron. J. Rickard and I. C. H. Hughes. BCIRA Journal (British Cast Iron Research Assoc.), v. 9, Jan. 1961, p. 11-25.

Ledeburite solidifies with only moderate undercooling and recalescence and is nucleated at points on the mold/metal interface; the plate-like eutectic, which occurs much less frequently and only when nucleation of ledeburite is avoided, is accompanied by considerable undercooling and recalescence and is nucleated at various points throughout the melt. (N12; CI-p)

230-N. APM Alloys. R. J. Towner. Metals Engineering Quarterly (American Society for Metals), v. 1, Feb. 1961, p. 24-40.

Several aluminum powder metallurgy (APM) alloys developed for use in the temperature range 400-1000° F. The alloys are dispersion hardened by either oxide particles or particles of insoluble intermetallic compounds to give high strength and stability at these temperatures; in addition, certain combinations of alloying elements produce desirable resistance to corrosion in high-temperature water. Although a variety and complexity of APM products have been fabricated, the range of such products is restricted by the amount of oxide or alloying elements present in a particular alloy. 45 ref. (N7; Al-b)

231-N. Strengthening Low-Alloy Steels by Deforming Austenite. R. A. Grange and J. B. Mitchell. Metals Engineering Quarterly (American Society for Metals), v. 1, Feb. 1961, p. 41-53.

The change in microstructure as a result of plastically deforming austenite under circumstances which preclude recrystallization of the "hot cold worked" austenite prior to transformation. The greater strength of low-tempered martensite in hot cold worked steel is attributed primarily to what is a grain refinement due to the preferred alignment of the direction of principal deformation. 10 ref. (N8; AY)

232-N. Temperature Gradient-Hardness Technique for Determination of Recrystallization Temperature. J. M. Dhosi and M. B. Pierson. Watertown Arsenal Laboratories. U. S. Office of Technical Services, PB 161473, May 1960, 22 p. $.75.

A 6-7 in. bar of a titanium-base alloy is heated for a specific time in a specially designed gradient furnace and cooled. A hardness survey is then made along the bar and cross-plotted against the temperature gradient to which the bar has been subjected. The temperature at that point of the bar where hardness value falls off abruptly is designated as the recrystallization temperature. (N5, Q29; Ti-b)

233-N. The Effect of Plastic Strain Rate on Diffusion in Aluminum-Zinc Alloys. G. A. Bruggeman. Massachusetts Institute of Technology (Wright Air Development Division). U. S. Office of Technical Services, PB 161884, Apr. 1960, 51 p. $1.50.

Effect of plastic strain rate on diffusion in Al-Zn alloys shows that strain rate has only a minor effect on the self-diffusion of Zn in the alloy, but that the effect is larger at lower temperatures and higher strain rates. (N1d, 3-68; Al-b, Zn)

234-N. Research and Development on the Effects of High Pressure and Temperature on Various Elements and Binary Alloys. J. S. Harvey. Manufacturing Laboratories, Inc. (Wright Air Development Division). U. S. Office of Technical Services, PB 161920, Apr. 1960, 99 p. $2.25.

High-pressure, high-temperature device capable of subjecting alloys used in high-pressure aircraft fabrication to 100,000 atm. pressure at temperatures above 1500° C. With this apparatus, high hydrostatic pressure is used to lower the temperature of martensitic transformations in Fe-Ni alloys and expand the temperature range of the gamma loop in the Fe-Cr system. The precipitation hardening process in both Al-Cu and Cu-Be alloys is significantly restrained and modified when carried out at high hydrostatic pressure produced by the device. (N8p, J27, 2-61, 3-74; Cu-b, Fe-b)

235-N. (German.) Diffusion in the Tin-Lead Alloy System. H. Cordes. Zeitschrift fur Anorgansiche und Allgemeine Chemie, v. 306, Oct. 1960, p. 121-132.

Measurement of diffusion coefficients in vacuum degassed Sn-Pb specimens (0-87% Sn) of different composition at 155-181° C. under vacuum. Representation of results in terms of concentration-diffusion path diagrams. Influence of temperature and concentration on diffusion coefficient. Reaction mechanism. (N1; Sn-b, Pb-b)

236-N. Layer Growth During Interdiffusion in the Aluminum-Uranium Alloy System. L. S. Castleman. Journal of Nuclear Materials, v. 3, Jan. 1961, p. 1-15.

Interdiffusion in the Al-U system is investigated as a function of annealing time and temperature and applied pressure. Determination of layer thickness and growth mechanisms, phase solubility diagram and the nature and distribution of structural defects at 400-600° C. and pressure of 1 1/4-10 tsi. for diffusion times of 24 hr. or less. 15 ref. (N1c, N1e, 2-64, 3-74; Al-b, U-b)

237-N. Some Aspects of the Growth of Diffusion Layers in Binary Systems. G. V. Kidson. Journal of Nuclear Materials, v. 3, Jan. 1961, p. 21-29.

Application of Fick's First Law to polyphase diffusion in binary systems to derive rigorous expressions for the interface positions as functions of time and temperature. Systems of two and three phases are treated and the results generalized to an n-phase system with some aspects of the temperature behavior of the rate constants. 11 ref. (N1, M24b, 2-61, 3-67)

238-N. Self-Diffusion in Beta Uranium. S. J. Rathmann, J. Gray, Jr., J. P. Hughes and A. L. Harkness. Journal of Nuclear Materials, v. 3, Jan. 1961, p. 72-76.

Autoradiographic examination of self-diffusion in cylindrical specimens, using vacuum deposited U-235 as the radioactive tracer with annealing at 678.0-760.0° C. Diffusion coefficients are plotted by an Arrhenius-type equation and self-diffusion is determined as a function of grain boundary and anisotropic volume diffusion. 11 ref. (N1d, M23q, M23r, 1-59; U)

239-N. The Diffusion of Gold in Gamma Uranium. S. J. Rothman. Journal of Nuclear Materials, v. 3, Jan. 1961, p. 77-80.

The diffusion of Au in gamma uranium is measured using a radioactive tracer and the sectioning technique. The values of D_o and the activation energy are 4.86×10^{-3} cm^2 per sec. and 30 400 cal. per mol respectively, fairly close to the values for self-diffusion in gamma uranium. 12 ref. (N1; U, Au)

240-N. The Recrystallization of Uranium During Cold or Hot Forging. J. A. Sabato and R. W. Cahn. Journal of Nuclear Materials, v. 3, Jan. 1961, p. 115-119.

Polygonization, nucleation and recrystallization mechanisms in uranium billet specimens deformed under controlled impact after 550° annealing and subsequent quenching are examined by macro and microhardness measurements and micrographic and X-ray back reflection methods. Banded and fine, inhomogenous equiaxed structure are observed as a function of recrystallization occurring before and after annealing. (N2, N5, F22, 2-64; U)

241-N. (Russian.) Polymorphic Transformations of Chromium in Cr-Ta Alloys. A. T. Grigor'ev, E. M. Sokolodvskaya, M. B. Maksimova, I. G. Sokolova and Nedumov. Zhurnal Neorganicheskoi Khimii, v. 5, Nov. 1960, p. 2640-2642.

Constitutional diagram of Cr-Ta (0.2-12%) heat treated at 1350-1750° C. Microscopic, X-ray, thermal analysis and hardness measurements reveal types of phases originating because of Cr modifications and eutectic transformations occurring at 1490, 1150, 950 and 775° C. 5 ref. (N-general, M24b; Cr-b, Ta)

242-N. (Russian.) Structure and Thermal Expansion of Delta and Eta Plutonium. S. T. Konobeevskii and N. T. Chebotarev. Atomnaya Energiya, v. 10, Jan. 1961, p. 50-57.

Structural changes occurring during allotropic transformations including epsilon-eta and eta-delta in Pu are studied in terms of the concept of increasing covalent bonding as a result of temperature decrease. 8 ref. (N6p, M27, P11g; Pu)

243-N. (Spanish.) Relation Between Substructures of Segregation and Dislocations Formed During Solidification in 99.99% Aluminum. Heraldo Biloni. Comision Nacional de Energia Atomica, no. 46, 1960, p. 1-11.

Study of segregation substructures and of macrosegregation substructures in casting polycrystals of 99.99% Al using thin surface layers and corrosion figures. Relation of impurity-dislocation interaction with segregation areas. 20 ref. (N12, M26b, M28k, 3-69, 9-69; Al)

244-N. (German.) Influence of Vibrations Causing Minor Stress on the Aging of Aluminum Alloys. A. T. Balewsky, R. H. Nikolov, W. R. Draganov and D. T. Butschkov. Comptes Rendus de l'Academie Bulgare des Sciences, v. 13, July-Aug. 1960, p. 443-446.

Samples are held at 500° C. for 4 hr., quenched to 60° C. in warm water, exposed to cyclic loads of 0.25-0.8 kg. per sq. mm. at a frequency of 6000 per min. and hardness tested at regular time intervals to study the influence of vibrating on the aging process. Effect of annealing at 165-175° C. for 14-40 hr. subsequent to vibrating. (N7a, 2-64, 3-66; Al-b)

245-N. (Japanese.) Tempering Process in Gamma-Type Heat-Resisting Alloys. Pt. 1. Change in Physical Properties During Tempering of Gamma Fe-Co-Cr-Ni Base Heat Resisting Alloy, LCN-155. Yunoshin Imai and Tsuyoshi Masumoto. Tetsu-to-Hagane (Iron & Steel Institute of Japan, Journal), v. 47, Feb. 1961, p. 139-145.

Kinetics of the tempering process and effects of solution treatment temperatures and of additional elements C, N, Mo, W and Cb on the process are investigated by dilation, specific heat, electrical resistance and hardness measurements on specimens after various water quenching, annealing and tempering treatments at 20-130° C. 22 ref. (N7d, 2-60; Fe-b, Co, Cr, Ni)

246-N. (Japanese.) Aging Behavior of Be-Cu Alloys Containing Ni With Special Emphasis on Its Relation to Solution Treatment and Cold Working. Osamu Tzumi and Hiroshi Fukuda. Japan Institute of Metals, Journal, v. 25, Jan. 1961, p. 15-19.

The effects of the temperature of solution treatment (700-850°) and of cold rolling prior to aging treatment (30 and 80% reduction) on the aging curve and age hardening characteristics of 0.5-1.1% Be-Cu alloys, containing a small amount of Ni, between 150 and 550° C. are investigated by hardness measurement and microstructural analysis. 17 ref. (N7a, J27, M27, 2-61, 2-64, 3-68; Cu-b, Be, Ni)

247-N. (Japanese.) Epsilon-Phase Transformation in Solution Treated and Heated Hadfield Steel. Yunoshin Imai and Toshio Saito. Japan Institute of Metals, Journal, v. 25, Jan. 1961, p. 57-60.

Effect of isothermal heating at 400-700° C. on grain boundary carbide and pearlitic constituent precipitation and consequent epsilon formation from the gamma phase is examined in solution treated specimens by dilatometry and X-ray diffraction methods. 19 ref. (N7, N8, M-general, 2-64; ST)

248-N. (Japanese.) Phase Translation in Isothermally Heated Hadfield Steel at 500° C. After Solution Treatment. Yunoshin Imai and Toshio Saito. Japan Institute of Metals, Journal, v. 25, Jan. 1961, p. 61-65.

Dilatometric and magnetic examination of gamma to carbide phase transformations with transitions through alpha and epsilon phases. 16 ref. (N7, N8, M-general, 2-64; ST)

249-N. (Japanese.) Aging Characteristics of Some Copper-Beryllium Alloys in Relation to Cold Working Prior to Aging Treatment. Osamu Izumi and Hiroshi Fukuda. Japan Institute of Metals, Journal, v. 25, Jan. 1961, p. 84-87.

Electrical resistivity, Young's modulus, Vickers hardness and elastic anisotropy measurements on cold rolled specimens of binary alloys containing 0.6-1.8% Be and ternary alloys containing in addition 0.3% Co after aging at 150-550° C. for various times. Influence of cold rolling, composition and recovery, over-aging and recrystallization mechanisms on the aging process. 19 ref. (N7a, N-general, P15g, Q-general, 2-60, 2-64, 3-68; Cu-b, Be, Co)

250-N. (French.) Transformations in High-Speed Steels. Jean Papier and Andre-Henri Michel. Memoires Scientifiques, v. 57, Dec. 1960, p. 901-908.

Influence of the presence of bainite or martensite on the transformation of residual austenite during heating at elevated temperatures of 18-4-0 steel and 18-4-2 and 18-4-1 steel with 1.7% Si. 8 ref. (N8, 2-62; TS-m)

251-N. (French.) Solidification Nuclei Studied by Granule Method. Claude Mascre, Aleth Touguet and Michel Drouzy. Memoires Scientifiques, v. 57, Dec. 1960, p. 909-922.

Thermal analysis of granules for the identification of solidification nuclei in pure Al and after addition of Cu, Zn, Fe, Si and Ti. Effect of undercooling and heating on the nuclei. 17 ref. (N2, N12, M23r, 2-61; Al-b)

252-N. (French.) Diffusion and Solubility of Hydrogen in Metals. Walter Eichenauer. Memoires Scientifiques, v. 57, Dec. 1960, p. 943-948.

Determination of H diffusion and solubility coefficients by measuring the degassing rate of Al, Cu, Ag, alpha Fe and Ni metal specimens after exposure to H, liquid H and, in the case of Ni, also to deuterium. 25 ref. (N1, P12e; Al, Ag, Cu, Fe-a, Ni, H)

253-N. (French.) Tempering of Quenched High-Speed Steel. J. Papier, G. Pomey and A. H. Michel. Memoires Scientifiques, v. 57, Dec. 1960, p. 949-971.

Four stages found above 500° C. after tempering of high-speed steel in either the differential dilatometer or in the thermomagnometer and their correspondence to magnetic expansion and contraction. Relation between the extent of these properties and the composition of the matrix obtained by austenitization. 36 ref. (N8a, 2-62; TS-m)

254-N. Tilt Boundary Motion in Zinc Produced by Static and Dynamic Shear Stress. T. Vreeland, Jr. Acta Metallurgica, v. 9, Feb. 1961, p. 112-116.

Crystals grown from 99.999+ Zn and zone refined Zn are subjected to static and dynamic stress. Tilt boundary motion and velocity is increased in zone refined Zn, the increased purity resulting in reduced impurity pinning and dislocation density. The stress required to initiate boundary motion is 100 times greater in the dynamic test than required in the static test. 3 ref. (N3, M26c, Q24, 2-60, 3-66; Zn-a, 14-61)

255-N. The Generalized Theory of the Martensitic Cubic to Orthorhombic Phase Transformation. M. S. Wechsler and H. M. Otte. Acta Metallurgica, v. 9, Feb. 1961, p. 117-124.

The crystallographic theory of the martensitic cubic-orthorhombic phase transformation is described in terms of a generalized lattice invariant shear. Solutions for the undistorted plane are given as explicit functions of the lattice parameters of the two phases and a possible isotropic dilatation with conditions for the existence of a solution and the criteria for the degeneracy of solutions. 15 ref. (N6q, M26)

256-N. Dislocation Configurations in $AuCu_3$ and AuCu Type Superlattices. M. J. Marcinkowski, N. Brown and R. M. Fisher. Acta Metallurgica, v. 9, Feb. 1961, p. 129-137.

Superlattice dislocations consisting of two pairs of partial dislocations held together by an antiphase domain boundary are observed by transmission electron microscopy techniques on thin films of $AuCu_3$. The separation between the pairs is measured to be about 130 Å. A theoretical calculation is made of the expected spacing, involving stacking fault, antiphase domain boundary and elastic interaction energies between the individual dislocations. 12 ref. (N10, M21e, M26b; Au-b, Cu-b, 14-62)

257-N. X-Ray Study of Aged Au-Ni Alloys. J. M. Sivertsen and R. C. Sundahl. Acta Metallurgica, v. 9, Feb. 1961, p. 162-163.

Measurement of the diffraction peak during aging of 34% Ni-Au specimens at 150° for 130 hr. after solution treatment and quenching from 850° C. and after various annealing treatments. Stacking fault formation, short range ordering and quenched-in vacancy migration and coalescence are observed during the aging process with little evidence of clustering. 7 ref. (N7a, N-general, M22g, 2-65; Au-b, Ni)

258-N. Morphology of Martensite. P. M. Kelly and J. Nutting. Iron and Steel Institute, Journal, v. 197, Mar. 1961, p. 199-211.

Transmission electron microscopy of the martensite formed in plain carbon steel, 20 Ni-0.8 carbon alloy steel and 18-8 stainless steel, in particular plate shaped grains containing numerous narrow twins and single crystal needles without internal twinning, as produced by quenching. Review of factors governing changes in martensite morphology, relationship between mechanical properties and morphology of tempered and untempered martensite and the mechanism of stabilization of austenite. 42 ref. (N8p, M-general, 2-64; ST)

259-N. Effect of Up-Quenching on the Kinetics of Bainite Formation. J. S. White and W. S. Owen. Iron and Steel Institute, Journal, v. 197, Mar. 1961, p. 241-243.

Effect of holding austenitized plain carbon eutectoid steel at 258° C. on the rate of subsequent isothermal transformation temperature with the rate at equivalent stage of the direct transformation of austenite. Differences in reaction in upper and lower bainite range. 12 ref. (N8m, 2-64; CN)

260-N. (Ukrainian.) Carbide Phase in High-Silicon Cast Iron. Ya. N. Malinochka and G. Z. Koval'chuk. Dopovidi Akademii Nauk Ukrainskoi RSR, Jan. 1961, p. 25-28.

Metallographic examination of synthetic Fe-C-Si alloys containing about 6% Si showing that crystals of eutectic and hypereutectoid carbides represent a mixture of two phases, easily revealed by etching. 9 ref. (N8r, M-general; Fe-b, Si, C)

261-N. (Translation-Brutcher no. 4653.) Effect of Temperature on Recovery and on Plasticity of Hardened Steel. S. S. Shurakov. Metallovedenie i Termicheskaya Obrabotka Metallov, July 1959, p. 10-15.

New data on effect of temperature at which recovery takes place in hardened low-carbon steels and alloy ferrite. Experimental procedure; results obtained on 0.12% C, 2 Cr, 4 Ni steel and 0.04% C, 7.2% Cr, balance Fe composition. (N4, Q23p, 2-61; CN-g, SS-d)

262-N. (Translation-Brutcher no. 4658.) Effect of Temperature of Austenitizing and Undercooling in Cycle Annealing on the Retained Austenite Content of Alloy Steels. E. S. Tovpenets and F. I. Ivanov. Metallovedenie i Termicheskaya Obrabotka Metallov, July 1959, p. 50-57.

Relationship between quantity of retained austenite and cyclic cooling treatment of hot worked steel to avoid flakiness. Cyclic annealing and quenching procedures and their results. Relation between steel composition and cyclic annealing conditions and amount and stability of retained austenite; effect of longer tempering times or repeated tempering at 650° C. (N8n; AY)

263-N. (Translation-Brutcher no. 4659.) Austenite Transformation in Continuous Cooling of Some Constructional Steels Used for Massive Components. M. P. Braun. Metallovedenie i Termicheskaya Obrabotka Metallov, July 1959, p. 58-60.

Correspondence between isothermal and thermokinetic (continuous cooling) diagrams and their usefulness for heat treatments. Differential optical dilatometer measurements for the construction of diagrams for large steel parts. (N8f; ST, SGB-s)

264-N. (Polish.) Magnetic Determination of Martensite in 18-8 Steel Type. T. Malkiewicz, J. Karp and A. Mazur. Hutnik, v. 27, Oct. 1960, p. 372-376.

Magnetic testing of martensite in steels with 7.27-8.93% Ni and 18% Cr and Armco iron of 100% ferromagnetic phase. Results of tensile stressing at room temperature and in liquid nitrogen show that deformation influences martensitic transformation to a greater degree than does lowering of the temperature. 11 ref. (N8p, M23a, 2-63, 3-68; Fe-a, SS)

265-N. Physical Metallurgy of Refractory Metals (Effects of Alloying Elements on Niobium-Zinc Coatings for Niobium). G. Sondoz and R. L. Newbegin. Report of NRL (Naval Research Laboratory) Progress, Mar. 1961, p. 31-32. (Available as PB 171316 from U. S. Office of Technical Services, Washington 25, D. C.) $1.25.

Cb specimens are tested at 1800° F. for 1000 hr. after dipping in Zn melts containing 3.0-6.8% Ni and 0.08-1.10% Al to determine the influence of the alloying elements on the oxidation resistance and healing ability of the Cb-Zn protective coating formed. (N15g, R1h, 2-61; Cb-b, Zn)

266-N. Physical Metallurgy of Refractory Metals (Kinetics of Formation of Niobium-Zinc Compounds on Niobium in Zinc Vapor). T. C. Lupton. Report of NRL (Naval Research Laboratory) Progress, Mar. 1961, p. 33-34. (Available as PB 171316 from U. S. Office of Technical Services, Washington 25, D. C.) $1.25.

Effect of the temperatures of the Zn source and of the Cb base metal being coated on the formation of unwanted $CbZn_2$ coatings. Thickness, composition and formation mechanism of the coatings are examined metallographically. (N15g, 2-61; Cb-b, Zn)

267-N. (Pamphlet.) The Role of Crystal Structure in Diffusion. Pt. 1. Diffusion Paths in Closest-Packed Crystals. Leonid V. Azaroff. Illinois Institute of Technology Research Report no. AFOSR TN60-1353. Dec. 1, 1960, 16 p. (Available from ASTIA, Document Service Center, Arlington Hall Station, Arlington 12, Va.)

Study of hexagonal and cubic closest packings in simple binary compounds to determine specific diffusion paths. Results suggest that voidal diffusion takes place without defect formation in some compounds while metal atoms block paths in others, indicating that vacancy or interstitial mechanisms account for diffusion. 13 ref. (N1, M26s)

268-N. (English.) Diffusion of Cobalt and Silver in Ordered and Disordered CuZn. S. Pace, C. Bassani and P. Camagni. Nuovo Cimento, v. 19, Feb. 1961, p. 393-395.

The conventional annealing-sectioning technique is used to study the atomic diffusion of Co and Ag in beta brass at 320-700° C. using pile-activated isotopes Co^{60} and Ag^{110} which are deposited electrolytically onto the end surface of cylindrical specimens. Diffusion coefficients of the two impurities are determined and compared with self diffusion. (N1, N10, M20n, 1-59, 3-69; Cu-n, Ag, Co)

269-N. (Japanese.) The Ms Points of Binary Titanium Alloys. Tomo-o Sato and Yen-chien Huang. Nagoya Institute of Technology, Bulletin, Dec. 1960, p. 1-5.

The temperatures at which the martensite transformation from beta solid solution to alpha prime supersaturated solid solution takes place are measured as a function of the concentration of alloying elements in titanium base binary alloys of 15 systems, Mo, V, Cb, Fe, Mn, Cr, Co, Ni, Cu, Pb, Bi, Pt, Ag, Al and Sn. Thermal analysis and electromagnetic oscillograph data are given for time and temperature curves. 12 ref. (N6q, M23r, 2-60; Ti-b)

270-N. (German.) Influence of Specimen Size on Age Hardening of an Aluminum Alloy With 3.5% Cu. Herbert Richter and Peter Wincierz. Zeitschrift fur Metallkunde, v. 52, Feb. 1961, p. 101-106.

Hardness measurements and X-ray investigation of internal stresses for quenched rod and wire specimens of 0.2-15 mm. thickness and subsequent examination of aging kinetics at 20 and 150° C. by electrical resistance measurements. (N7a, Q29, P15g; Al-b, Cu, 4)

271-N. (German.) Transformation Characteristics of Titanium-Molybdenum Alloys. Karl Dungardt and Klaus Rudinger. Zeitschrift fur Metallkunde, v. 52, Feb. 1961, p. 120-135.

Investigation of phase transformations in TiMo alloys containing 2.27-8.57% Mo during isothermal annealing at 400-850° C. by dilatometric measurements during continuous cooling by Debey-Scherrer X-ray analysis (Cu-K-alpha radiation) and by electrical resistance and modulus of elasticity measurements. (N7c, M23b, S11p; Ti-b, Mo)

272-N. (English.) Recrystallization of Stretched Iron Single Crystal Plates. Shoso Dohi. Hiroshima University, Journal of Science, Series A, v. 24, Oct. 1960, p. 313-325.

X-ray photographic examination of the effect of stretching and annealing at 700-900° C. on microstructure and crystallographic orientation. (N5, M26c, M27, 2-64, 3-68; Fe, 14-61)

273-N. (English.) Ribbon-Like Crystals of Selenium Grown From Vapor. Noboru Furuta. Hiroshima University, Journal of Science, Series A, v. 24, Oct. 1960, p. 327-337.

Relation between outer shape and ratio of supersaturation in the vapor phase and effect of illumination and temperature on shape and growth rate are observed with optical and electron microscopes and by electron diffraction. (N12g, M-general, 2-61; Se)

274-N. (French.) Detection of Zinc Diffusion Into Tin Coatings on Brass. S. C. Britton and M. Clarcke. Galvano, v. 30, Jan. 1961, p. 25-26.

Estimation of Zn diffusion by measurements of corrosion potential differences in 0.001% NaCl solutions. (N1, L17c; Cu-n, Sn, Zn, 8-62)

275-N. The Effect of Pressure on the Age-Hardening Characteristics of a Copper-Beryllium-Nickel Alloy. V. A. Phillips. Acta Metallurgica, v. 9, Mar. 1961, p. 216-224.

The effect of pressure during aging at 390° C. and solution treatment at 825° C. on the optical microstructure and microhardness of a commercial Cu-2.1% Be-0.4% Ni alloy. The application of 69-75 k-atm. pressure reduces the growth rate of precipitates nodules, reduces the solubility of Be in Cu and gives an unusually fine-grained structure due to the inhibition of grain growth. 9 ref. (N7a, N3, 3-74; Cu-b, Be, Ni)

276-N. (English.) The Influence of Heat Treatment on the Strain Aging of Aluminum-Killed Mild Steel. P. Szeki. Acta Technica Academiae Scientiarum Hungaricae, v. 32, Jan-Feb. 1961, p. 141-148.

Mild steel containing 0.008-0.049% Al is austenized for 15 min. at 930° C., quenched in an 8% NaOH solution, tempered at 600-680° C. for 3 hr. and allowed to cool in air. After 10% stretching, notched samples are machined, artificially aged at 250° C. for 1 hr. and impact tested at -60 to 20° C. Effects of tempering range and Al content on stress aging. (N7e, 2-64; CN)

277-N. (Japanese.) Substructure Hardening Effect on Aluminum and Aluminum Manganese Alloy. Asada Hiroshi and Koike Kichizo. Light Metals, v. 11, Jan. 1961, p. 35-42.

Substructures formed within the grain of polycrystalline Al and Al-0.52% Mn specimens by prestrain-annealing treatment at 400-500° C. and the hardening due to the presence of substructures is investigated by metallographic and X-ray back reflection methods. Data are given for work hardening capacity and stress-strain load elongation relations. (N7e, M27, M-general; Al-b, Mn)

278-N. (English.) Direct Observation of Subgrain-Growth of Cold Worked Aluminum by Means of Electron Microscopy. Hiroshi Fujita. Physical Society of Japan, Journal, v. 16, Mar. 1961, p. 397-406.

Observations of growth mechanisms are used to support a theory of recrystallization. 7 ref. (N3, M21e; Al)

279-N. (English.) Diffusion of Cobalt Into Silver. Tokutaro Hirone and Hisao Yamamoto. Physical Society of Japan, Journal, v. 16, Mar. 1961, p. 455-458.

Diffusion coefficient is measured as a function of temperature from 745-943° C. by tracer and lathe-sectioning techniques. (N1a; Ag-b, Co)

280-N. (French.) Micrographic Observation of the Structure of a Mg-0.6% Zr Alloy, Heated in Hydrogen. P. Lelong, J. Dosdat, J. Boghen and J. Herenguel. Journal of Nuclear Materials, v. 3, Feb. 1961, p. 222-234.

The structure of a Mg-0.6% weight Zr alloy after heating in hydrogen at 500-600° C. is studied with the optical and electron microscopes. Effect of H diffusion on Zr precipitation and grain boundary anchoring, leading to blocked microstructure and precipitation hardening. 20 ref. (N-general, M-general, Q21s, 2-64; Mg-b, Zr, H)

281-N. Estimating Critical Ranges in Heat Treatment of Steels. R. A. Grange. Metal Progress, v. 79, Apr. 1961, p. 73.

Formulas are proposed for calculating the upper and lower critical temperatures from the chemical compositions of medium carbon and low-alloy steels. Mean deviations of measured values from calculated values are between 5 and 6%. (N8, 2-60, CN, AY)

282-N. (German.) Investigation of Age-Hardenable Aluminum Alloys by Electrical

Resistance Measurements. A. Ersumer. Metall, v. 15, Mar. 1961, p. 219-220.

Measurement of electrical resistance of thin Al-Cu alloy wires on heating to 520° C., slow cooling, homogenizing, water quenching to 20° C. and subsequent aging at temperatures from 20-200° C. to determine age hardening characteristics. (N7a, P15g, 2-65; Al-b, 4-61)

283-N. (German.) Investigation of Voids and Phase Separation in the Copper-Nickel System by Electrical Resistance Measurements. Wolfgang Schule and Hans-Peter Kehrer. Zeitschrift fur Metallkunde, v. 52, Mar. 1961, p. 168-179.

Resistance measurement for temperatures from 20-1000° C. on wire (0.4 mm. diameter, 60% deformed) and foil (0.1-0.2 mm. thick, 90% deformed) specimens of 40-80 at.% Cu containing CuNi alloy after annealing (20-1000° C.) and quenching. Detection of voids; activation energy of void migration; state of order and phase separation of alloy. (N-general, M24b, P15g; Cu-b, Ni-b)

284-N. (German.) Formation of an Intermediate Phase in the Aging of Copper-Beryllium Alloys. Rudolf Reinbach and Ursula Wilke-Dorfurt. Zeitschrift fur Metallkunde, v. 52, Mar. 1961, p. 186-188.

Aging of Cu-Be alloy specimens, containing 1.45-2.03% Be at 250-400° C. for varying times with subsequent microscopic and microhardness measurements for investigating the formation of an intermediate phase in precipitation of the equilibrium phase from the supersaturated solid solution. (N7, M-general, 2-65; Cu-b, Be)

285-N. (Russian.) Hydrogen Diffusion in Steel Semi-Products. D. Ya. Povolotskii. Izvestiya Vuz Chernaya Metallurgiya, Oct. 1960, p. 79-83.

Investigation of the process of hydrogen liberation during annealing of steel blooms at 660-700° C. The amount of liberated hydrogen is determined to be in direct proportion with the diffusion coefficient and in reverse proportion with the cross section area. 9 ref. (N15d, N1, 2-64; ST, H)

286-N. (Russian.) Austenite Stability During Heating of Deformed Steel. Yu. A. Sysuev and V. G. Myasnikov. Izvestiya Vuz Chernaya Metallurgiya, Oct. 1960, p. 122-125.

Austenite decomposition of deformed Cr and Mn steel powders at 100-600° C. Phase composition and magnetization changes as influenced by deformation and temperature. 6 ref. (N8, H11p, 2-62, 3-68; AY, 6-68)

287-N. The Austenite Solidus and Revised Iron-Carbon Diagram. M. G. Benz and J. F. Elliott. Metallurgical Society of AIME, Transactions, v. 221, Apr. 1961, p. 323-331.

The austenite solidus of the Fe-C system is determined using a series of diffusion couples consisting of a specimen of austenite held in contact with a melt saturated with austenite. The solidus is found to be a straight line as a function of temperature and carbon content. Test data are used to construct a revised Fe-C temperature-composition diagram. 34 ref. (N8, M24b, 2-60, 2-61; Fe-b, C)

288-N. Fluid Flow Control During Solidification. Pt. 1. Magnetic Stirring in the Plane of the Solid-Liquid Interface. W. C. Johnston and W. A. Tiller. Metallurgical Society of AIME, Transactions, v. 221, Apr. 1961, p. 331-336.

Single pass zone-melting experiments on Pb-Sn alloys in which the liquid is caused to rotate in the plane of the solid-liquid interface due to the influence of a magnetic field. Determination of the variation of the diffusion boundary layer thickness with field strength. 10 ref. (N12, C28k, 1-69; Pb, Sn)

289-N. The Effect of Orientation on the Recrystallization Kinetics of Cold Rolled Single Crystals. W. R. Hibbard, Jr., and W. R. Tully. Metallurgical Society of AIME, Transactions, v. 221, Apr. 1961, p. 336-343.

Single crystals of Cu and Si-Fe are cold rolled in orientations chosen to produce individually the major component of the polycrystalline deformation texture. The orientation dependence of the recrystallization kinetics is studied relative to the primary recrystallization textures as effected by the interaction of adjacent crystals during the deformation. 21 ref. (N5, M26c, 3-68, 3-72; Cu, Fe-b, Si, 14-61)

290-N. The Determination of the Eutectic Composition by the Zone-Melting Method.

A. S. Yue and J. B. Clark. Metallurgical Society of AIME, Transactions, v. 221, Apr. 1961, p. 383-389.

Application of the segregation principle of the zone-melting technique for determination of the eutectic composition of a simple system, Mg-Al, in which the eutectic composition is known and in a complex ternary system, Mg-Al-Zn, in which the literature is uncertain as to the composition of the ternary eutectic. 9 ref. (N9n, C28k, M24c, 2-60; Mg-b, Al, Zn)

291-N. Comparison of Dispersion Hardening in Four Silver-Base Alloys of Equivalent Composition. J. Gurland. Metallurgical Society of AIME, Transactions, v. 221, Apr. 1961, p. 407-408.

Effect of 15% of either W, Mo, WC or Ni second-phase additions on the strength of composite alloys with a common matrix in which the second phase is distributed randomly is investigated by mechanical properties and fracture-deformation mechanisms. (N7a, Q-general, 2-60; Ag-b, Ni, Mo, W-b, 6-72)

292-N. On Secondary Recrystallization in High-Purity Alpha Iron. C. G. Dunn and J. L. Walter. Metallurgical Society of AIME, Transactions, v. 221, Apr. 1961, p. 413-414.

Recrystallization microstructure for cold rolled 99.99% Fe strip after isothermal annealing in dry hydrogen at 875° C. Annealing twins, grain boundaries and interfaces and grain size and shape effects are observed as a function of specimen thickness and impurity relations. 10 ref. (N5h, M27, 2-64, 3-69, 3-73; Fe-a)

293-N. Surface Graphitization of a Hypereutectoid Iron-Carbon Alloy. G. R. Speich. Metallurgical Society of AIME, Transactions, v. 221, Apr. 1961, p. 417-419.

Effect of austenitization temperature and austenite orientation on surface graphite formation in a 0.88% carbon steel heat treated at 1100° C. is examined by hot stage microscopy and electron diffraction. 10 ref. (N8s, M-general, 2-64, 3-72; CN)

294-N. (Translation-Brutcher no. 5111.) Crystallization of Steel Under Mechanical Pressure. B. B. Gulyaev. Liteinoe Proizvodstvo, Dec. 1960, p. 33-34.

Effect of vibration and pressure on the density, strength and toughness of carbon steels. (N12, P10a, Q27a, Q23r; CN)

295-N. (German.) Hydrogen Permeability, Absorption and Effusion of Worked and Nonworked Electrolytic Nickel at Room Temperature. Friedrich Erdmann-Jesnitzer. Bergakademie, v. 13, Jan. 1961, p. 8-16.

Measurement of hydrogen permeability in cathodic charging of 0.3 mm. thick cold rolled Ni sheet specimens and measurement of hydrogen release of saturated Ni cylinders during aging at room temperature and during bulging. (N15d, P10m, P13d; Ni, H)

296-N. (German.) Vacuum Evaporation. D. Hacman. Schweizer Archiv, v. 27, Feb. 1961, p. 62-66.

Design and operation of a high-vacuum plant for evaporation of metals including Al, Cu, Au, Fe, Ni, Mo, W, Ta, V, U, Zr, Pt and Th. Use of evaporated metal films in optical (visible and invisible spectrum range) and electrical engineering, in electronics and semiconductor technology. (N16n, 1-52; Al, Cu, Au, Fe, Ni, Mo, W, Ta, V, U, Zr, Pt, Th)

297-N. (Japanese.) Influence of Added Chromium, Vanadium, Tungsten or Boron on the S-Curve in Molybdenum Copper Cast Iron. Youichi Tokunaga. Imono (Japan Foundrymen's Society, Journal), v. 33, Jan. 1961, p. 18-23.

S-curves of 0.5% Mo-1.4% Cu cast iron containing about 0.2% or 0.5% of Cr, V, W and 0.01% of B are determined through metallographic examination and measurements of expansion time curves. Effect of alloying elements and austenizing treatments on pearlite and bainite transformations. 16 ref. (N8g, 2-60; CI, Cr, V, W, B, Cu, Mo)

298-N. (Japanese.) Nonequilibrium Segregation Due to the Beta and Alpha Phase. Transformation in Nickel-Aluminum Bronze Casting. Shoji Ueda and Masato Zama. Imono (Japan Foundrymen's Society, Journal), v. 33, Jan. 1961, p. 35-40.

Relation of alpha phase nucleation rate and cooling rate on diffusion mechanisms during the beta-alpha transformation with consequent nonequilibrium solid

solution formation and segregation during solidification is studied for bronze castings containing 8.70-9.82% Al, 4.60-4.90% Ni and 5.08-5.28% Fe. 11 ref. (N12, N-general, E25n, 9-69; Cu-s, Al, Ni, Fe)

299-N. (German.) Surface Martensite and Plastic Deformation. A. Masin and O. Bakalikova. Czechoslovak Journal of Physics, v. 11, Feb. 1961, p. 144-149.

Microscopic investigation of change of austenite grain containing surface martensite during plastic deformation by tensile stressing of 27.5% Ni, 18.3% Co-containing steel specimens. Shifting of surface martensite particles during elongation of crystal. (N8p; ST, Co, Ni, 4-53)

300-N. (Italian.) Influence of the Addition of Nickel on Austenitic Manganese Steel. Giuseppe Violi. Fonderia Italiana, v. 10, Jan. 1961, p. 5-10.

Metallography of austenitic Mn steel. Influence of Si, S, P, Cr, H and Ni on mechanical and structural properties. (N8, 2-60; SS-e)

301-N. The Kinetics of Impurity Precipitation on Dislocations. Small Drift Theory. R. Bullough and R. C. Newman. Philosophical Magazine, v. 6, Mar. 1961, p. 403-417.

A perturbation solution of the differential equation controlling the migration of impurity atoms to a dislocation is given and boundary conditions are derived appropriate to precipitation on the dislocation. Numerical results within the range of validity of the analysis are obtained for aging of carbon and nitrogen in Fe. 11 ref. (N3, N7, M26b, 3-69; Fe)

302-N. The Formation of Short Range Order in Quenched Gold-Copper Alloys. B. M. Korevaar. Acta Metallurgica, v. 9, Apr. 1961, p. 297-303.

The effect of quenching and annealing on the short range order-induced resistivity of five Au-Cu alloys with 1.5-25.4 at.% Cu is determined as a function of the movement of lattice defects and single vacancies during annealing. 11 ref. (N10, M26s, P15g, 2-64; Au-b, Cu)

303-N. Energy Changes and Kinetics of Isothermal Ordering in Au_3Cu. F. M. d'Heurle and P. Gordon. Acta Metallurgica, v. 9, Apr. 1961, p. 304-314.

Microcalorimetry at 70-230° C. and X-ray diffraction examination of 72.5% Au specimens after quenching and after annealing below the critical temperature. The kinetics of heat evolution are correlated with the formation of superlattice lines and the transformation heats are used to calculate the difference in internal energy between an ideally disordered and a perfectly ordered sample. 30 ref. (N10, P12q, 2-64; Au-b, Cu)

304-N. The Metallography of Precipitation in an Al-16% Ag Alloy. R. B. Nicholson and J. Nutting. Acta Metallurgica, v. 9, Apr. 1961, p. 332-343.

Thin foil transmission electron microscopy study of precipitation in supersaturated specimens after quenching and aging at various times and temperatures. Observation of Guinier-Preston zone formation, gamma and gamma prime phase transformation, stacking fault and dislocation modes and ordering and grain growth mechanisms as a function of heat treatment, composition and temperature. 52 ref. (N7, N-general, M21e, 2-60, 2-61, 2-64; Al-b, Ag)

305-N. Copper Precipitation in Germanium. D. J. D. Thomas. Acta Metallurgica, v. 9, Apr. 1961, p. 388-389.

Kinetics of the precipitation of Cu in "dislocation-free" Ge single crystals quenched from 850° C. Effect of temperature increase during diffusion annealing and vacancy concentration on activation energies and precipitation rate. 5 ref. (N7, M26s, 2-62; Ge, Cu, 14-61)

306-N. Research and Development on the Effects of High Pressure and Temperature on Various Elements and Binary Alloys. J. S. Kasper. General Electric Research Laboratory (Wright Air Development Division). U. S. Office of Technical Services, PB 171348, July 1960, 71 p. $2.

Effect of pressure on the properties and kinetics of transformation in various alloy systems. A shift is observed in the gamma loop of the Fe-Cr system from 12.5 to about 20% Cr. A similar shift in the gamma loop of the Fe-Al system is also found. (N-general, 2-61, 3-74; Fe-b, Cr)

307-N. Gamma to Alpha Transformation in Austenitic Stainless Steel Under Stress (Single and Repeated) Down to 20° K. J.

Menard and L. Weil. Paper from "Advances in Cryogenic Engineering". v. 6. Plenum Press, Inc., New York, 1961, p. 587-589.

Measurements of saturation magnetization during tensile testing at various stresses are used to indicate amount of austenite remaining in the steel. 5 ref. (N8n, Q27, 2-63; SS-e)

308-N. Progress in the Study of Gas-Metal Reactions at High Temperature. G. R. Wallwork and A. E. Jenkins. Paper from "Australian Atomic Energy Symposium". Melbourne University Press, Melbourne, Australia, 1958, p. 182-185.

Study of the oxidation of Ti, Zr and Hf at 600-950° C. with O_2. The solution of O_2 in the metal phase and the movement of the diffusion gradient formed are proposed as factors in the oxidation mechanism of metals. 16 ref. (N1, N15, R1h, 2-62; Ti, Hf, Zr)

309-N. (German.) Metal Melts. Erich Scheil. Forschungsberichte des Landes Nordrhein-Westfalen, no. 969, 1961, 37 p.

Review of structure of liquid metals in terms of "void theory", the theory of Borelius, liquid alloy characteristics is compared with solid solutions and mutual chemical affinity of liquid metals. Classification of metals according to their alloying behavior in liquid state. Nonequilibrium states. (N12)

310-N. (Russian.) The Ti-H_2 System. A. A. Zhurenkova. Izvestiya Vuz--Chernaya Metallurgiya, Sept. 1960, p. 8-13.

Investigation of H_2 absorbtion by Ti at 300-900° C. to form TiH_2. Absorbtion and phase distribution related to partial pressures, time, temperature and Ti purity. 5 ref. (N15d, P13d; Ti, H)

311-N. (Russian.) The Dependence Upon Alloying of the Temperature Level of Recrystallization in Single Phase Nickel Alloys. S. S. Gorelik and E. N. Spektor. Izvestiya Vuz--Chernaya Metallurgiya, Sept. 1960, p. 128-131.

Determination of recrystallization and characteristic temperatures for Ni-Fe alloys by X-ray diffraction and the method of rigid vibrations. Relation of initial recrystallization temperature and lattice period to composition. 14 ref. (N5, M26, M-general, 2-60, 2-62; Ni-b, Fe)

312-N. (Russian.) Effect of Induction Heating on the Kinetics of Isothermic Austenite Transformation in Chromium Steel. Yu. A. Bashnin and I. N. Kidin. Izvestiya Vuz--Chernaya Metallurgiya, Sept. 1960, p. 132-139.

Transformation curves determined for a number of Cr steels. Effect of heating rate, composition and type of heating on austenite composition, grain size, hardness and transformation time. 6 ref. (N8q, 2-60, 2-64; AY, Cr)

313-N. (Russian.) Peculiarities of Formation and Decomposition of Supersaturated Ferrite in Alloy Steels. A. A. Popov and L. E. Shevyakina. Izvestiya Vuz--Chernaya Metallurgiya, Sept. 1960, p. 140-147.

Theoretical and experimental phase transformation analysis for medium carbon steels. Ferrite formation and decomposition are related to annealing time, temperature and composition with attention to the influence of W and Mo on ferrite formation. (N8, 2-60, 2-62, 2-64; AY, Mo, W)

314-N. (Japanese.) The Effect of Sulphur and Manganese on the Solidification Process or Pure Fe-C-Si Alloy. Osamu Fujita and Kiyoshi Kubo. Imono (Japan Foundrymen's Society, Journal), v. 33, Feb. 1961, p. 3-11.

Microscopic observation of austenite and flake graphite formation and sulphide inclusion segregation to grain boundaries, during solidification and after quenching and furnace cooling, as a function of Mn and S contents. 14 ref. (N12, M27f, 2-60, 2-64, 9-69; Fe-b, C, Si)

315-N. Gas Atmosphere Effect on Materials. R. A. Baughman. General Electric Co. (Wright Air Development Division). U. S. Office of Technical Services, PB 161980, May 1960, 232 p. $3.50.

Effects of a special water saturated gas atmosphere on the properties of several structural materials. Results show that gas containing 5% H_2-95% N_2-70% saturated will cause a decrease in rupture strength of Fe, Ni and Co base materials with strength loss to a maximum of about 50%. The mechanism of strength loss is associated with either the surface reactions taking place during the gas testing of the penetration of hydrogen or nitrogen which

affects the barriers to dislocation movement. (N15d; Co, Fe, Ni)

316-N. Investigation of Diffusion Barriers for Refractory Metals. E. M. Passmore. Manufacturing Laboratories, Inc. (Wright Air Development Division). U. S. Office of Technical Services, PB 171400, Aug. 1960, 59 p. $1.50.

Twenty-three base barrier metal combinations are screened by annealing diffusion couples at 1700-15° C. Measurements indicating the extent of interdiffusion between barrier and base metals are made by metallographic examination and electron microbeam analysis. Hf and Ir are the most promising barriers for W at 1700° C. with V as a third choice. (N1; EG-d37)

317-N. Diffusion in Metals. P. G. Shewman and G. R. Love. I/EC (Industrial and Engineering Chemistry), v. 53, Apr. 1961, p. 325-328.

Review of research on diffusion in pure metals, alloys, liquid metals and nonmetals. (N1)

318-N. (Russian.) Structural Transformations in Low-Carbon Cr-Mo-V Steels. N. V. Ul'yanova and V. S. Teplov. Metallovedenie i Termicheskaya Obrabotka Metallov, Feb. 1961, p. 21.

Phase composition and isothermic austenitic transformation curves of 12Kh1MF and 15KhMiF heat resistant steels. Effect of normalizing and tempering at 440-700° C. for 1-20 hr. on microstructure, hardness and phase composition. (N8, M27, Q29n, 2-64; SS, SGA-h)

319-N. (French.) Recovery of A9-G3 Alloy. Maurice Bitran. Revue de l'Aluminium, v. 38, Jan. 1961, p. 69-80.

Recovery upon heating of a high-purity, heavily cold worked Al-Mg alloy (3% Mg). Determination of hardness, changes in microstructure and preferred orientation and grain growth. 8 ref. (N4, Q29n, M27; Al-b, Mg)

320-N. (Japanese.) Study of Copper-Bearing Low-Carbon Steels. Pt. 2. Mass Effects in Normalizing on the Precipitation-Hardening Characteristics of Copper-Bearing Low-Carbon Cast Steels During Subsequent Tempering. Ryohei Tanaka and Rokuro Ito. Tetsu-to-Hagane (Iron and Steel Institute of Japan, Journal), v. 47, Apr. 1961, p. 575-580.

Effect of cooling rate during normalizing on ferrite and Cu-rich phase precipitation and hardening, resultant microstructure and mechanical properties of 0.1% carbon steel containing 0-3.0% Cu. 5 ref. (N7, M27, 2-64; CN-g)

321-N. (Czech.) Formation of Intermetallic Phases by Diffusion. Stevo Trajkov. Hutnicke Listy, v. 16, Mar. 1961, p. 198-205.

A cylindrical Cu sample is immersed in liquid Zn which is allowed to solidify. Diffusion and chemical reaction of Zn on Cu at 250-419° C. are studied. Chemical analysis, microstructure testing and determination of microhardness. Presence of epsilon, gamma and beta phases at various depths. 6 ref. (N1, 2-65; Cu, Zn)

322-N. (Japanese.) Recrystallization of Tungsten Wires. Masataka Sugiyama, Yoshitsugu Mishima and Kunio Shida. University of Tokyo, Engineering Research Institute, Annual Report, v. 19, Mar. 1961, p. 52-56.

Examination of microstructures of specimens after annealing at 1500-1800° C. Recrystallization is observed first as formation of a columnar structure accompanied by secondary recrystallization at higher temperature with the recrystallization phenomena being sensitive to the nature and amount of doping additives. (N5, M27, 2-62, 2-64, 3-69; W, 4-61)

323-N. Physical Metallurgy of Refractory Metals (The Removal of Interstitial Impurities From Niobium by Zinc-Niobium Compounds). R. J. Goode, R. A. Meussner and A. J. Pollard. Report of NRL (Naval Research Laboratory) Progress, Apr. 1961, p. 36-38.

Carburized strips of Cb are reacted with Zn vapor at 1600° F. and heated in vacuum at 1800° F. for various times. X-ray and metallographic examinations show formation of protective Cb-Zn compound coatings which extract Cb carbides as stringers from the specimens during heating. Comparison with previous experiments on removal of O, N and C-N interstitials. (N15g; Cb, Zn)

324-N. The Carbide Constituents in Iron-Carbon-Silicon Alloys. J. G. Humphreys and W. S. Owen. Iron and Steel Institute, Journal, v. 198, May 1961, p. 38-45.

The carbides in Fe-C-Si alloys known as the x-constituent, the Marles carbide and the Hurst and Riley carbide are shown to have the same crystal structure. Planimetric and chemical analysis show they are iron-silico carbides containing 9% Si and 6.5% C. The composition range for forming hexagonal silico-carbide is determined by cooling slowly in vacuum and quenching. Graphitization of silico-carbide indicates that diffusion of Si is a rate controlling step. 20 ref. (N8r)

325-N. Two-Stage Isothermal Treatment of an En26 Steel. G. T. Higgins and H. J. Axon. Iron and Steel Institute, Journal, v. 198, May 1961, p. 46-49.

En26 steel of nominal composition 0.40% C, 0.22% Si, 0.62% Mn, 0.13% S, 0.015% P, 2.44% Ni, 0.71% Cr, 0.61% Mo, 0.16% Cu is homogenized and heat treated for various times and temperatures. Data are presented for the kinetics of the bainite reaction as a function of the austenite pretreatment. Conditioning of austenite is accomplished by diffusion at the selected temperatures. 9 ref. (N8g; ST)

326-N. Long-Range Order in Fe-Al Alloys. Pt. 2. Thermoelectric Power. G. Erez and P. S. Rudman. Physics and Chemistry of Solids, Journal, v. 18, Mar. 1961, p. 307-315.

The thermoelectric power is measured for the system at 100-950° C. with values determined for the critical temperature, density of states and ordering energy. The formation of new Brillouin zones accompanies ordering. 16 ref. (N10, P15j; Fe-b, Al-b)

327-N. The Effect of Thermal Treatment on the Constitution of 80-20 Nickel-Chromium Alloys Hardened With Titanium and Aluminium. E. A. Fell. Metallurgia, v. 63, Apr. 1961, p. 157-166.

Nature and morphology of the phases present investigated by X-ray diffraction and optical and electron microscope techniques. The precipitates identified are titanium carbonitride--Ti(C, N)--the chromium carbides Cr_7C_3 and $Cr_{23}C_6$ and two Ni_3Al type phases. High Ti and Al at low-carbon contents increase the normal rate of the carbide reaction $Cr_7C_3 \rightarrow Cr_{23}C_6$. 10 ref. (N7, 2-64, M21, M22g; Ni-b, Cr)

328-N. (Japanese.) The S-Curve of Molybdenum Nickel Cast Iron Containing Nodular Graphite. Youichi Tokunaga. Imono (Japan Foundrymen's Society, Journal), v. 33, Mar. 1961, p. 190-201.

Isothermal austenite transformation behavior of Mo-Ni cast irons with various alloys and fluxes added as graphite spheroidizers is examined by microscopy in the pearlite range and by dilatometry in the bainite range after austenitization at 950° C. for 30 min. 21 ref. (N8g, M-general, 2-60, 2-64; CI-r, Ni)

329-N. (Japanese.) The Influence of Heat Treatment on the Thermal Expansion Coefficient and Carbides of Steel for Turbine Shafts. Pt. 1. Studies on Reversible Deflection of Turbine Shafts. Akira Tokuda. Japan Institute of Metals, Journal, v. 25, Feb. 1961, p. 131-135.

Investigation of the effects of hardening on deflection of low-alloy steel shaft forgings in heat indication tests. Electron diffraction and microscopy, X-ray diffraction, electrolytic isolation and extraction replica techniques are used to examine carbide and transformation microstructure and to calculate thermal expansion coefficient of specimens after oil quenching, tempering and air-cooling treatments at 400-1100° C. 11 ref. (N-general, N8r, M-general, T7j, 2-64; AY, 17-57)

330-N. Protection of Refractory Metals for High-Temperature Service. Report 2. Oct. 1, 1960--Durability of the Zinc Base Coating for Niobium. B. F. Brown. Naval Research Laboratory. U. S. Office of Technical Services, PB 171159, Jan. 1961, n. p. $.75.

Effects of coating thickness, method and temperature of application of the coating, the composition of the compounds formed, test temperature and thermal cycling are examined in life tests lasting approximately 1000 hr. (N15, L25g, Q7j, 2-60, 2-62; Cb, Zn)

331-N. Protection of Refractory Metals for High-Temperature Service. Report 1. July 1, 1960--The Zinc-Base Coating for Niobium. B. F. Brown. Naval Research Laboratory. U. S. Office of Technical Services, PB 161932, Nov. 1960, 37 p. $1.

The protective action of a Zn base coating on Cb due to the formation of a tight layer of ZnO. Breaks occurring in the oxide barrier are self-healed by

the formation of additional ZnO resulting from the reaction of air with Zn vapor arriving from Zn rich intermetallic compounds between the oxide barrier and the Cb. (N15, L25g, Rlh; Cb, Zn)

332-N. Anomalous Diffusion at the Interface of Thin Bimetallic Film of Bi and Sb. Ryoji Suganuma, Toshiho Yoshida and Yoshibumi Fujiki. Physical Society of Japan, Journal, v. 16, Apr. 1961, p. 676-687.

Intermetallic diffusion is studied by electron and X-ray diffraction and electrical resistance measurements on vacuum deposited thin Bi and Sb films. 13 ref. (N1h; Bi, Sb, 14-62)

333-N. Direct Observation of the Lattice Imperfections in Pearlites by Electron Microscopy. Zenji Nishiyama, Atsuo Kore'eda, Isamu Eguchi and Koshi Kato. Physical Society of Japan, Journal, v. 16, Apr. 1961, p. 834.

Specimens are prepared from a cold rolled sheet of 0.7% carbon steel and annealed for 1/2 hr. at 950° C., then slowly cooled. Electropolished foils are then studied by transmission electron microscopy. (N8h; CN, 4-56)

334-N. Low-Temperature Ageing of Iron and Low-Carbon Steel. Ivan Hrivnak. Metal Treatment and Drop Forging, v. 28, May 1961, p. 175-181.

Carbon extraction replica study of nitride precipitates formed in spectrographically pure iron and low-carbon steel during aging at 25, 100, 200, 300 or 400° C. A mechanism is proposed for the formation of precipitates. (N7b, M20r, 2-65; Fe-a, CN-g, 14-68)

335-N. Some Structural and Physical Aspects of the Heat Treatment of Steels. K. W. Andrews. Metal Treatment and Drop Forging, v. 28, May 1961, p. 183-192.

Survey of heat treatment induced transformations and resultant structures in alloy steels and dependence of properties on these structures. Topics include effects of allotropy and alloying additions on equilibrium relationships; effects of diffusion and diffusionless transformations; relation of T-T-T diagrams to hardness and hardenability and determination of martensitic, austenitic, bainitic and ferritic transformation ranges and temperatures. 23 ref. (N-general, Q-general, 2-64; AY)

336-N. Hardness and Structural Transformations in Eutectoid Copper-Aluminium and Copper-Beryllium Alloys. E. R. Petty and H. O'Neill. Institute of Metals, Journal, v. 89, Apr. 1961, p. 281-286.

Isothermal and hot hardness test data are used to construct TTT diagrams and examine hardening and softening characteristics of aluminum and beryllium bronze specimens as a function of tempering and quenching treatments. Transformation microstructures and the nature of various phases in the system are examined metallographically. 16 ref. (N7c, N-general, M24b, Q29p, 2-64; Cu-b, Al, Be)

337-N. The Improvement in Stress-Corrosion Resistance of Aluminium D.T.D. 687 Alloys. G. Thomas. Institute of Metals, Journal, v. 89, Apr. 1961, p. 287-288.

Age-hardening treatments incorporating solution treatment, annealing and tempering with plastic deformation and subsequent aging on Cr-bearing D.T.D. 687 specimens, causing desired grain boundary embrittlement and precipitation with increased tensile strength and resistance to stress corrosion cracking. 4 ref. (N7e, Q-general, Rld, 2-64; Al-b, Cr)

338-N. Quenching Effects and Isothermal Martensitic Transformations in Au-Cd. B. S. Subramanya, G. S. Baker, D. S. Lieberman and T. A. Read. Australian Institute of Metals, Journal, v. 6, Feb. 1961, p. 3-10.

Description of experiments on two alloys which transform reversibly from an ordered cesium-chloride structure to two different structures of lower symmetry. Resistance measurements show effects of quenching on phase structures. 16 ref. (N6q; Au-b, Cd-b)

339-N. Some Isothermal Aging Effects in Gold-47.5 Atomic Per Cent Cadmium Alloys. W. Class and D. S. Lieberman. Australian Institute of Metals, Journal, v. 6, Feb. 1961, p. 11-16.

Changes in length, resistivity and hardness are observed during isothermal aging of AuCd single crystals. Results are consistent with the model of a phase separation recently proposed. Suppression of the normally observed cubic to orthorhombic transformation in favor of a transformation to a different product 35° C. lower is discussed. 14 ref. (N7a; Au-b, Cd-b)

340-N. Instabilities Due to Strain Aging in the Tensile Test. J. B. Lean. Australian Institute of Metals, Journal, v. 6, Feb. 1961, p. 62-67.

The apparent activation energy controlling the appearance of instabilities on the stress-strain curves of commercial basic Bessemer rimmed steel is measured above 50° C. Differing diffusion rates of carbon and nitrogen and the variation with temperature of the proportions of interstitial elements involved in strain aging are discussed. 17 ref. (N7e; ST-d)

341-N. (Russian.) Effect of Some Oxides on the Recrystallization of Molybdenum. D. A. Prokoshkin and Chzhan Shoo-Tzyun. Metallovedenie i Termicheskaya Obrabotka Metallov, Mar. 1961, p. 9-11.

Mo containing ZrO_2 or TiO_2 in quantities up to 0.5% or ThO_2 up to 2% is produced by powder metallurgical processes. The samples obtained are forged into rods which are exposed to 92% deformation by drawing. Recrystallization in subsequent heat treatment at 900-1300° C. is studied by microstructure, microhardness and X-ray testing. 5 ref. (N5, 2-60; Mo)

342-N. (Russian.) Recrystallization After Small Deformations. S. S. Gorelik. Metallovedenie i Termicheskaya Obrabotka Metallov, Mar. 1961, p. 12-17.

An Fe-Si alloy with 3% Si is subjected to 0-20% deformation by upsetting and subsequently heat treated at 300-1100° C. for 30 min. to 2 hr. The effect of subcritical and critical deformations on the recrystallization mechanism is deducted from the results of X-ray and structure tests. 6 ref. (N5f, 3-68; Fe-b, Si)

343-N. (Russian.) Aging N35KT Alloy. A. V. Smirnova and N. A. Solov'eva. Metallovedenie i Termicheskaya Obrabotka Metallov, Mar. 1961, p. 18-22.

The Fe base alloy containing 0.01% C, 35% Ni, 5% Co, 2.3% Ti, 0.2% Cu, 0.4% Si and 0.6% Mn is quenched from 950° C., subjected to deformation and aged at 575-900° C. for 4-100 hr. The decomposition of the solid solution during aging is studied on electron micrographs. 7 ref. (N7a, M21e; Fe-b)

344-N. (Russian.) Coagulation of Carbides in Martensite Crystals. N. A. Golovan'. Metallovedenie i Termicheskaya Obrabotka Metallov, Mar. 1961, p. 22-24.

Cast iron with and without 0.45% Cr and 1.02% Ni is poured into permanent molds to obtain test bars of 250 mm. length and 18 mm. diameter of white fracture. Structure testing after holding at 1100-1130° C. for 160-320 min., quenching and subsequent annealing at 500-700° C. for 1-100 hr. Effect of composition, annealing temperature and time and depth on carbide coagulation. (N8r; CI, Cr, Ni)

345-N. (Russian.) Effect of Chemical Heat Treatment on the Behavior of Iron and Steel in Liquid Zinc. D. Ya. Gluskin. Metallovedenie i Termicheskaya Obrabotka Metallov, Mar. 1961, p. 35-40.

Technically pure iron and steel with 0.3-1% carbon is chromized, siliconized or electrolytically chromium plated, wetted in zinc chloride and immersed in a melt of 99% pure Zn of 500° C. for 2-10 hr. Effect of the above treatments on depth of the diffusion zone formed during immersion, size reduction of Fe and steel samples, and the quantity of $FeZn_7$ present in the Zn melt. (N1, 2-64; Fe, ST, Zn)

346-N. (Russian.) Transformation of Retained Austenite in Case Hardening Steels. S. N. Krasotskaya. Metallovedenie i Termicheskaya Obrabotka Metallov, Mar. 1961, p. 42-46.

The transformation is studied by measuring magnetizability changes of case hardened 18KhNVA, 18KhNT, 12KhN3A, 12Kh2N4 and 20KhGR steels occurring in slow (5° C. per min.) heating and isothermal heat treatment of temperatures up to 650° C. (N8n; ST)

347-N. The Kinetics of Absorption and Evolution of Hydrogen by Palladium and Palladium/Platinum Electrodes. Ted B. Flangan and F. A. Lewis. Electrochemical Society, Journal, v. 108, May 1961, p. 473-477.

An equation relating absorption rate and electrode potential is derived and applied to data obtained from studies of absorption and desorption of hydrogen from electrodes supersaturated with hydrogen. 10 ref. (N15d; Pd, Pt, H)

348-N. A Method of Determining Primary Solid Solubility of an Alloy. F. N. Adgate. Welding Journal, v. 40, May 1961, p. 196s, 222s.

Tentative method of predicting solid solubility of an alloy from size factor of the atoms, electrochemical compounds and valency factors of the components. Atomic diameters and electrochemical factors of common metallic elements. (N12p)

349-N. (English.) Some Aspects of Dispersion Hardening in the Uranium-Uranium Oxide System. W. Arbiter and G. Stern. Planseeberichte fur Pulvermetallurgie, v. 9, Apr. 1961, p. 113-121.

Fabrication technique, microstructure investigation, hot (1500° F.) indentation hardness, hot (1560-1750° F.) bending and thermal cycling (1130-1350° F.) tests for a dispersion hardened material of near theoretical density (called SUP), which is obtained by controlled surface oxidation of fine uranium particles followed by hot (1500-1700° F.) pressing and extrusion. (N7a; U)

350-N. (French.) Phenomena Occurring During Annealing of Cold Rolled Mild Steel Blanks for Deep Drawing. G. Odone and V. Berruti. Revue de Metallurgie, v. 58, Feb. 1961, p. 165-176.

Investigation of recovery, polygonization and recrystallization of low-carbon steel during heating below Ac_1. Development of a heating cycle with prolonged holding at the recovery stage. 7 ref. (N4, N5, J23; CN-g)

351-N. (English.) Grain Boundary Precipitation in Alpha/Beta Brass. M. S. Wood and A. Hellawell. Acta Metallurgica, v. 9, May 1961, p. 428-433.

Cast specimen containing 45% Zn of (100) orientation are annealed at 520-600° C. for 3-30 min. to produce grain boundary precipitation of the alpha phase with subsequent examination by microscopy and X-ray back reflection. Growth, shape and orientation of the precipitate are controlled by grain boundary migration, matrix grain growth and orientation of the boundary plane. 7 Ref. (N7, N3, M27f, 2-64, 3-72; Cu-n)

352-N. (English.) Self Diffusion in Iron. F. S. Buffington, K. Hirano and M. Cohen. Acta Metallurgica, v. 9, May 1961, p. 434-439.

Self-diffusion in high-purity Fe (99.97%) is determined at 700-1436° C. using Fe^{55} and Fe^{59} with the temperature dependence of the self-diffusion coefficient in f-c-c. and in b-c-c. Fe being expressed by equations. An anomaly is found in the diffusivity below the magnetic transformation. 10 ref. (N1d, 1-59, 2-61; Fe-a)

353-N. (English.) Diffusion of Nickel Into Iron. K. Hirano, M. Cohen and B. L Averbach. Acta Metallurgica, v. 9, May 1961, p. 440-445.

Radioactive tracer study of Ni diffusion in gamma Fe and paramagnetic and ferromagnetic Fe from 600-1050° C. using Ni^{63} as a tracer and surface-decrease and residual-activity sectioning methods. An anomaly in the diffusivity is observed below the Curie temperature, associated with the effect of short range magnetic order on the formation energy of vacancies. 10 ref. (N1, P16, 1-59, 2-61; Fe, Ni)

354-N. (English.) Segregation of Solute Atoms During Strain Aging. T. Mura, E. A. Lautenschlager and J. O. Brittain. Acta Metallurgica, v. 9, May 1961, p. 453-458.

A relation between the number of solute atoms migrating to a dislocation and the aging time which eventually leads to saturation is presented with experimental data to explain strain aging of Fe and steel under several aging strains, stresses and temperatures. A term is included to account for the bulk diffusion due to the carbon concentration gradient developed in the vicinity of the dislocation. 9 ref. (N7e, N3, N1, 2-61, 3-66, 9-69; Fe-b)

355-N. (English.) The Role of Halide-Cycle Reactions in the Growth of Nickel Whiskers. R. E. Cech. Acta Metallurgica, v. 9, May 1961, p. 459-463.

Observations on the growth of Ni whiskers on NiO crystals by hydrogen reduction of halide salts in steam. Growth rates are determined as a function of orientation and hydrogen-halide reaction in which the Ni is transported from the oxide to the metal by halide-cycle reaction with the chemical driving force being supplied by the oxidation of hydrogen to steam. 4 ref. (N3, C26; Ni, 14-61)

356-N. (English.) Fine Particle Effect in Dispersion-Strengthening. G. S. Ansell.

Acta Metallurgica, v. 9, May 1961, p. 518-519.

Theoretical determination using a dislocation model of the dependence of yielding phenomena on the volume fraction of dispersed phase of alloys consisting of fine particles dispersed in a matrix. Influence of particle size and shape. Review of experimental data for alloys of Fe in Hg. 5 ref. (N7a, M26b, Q23b; Hg-b, Fe)

357-N. (Translation-ConBur.) Autocatalytic Nature of the Martensite Transformation. O. P. Maksimova, N. P. Soboleva and E. I. Estrin. Academy of Sciences of the USSR, Proceedings, Physical Chemistry Section, v. 134, Sept-Oct. 1960, p. 919-923.

Investigation of the autocatalytic effect of the martensite transformation of Fe-Ni-Mn alloy as influenced by temperature, crystal structure and heating and cooling rates. 24 ref. (N8p; Fe-b, Mn-b, Ni-b)

358-N. (German.) Recrystallization of Cold-Rolled Uranium. G. J. Sergeev, V. V. Titova and L. I. Kolobneva. Kernenergie, v. 4, Mar. 1961, p. 239-243.

Cast uranium is 80% hot rolled from 900-950° C., annealed from 720-730° C., water-quenched, 5-40% cold rolled and vacuum annealed at 350-650° C. with investigation of recrystallization by metallographic examination and by mechanical testing. Influence of 0.1% Mo additions on transformation structures. 10 ref. (N5, 2-60, 3-68; U)

359-N. (Translation.) Decomposition of a Supersaturated Solid Solution of Copper in Germanium. A. M. Elistratov and P. R. Kamadzhiev. Soviet Physics--Solid State, v. 2, May 1961, p. 2621-2630. (Translation of Fizika Tverdogo Tela, v. 2, Nov. 1960, p. 2671-2988).

Anomalous X-ray scattering is used to follow the structural changes which occur during decomposition of supersaturated solid solutions of Cu in Ge. A definite correlation is established with the change in electrical properties. 14 ref. (N7c, P15g; Cu, Ge, 14-67)

360-N. (Spanish.) Metallographic Study of "Uranus 50", an Austenitic-Ferritic Stainless Steel. Fernando Medina Garcia. Instituto del Hierro y del Acero, v. 14, Feb. 1961, p. 160-180.

Behavior of "Uranus 50" under heat treatment and with varying cooling rates. Calculation of austenite and ferrite percentages after treatments. 8 ref. (N8, 2-64; SS)

361-N. (French.) Classification of Elements Present in Iron and Steel. Journal d'Informations Techniques des Industries de la Fonderie, no. 125, Apr. 1961, p. 17-21.

Effect of Ni, Mn, Cu, Co and several other elements on the formation of gamma and alpha phases. Influence of the above elements on graphitization and hardening depth. (N-general, 2-60; Fe, ST)

362-N. The Role of Powder Metallurgy in Dispersion-Strengthened Alloy Development. C. G. Goetzel and R. F. Bunshah. Paper from "Powder Metallurgy". Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 253-265.

The most versatile technique consists of mechanically mixing fine powders of the matrix metal and a nonmetallic substance. Matrix metals encompass Cu, Ni, W, Mo, stainless steel and many others. The most effective dispersoids belong to the group of refractory oxides including alumina, thoria, titania and zirconia. Other techniques consist of precipitation from the liquid during solidification or are based on chemical reactions; for example, co-precipitation followed by reduction of one component, reaction with oxygen on either the surfaces or interior of powder particles. 15 ref. (N7a, H-general)

363-N. A Theory of Dispersion Strengthening. F. V. Lenel and G. S. Ansell. Paper from "Powder Metallurgy". Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 267-307.

Dispersion strengthening is explained by utilizing two methods. The first, a theoretical approach, predicts the yielding and creep behavior of these alloys on the basis of dislocation theory. The second, an experimental approach, shows the variation of the yield and creep strength of these alloys with both the testing conditions and the structural parameters of these alloys. The combination of these two approaches leads to a fundamental understanding of the mechanism involved. 21 ref. (N7a)

364-N. Some Features of Internal Oxidation of Dilute Copper and Nickel Alloys for Dispersion Strengthening. Noboru Komatsu, Laszlo J. Bonis and Nicholas J. Grant. Paper from "Powder Metallurgy". Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 343-358.

In applying internal oxidation as a means of producing dispersion-hardened metal-metal oxide alloys, it is preferable to accomplish this with the alloy in fine powdered form. Problems involved include powder size and shape, maximum solute content, oxide particle size as a function of temperature, time, distance of penetration and solute type. 4 ref. (N7a; Cu-b, Ni-b, 6)

365-N. Dispersion-Strengthened Steel. Yunoshin Imai and Hiroshi Hirotani. Paper from "Powder Metallurgy". Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 359-369.

Specimens are composed of powdered Fe, ferritic and austenitic heat resisting steels, in which Al_2O_3, MgO or SiO_2 are dispersed. From the change in hardness upon heating the cold worked specimens of various compositions and the results of tensile and rupture tests at high temperatures, the dispersion-strengthening phenomenon is elucidated. 5 ref. (N7a, Q27, Q3q, Q29n; Fe, SS, 6)

366-N. Theory of the Self-Diffusion Coefficient in Cubic Metals. G. M. Pound, W. R. Bitler and H. W. Paxton. Philosophical Magazine, v. 6, Apr. 1961, p. 473-483.

The kinetics of diffusion in cubic metals is examined in terms of statistical mechanics based on absolute rate theory. Self diffusion is related to atomic jump direction, entropy of activation and vibrational energy levels with diffusion in Cr and U (b-c-c.) being attributed to a ring mechanism. Experimental data are reviewed for Ti, Mo, Fe, Cu and their alloys at various temperatures. 25 ref. (N1d; Cr, Cu, Fe, Mo, Ti, U)

367-N. Precipitation and Irradiation Hardening in Iron. D. Hull and I. L. Mogford. Philosophical Magazine, v. 6, Apr. 1961, p. 535-546.

Precipitation of carbon from alpha iron during irradiation at 100° C. and thermal aging at 100-200° C. using thin film electron transmission microscopy. Precipitate density and shape, dislocation mechanism, hardening mechanism and orientation are related to temperature. 13 ref. (N7, 2-61, 2-65, 2-67; Fe-a)

368-N. The Formation of Sub-Grain Structure by Alternating Plastic Strain. J. Holden. Philosophical Magazine, v. 6, Apr. 1961, p. 547-558.

A micro-beam X-ray technique is applied to the fracture surfaces produced by slow-growing fatigue cracks propagated in mild steel, Cu and Al and Al alloy sheets subjected to pulsating tension and to large plastic strain in tension. The fracture surfaces show a highly developed subgrain structure with large misorientation down to 13°. The subgrain size is independent of the range of cyclic stress used. 16 ref. (N4, N5, M-general, Q26q, 3-68; CN, Cu-b, Al-b)

369-N. (German.) Equilibria Between Carbonmonoxide-Carbondioxide Mixtures and the Gamma Phase, Cementite and Graphite. Erich Scheil, Theodor Schmidt and Joachim Wunning. Archiv fur das Eisenhuttenwesen, v. 32, Apr. 1961, p. 251-260.

Measurement of thermodynamic activities of C in gamma iron and of phase equilibria between gamma iron, cementite and graphite by equilibrating CO-CO_2 gas mixtures with thin Fe foils from 700-1100° C. (N8, P12)

370-N. (German.) Transformation Characteristics of 50 CrV 4 Steel. Karl Bungardt, Hans Preisendanz and Helmut Brandis. Archiv fur das Eisenhuttenwesen, v. 32, Apr. 1961, p. 261-268.

End quench tests (840° C. hardening temperature) and microstructure investigation on normalized (870° C.) specimens of 50 CrV 4 steel to establish TTT diagrams. Dilatometric and X-ray investigation of austenite formation as influenced by soaking time and temperature. (N8, M27, M23b)

371-N. (German.) Recrystallization Anomalies in Metal Alloys. F. Erdmann-Jesnitzer and W. Bernhardt. Metall, v. 15, May 1961, p. 404-408.

20-700° C. annealing of 60% cold worked, recrystallizing soft annealed and again cold rolled ingots of Cu-Al alloy (0.084-9.4% Al), Cu-P alloy (0.032-1.534% P), and Cu-Mg alloy (0.36-1.61% Mg) to establish recrystallization curves by measurement of

hardness as influenced by cold rolling and annealing temperature. Anomalies of recrystallization curves. 17 ref. (N5, Q29n, 2-64, 3-68; Cu-b, Al, Mg, P)

372-N. The Solutions of the Metallurgist--Retrospect and Prospect. F. D. Richardson. Paper from "Physical Chemistry of Process Metallurgy". Pt. 1. v. 7. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1959, p. 1-26.

Paper tracing the development of ideas concerning solutions of metals, salts and slags. Consideration of various models from which thermodynamic properties can be derived and their limitations. New equations for dilute ternary solutions are derived by a quasi-chemical treatment. 71 ref. (N14)

373-N. Electrolysis and Diffusion in Liquid Alloys. Paul C. Mangelsdorf, Jr. Paper from "Physical Chemistry of Process Metallurgy". Pt. 1. v. 7. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1959, p. 429-445.

The Stokes-Einstein relation for relating molecular dimensions to diffusion coefficients suggests that classical hydrodynamics should be approximately applicable to transport processes in liquid metals. Data are presented to show that the mechanism of electrolysis is fundamentally the same as the "electronic friction" originally proposed by Skaupy. (N14, N1)

374-N. General Considerations of Diffusion in Melts of Metallurgical Interest. Ling Yang and G. Derge. Paper from "Physical Chemistry of Process Metallurgy". Pt. 1. v. 7. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1959, p. 503-521.

Existing data on diffusion in molten metals and alloys, salts, silicates and sulphides are analyzed with regard to their general characteristics and their correlation with thermodynamic and other kinetic properties of these systems. 62 ref. (N1e)

375-N. Diffusion of Some Alloying Elements in Liquid Iron. Tunezo Saito, Yasuji Kawai, Kazuo Maruya and Michiyoshi Maki. Paper from "Physical Chemistry of Process Metallurgy". Pt. 1. v. 7. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1959, p. 523-533.

Diffusion coefficients of Si, S and Mn in liquid Fe are measured at various concentrations and the relation to thermodynamic properties of the liquids. 9 ref. (N1e; Fe-b, Mn, S, Si, 14-60)

376-N. Self-Diffusion of Iron and Copper in Molten Mattes. Ling Yang, Satoshi Kado and G. Derge. Paper from "Physical Chemistry of Process Metallurgy". Pt. 1. v. 7. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1959, p. 535-541.

Self-diffusion coefficients are measured in molten mattes of various compositions from 1150-1260° C. They are found to be of the same order of magnitude as those of molten metals and simple ionic melts. 4 ref. (N1d; Cu, Fe, 14-60)

377-N. (Japanese.) Phase Changes During Austempering of Si-Cr-Mn Steels. Pt. 1. Metallographic Study of Austempering. Masazo Okamoto, Ryohei Tanaka and Nobukazu Suzuki. Japan Institute of Metals, Journal, v. 25, Mar. 1961, p. 201-205.

Isothermal transformation during austempering at 300-400° C. of austenitized Si-Cr-Mn steel specimens are studied by dilatometric, microscopic and X-ray diffraction methods. Examination of retained austenite, ferrite and carbide precipitation, martensitic temperature lattice constant and transformation microstructures as a function of composition, particularly Si, and heat treatment temperature. 8 ref. (N8g, J26p, M-general, 2-60, 2-64; AY, ST)

378-N. (Japanese.) Change of Structure in Alpha and Beta Brass (58.0-62.0% Cu) by Hot Working. Pt. 1. Homogeneous Structure in Alpha + Beta. Hideo Tajiri, Masaharu Matsubara, Koshi Katayama and Tadao Nakada. Japan Institute of Metals, Journal, v. 25, Mar. 1961, p. 205-209.

Effect of hot working temperature and working reduction on structural homogeneity and phase distributions is investigated for plate specimens by forging for various holding times at 500-840° C. (N-general, M27, 2-62, 3-68; Cu-n)

379-N. (Japanese.) The Effect of Low Temperature Annealing After Cold Working of OFHC Copper. Hajime Koto, Haruo Watanabe and Michitomo Kato. Japan Institute of Metals, Journal, v. 25, Mar. 1961, p. 210-212.

Anomalous phenomena in the isothermal change of cold worked specimens, as a function of reduction, and annealing time and temperature at 10-400° C. are examined by measurement of specific electrical resistivity in vacuum. 14 ref. (N7c, P15g, 2-61, 2-64, 3-68; Cu-a)

380-N. (Japanese.) Effect of Applied Stress Upon Martensite Transformation. Iwao Hagiwara and Shogo Kanazawa. Japan Institute of Metals, Journal, v. 25, Mar. 1961, p. 213-216.

Steel specimens containing 1% C and 5% Ni are loaded in tension and compression from 10-350° C. The observed directional stress effect on the transformation and the Ms temperature is attributed to the formation of the coherent embryo of martensite due to Bain's deformation for transformation, preferentially in regions of the lattice subjected to uniaxial stress, as in the neighborhood of dislocations. 10 ref. (N8p, 3-66; AY)

381-N. (Russian.) Influence of Molybdenum and of Additional Alloying on Annealing and Austenite Stability of Manganese Structural Steel. D. Ya. Vishniakov and Lei Tin-Zuan. Chernaya Metallurgiya, Nov. 1960, p. 97-103.

Alloying of manganese steel (0.4% C and 1.8% Mn) with various quantities of Mo, Ti, Cb and Zr and anisometric determination of stability of the austenite phase as a function of annealing temperature and composition. 8 ref. (N8n, 2-60, 2-64; AY, Mo)

382-N. (Russian.) Transformations in the Co-Cr-Ti System. E. K. Zakharov and B. H. Livshiz. Chernaya Metallurgiya, Nov. 1960, p. 105-112.

Determination of the microhardness, phase stability, chemical equilibrium and temperatures for magnetic and allotropic transformation in binary Co-Cr and Co-Ti systems and for the ternary Co-Cr-Ti system. 13 ref. (N6p, M24c; Co-b, Cr-b, Ti-b)

383-N. (Russian.) Changes in Microhardness and Structure of Hardened Low-Carbon Steel Depending on Annealing Temperature. K. F. Starodubov and Y. Z. Borkowsky. Chernaya Metallurgiya, Nov. 1960, p. 121-124.

Hardening of 20-steel (0.19% C) by heating to 900° C., cooling in salted water and annealing from 200-700° C. Determination of microhardness and products of phase transformations. 4 ref. (N8, J-general, M27, Q29q, 2-61; CN-g)

384-N. (English.) Metallographic Study of Isothermal Transformation of Beta Phase in Zircaloy-2. G. Ostberg. Jernkontorets Annaler, v. 145, Mar. 1961, p. 119-142.

Isothermal transformation of high-temperature beta solid solution of Zircaloy-2. Relationship of alpha Widmanstatten pattern and structure to beta phase precipitation. 17 ref. (N7c;Zr-b)

385-N. The Degeneration of Freezing Plane Interfaces in a Controlled Solidification System. Edward E. Hucke, Merton C. Flemings, C. M. Adams and H. F. Taylor. Paper from "Physical Chemistry of Process Metallurgy". Pt. 2. v. 8. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1959, p. 815-831.

Apparatus capable of independent control and variation of temperature gradients and solidification velocity used to freeze alloy melts agitated by low frequency and inductive stirring. Conditions required for interface stability and the resulting structures and segregation investigated over a range of freezing rates for Al-Zn, Al-Cu and Al-Fe alloys ranging from 2-50% Zn, 0.5-10% Cu and 0.04-0.2% Fe respectively. 5 ref. (N12, 1-52, 1-54, 3-67; Al-b, Cu, Fe, Zn)

386-N. The Effect of an Electric Field on the Segregation of Solute Atoms at a Freezing Interface. John Angus, David V. Ragone and Edward E. Hucke. Paper from "Physical Chemistry of Process Metallurgy". Pt. 2. v. 8. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1959, p. 833-843.

Steady-state segregation occurring in metallic systems at a freezing interface derived for the case where electrical diffusion flux has been added to the ordinary diffusion of solute away from the interface. Effect of electric diffusion flux on the stability of a plane front interface. 7 ref. (N12, N1h, 9-69)

387-N. Morphological and Distributive Features of the Solidification Process in Chill-Cast Aluminum-Copper Ingots. W. V. Youdelis, J. U. MacEwan and J. S. Kirkaldy. Paper from "Physical Chemistry of Process Metallurgy". Pt. 2. v. 8. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1959, p. 865-890.

Theoretical and experimental study of the morphology, temperature distribution and solute distributions in chill-cast Al-rich Al-Cu ingots. Morphological features and solute distributions are explained in terms of the principle of minimum rate of entropy production in the neighborhood of the growing crystal face. A model is proposed for eutectic exudation. 17 ref. (N12, M27; Al-b, Cu, 5-66)

388-N. (Russian.) Effect of Hydrogen Development on the Cathode on the Properties of Metals. O. S. Popova and A. T. Sanzharovskii. Doklady Akademii Nauk SSSR, v. 136, Mar. 1961, p. 654-656.

Fe and Ni samples are immersed for up to 23 min. in an electrolyte containing 10% H_2SO_4 and 0.1 g. per liter Na_2S while the temperature is held at 20-25° C. During the first 15 min. a current of 100 milliamp. per sq. cm. is passed. The effect of the hydrogen absorbed in different immersion times is determined by removing the samples at various time intervals from the electrolyte and subjecting them to mechanical tests and X-ray analysis. Determination of the hydrogen absorbed by vacuum extraction. 5 ref. (N15d; Fe, Ni)

389-N. (Translation.) Diffusion of Silver in Plastically Deformed Copper. L. M. Shestopalov and Yu. P. Romashkin. Soviet Physics--Solid State, v. 2, June 1961, p. 2664-2672. (Translation from Fizika Tverdogo Tela, v. 2, Dec. 1960, p. 2989-3196.)

Determination of the diffusion coefficient of Ag in coarse-grained plastically deformed Cu by using a layer removal and diffusion absorption technique and beta and gamma irradiation. Deformation is produced by compression under constant stress. 7 ref. (N1; Cu, Ag)

390-N. (Translation.) Grain Boundary Diffusion During the Creep of Copper. Yu. P. Romashkin and L. M. Shestopalov. Soviet Physics--Solid State, v. 2, June 1961, p. 2691-2699. (Translation from Fizika Tverdogo Tela, v. 2, Dec. 1960, p. 2989-3196.)

Method for investigating structural changes during creep of Cu by diffusion of radioactive Ag^{110}. Compression creep tests on Cu from 400-900° C. at various deformation rates. Grain-boundary diffusion at 600° C. in specimens previously deformed at various temperatures. 9 ref. (N1h, Q3, 2-61, 3-68; Cu)

391-N. (Translation.) The Theory of Diffusion During the Plastic Deformation of Metals. Pt. 1. Review. Yu. P. Romashkin. Soviet Physics--Solid State, v. 2, June 1961, p. 2709-2715. (Translation from Fizika Tverdogo Tela, v. 2, Dec. 1960, p. 2989-3196.)

Critical review of experimental data covering diffusion of Fe^{55}, Co^{60}, Fe^{59}, H and Ag^{110} during plastic deformation of coarse and fine grained Fe, coarse grained Cu, single crystal Ag, low-carbon steel, Ni-Mo alloys and Ni. 18 ref. (N1, Q24; Fe, Cu, Ag, CN, Ni-b, Mo, Ni)

392-N. (Translation.) The Theory of Diffusion During the Plastic Deformation of Metals. Pt. 2. Yu. P. Romashkin. Soviet Physics--Solid State, v. 2, June 1961, p. 2716-2720. (Translation from Fizika Tverdogo Tela, v. 2, Dec. 1960, p. 2989-3196.)

Establishment of a general functional relationship between the magnitude of the diffusion coefficient acceleration effect and external parameters stress and temperature, internal parameters activation energy and lifetime of defects and parameters of the deformation derived from them. 5 ref. (N1, Q24)

393-N. (Translation.) The Theory of Diffusion During the Plastic Deformation of Metals. Pt. 3. Possible Nature of the Phenomenon. Yu. P. Romashkin. Soviet Physics-Solid State, v. 2, June 1961, p. 2722-2731. (Translation from Fizika Tverdogo Tela, v. 2, Dec. 1960, p. 2989-3196).

Thermodynamic correspondence of the phenomena of creep and diffusion. Structural nature of the diffusion acceleration effect. During plastic deformation diffusion can be accomplished by nonequilibrium vacancies whose concentrations over long times under appropriate conditions can exceed the concentration of equilibrium vacancies by several orders and these are primarily responsible for the significant acceleration of diffusion processes. (N1, Q24)

394-N. (English.) Diffusion of Nb With Cr, Fe, Ni, Mo and Stainless Steel. L. S. Birks and R. E. Seebold. Journal of Nuclear Materials, v. 3, Mar-Apr. 1961, p. 249-259.

Diffusion couples are prepared at 1100° C. from pure Cb and several compositions of stainless steels and with each of the components of the steel, the composition across the diffusion zone being measured by electron probe microanalyzer.

Diffusion coefficients are determined with stoichiometric composition of intermediate phases and miscibility and solubility relations. 5 ref. (N1, P12e, S11e, Cb, SS, Cr, Ni, Mo, Fe)

395-N. (English.) Elevated Temperature Diffusion in the Systems Nb-Pt, Nb-Se, Nb-Zn, Nb-Co, Ni-Ta and Fe-Mo. R. E. Seebold and L. S. Birks. Journal of Nuclear Materials, v. 3, Mar-Apr. 1961, p. 260-266.

The electron probe microanalyzer is used to determine the composition and extent of phases occurring in bimetallic diffusion couples at 1100° C. Data are given for solubility relations with discussion of precipitation, grain formation and cracking in the diffusion zone. 6 ref. (N1, S11e, 2-62; Cb-b, Pt, Se, Zn, Co, Ni-b, Ta, Fe-b, Mo)

396-N. (English.) Transformation Kinetics of a Zirconium-Uranium-Hydrogen Alloy. J. C. Bokros. Journal of Nuclear Materials, v. 3, Mar-Apr. 1961, p. 320-326.

Phase equilibrium diagrams, isothermal diagrams and reaction curves are constructed for the eutectoid transformation of a Zr-U-H alloy with the atom ratio of 1:0.03:1 from dilatometric and X-ray diffraction examination from 20-650° C. 5 ref. (N7c, M24c, M-general; Zr-b, U, H)

397-N. (French.) Study of the Disordering of the Phase U_2Mo by Irradiation. J. Bloch, J. Doulat and J. Blin. Journal of Nuclear Materials, v. 3, Mar-Apr. 1961, p. 327-330.

Crystallographic analysis of U-Mo alloy specimens, having the composition U_2Mo (with an ordered tetragonal structure), after reactor irradiation from -197 and 20-65° C. Transformation from the gamma prime tetragonal to the gamma cubic structure is observed as a continuous function of the burn-up with collisions during fission being responsible for disordering. 5 ref. (N10, M-general, 2-60, 2-67; U-b, Mo)

398-N. Low-Cast Bridgman-Type Single-Crystal Growing Apparatus. E. H. Olson. Ames Laboratory (Iowa State University of Science and Technology). U. S. Office of Technical Services, PB IS-178, Aug. 1960, 51 p. $1.25.

Single crystals of Zn, Pb, Sn metals and silver chloride can be successfully grown with an economical, easily operated, Bridgman-type apparatus. Costing approximately $500 to construct, the apparatus passes the melt through a steep temperature gradient. It utilizes crystallizing crucibles made of quartz and graphite, all of which have 50° conical nucleating tips. The removal of the single crystals is facilitated by tapered walls on the graphite crucibles. (N3; Pb, Sn, Zn)

399-N. Effect of Single Trace Alloy Additions on the Properties of Pure Iron. G. London. Franklin Institute (Air Research and Development Command). U. S. Office of Technical Services, n. p. $2.

Elements used are P, S, Co, Cr and Ni. Radioactive tracer techniques are utilized as a tool to determine relative alloy concentration. In the concentration levels studied, the specific alloys have the usual grain refining effects on recrystallization. However, even in the zone purified and unalloyed material, recrystallization is influenced by the residual impurities. Alloy effects on mechanical properties are slight except for low temperature embrittlement and room temperature strengthening due to phosphorus. (N5, Q-general, 3-69; Fe)

400-N. The Liquid State and the Liquid Solid Transition. David Turnbull. Metallurgical Society of AIME, Transactions, v. 221, June 1961, p. 422-438.

Thermodynamic and thermochemical analysis of solidification mechanism in terms of the free volume theory for undercooling crystallization glass formation relations and by the method of distribution functions using various liquid state models. Review and correlation of data for fluidity-temperature-pressure volume relations, fusion, crystal growth, nucleation and diffusion mechanism in metals and viscous molecular compound and other nonmetals in liquid, solid and gaseous states and transitions. 61 ref. (N12, N-general, 10-54)

401-N. Secondary Recrystallization Kinetics in Singly Oriented Silicon Iron. T. V. Philip and R. E. Lenhart. Metallurgical Society of AIME, Transactions, v. 221, June 1961, p. 439-445.

Commercial Si-Fe sheets of varying magnetic quality are isothermally annealed at high temperatures with extremely large grains developing in the material having good magnetic properties. The grains are of the (110) (001) orientation

and are formed by secondary recrystallization, the primary driving force being grain boundary free energy. The activation energy for nucleation is consistent with a model involving redistribution of a precipitate acting as the primary grain growth inhibitor. 22 ref. (N3, N5, N7, 3-72; Fe-b, Si)

402-N. Transformation Kinetics in High-Purity Iron and Some Iron Binary Alloys. V. Bharucha, G. A. Mancini, G. W. Powell and J. W. Spretnak. Metallurgical Society of AIME, Transactions, v. 221, June 1961, p. 498-502.

The characteristics of the motion of the gamma-alpha interface during the "down" transformation in zone-refined Fe and dilute binary alloys containing Ni and Mo is examined by the thermionic emission microscope and high-speed photography. The frontal movements are found in all cases to be discontinuous with time and a number of incremental jumps proceed in the reverse direction (alpha + gamma). (N-general, M21, 3-67; Fe-b, Ni, Mo)

403-N. The Structure and Associated Properties of an Age Hardening Copper Alloy. W. D. Robertson, E. G. Grenier and V. F. Nole. Metallurgical Society of AIME, Transactions, v. 221, June 1961, p. 503-512.

The electrical, mechanical and corrosion cracking properties of an age-hardenable Cu-Ni-Si alloy are studied over a range of time, temperature and deformation states developed by various combinations of heat treatment and cold working for determining the relationship between the properties and the structural state. Observation of precipitation phenomena and relation of deformation banding to strain concentration along paths which transcrystalline cracks propagate 9 ref. (N7a, P15g, Q26q, Q-general, 2-64, 3-68, 3-73; Cu-b, Ni, Si)

404-N. Nucleation Catalysis by Carbon Additions to Magnesium Alloys. V. B. Kurfman. Metallurgical Society of AIME, Transactions, v. 221, June 1961, p. 540-546.

Grain refinement of Mg-Al melts by carbonaceous additions is attributed to nucleation by Al carbide. The effects of process and alloy variables are interpreted and predicted in terms of the dispersion and chemistry of this phase. Grain coarsening action is evaluated of Be, Zr, Ti and rare earth additions and for chlorination, temperature extremes and prolonged holding times. 14 ref. (N2, N3, 2-60, 2-61; Mg-b, Al, C, Be, Zr, EG-g, AD-p35, 17-57)

405-N. Diffusion in Gamma Brass. Robert F. Mehl and Carl F. Lutz. Metallurgical Society of AIME, Transactions, v. 221, June 1961, p. 561-567.

A layer of gamma brass is formed on beta brass using a vapor-solid reaction technique. The variation in composition with distance within the gamma phase layer and across the gamma-beta interface is determined by an electron probe. The diffusivities are calculated as a function of concentration. The diffusion coefficient in gamma brass changes by a factor of 25 over a compositional range of 8 at.%. 17 ref. (N1c, 2-60; Cu-n)

406-N. Orientation Relationships in the Heterogeneous Nucleation of Solid Lead From Liquid Lead. B. E. Sundquist and L. F. Mondolfo. Metallurgical Society of AIME, Transactions, v. 221, June 1961, p. 607-613.

A study of the undercooling and orientation relationships resulting when Pb is nucleated from the liquid by Ni, Cu, Ag and Ge to determine the importance of crystallographic disregistry between nucleating catalyst and nucleated metal. The results indicate that disregistry is not an important factor and that the process starts with the formation of an absorbed layer of nucleated metal on the nucleating impurity. 21 ref. (N2g, N12, 2-60; Pb-a, Ni, Cu, Ag, Ge)

407-N. The Production of Controlled Orientation Bicrystals for Grain Boundary Migration Studies. J. W. Rutter and K. T. Aust. Metallurgical Society of AIME, Transactions, v. 221, June 1961, p. 641-642.

A technique applied to zone-refined Pb single crystals, which consists of placing a striated crystal and a striation-free crystal of controlled orientations end-to-end in a graphite trough, then melting a short zone at the junction of the two crystals and allowing the junction to freeze to form the desired grain boundary. (N3, M26c; Pb-a)

408-N. Observations on the Powdering of Yttrium Hydride. John D. Roach. Metallurgical Society of AIME, Transactions, v. 221, June 1961, p. 646-647.

X-ray diffraction examination of surface of as-hydrided yttrium specimens and of hydrided specimens after exposure to nitrogen to determine the nature of the reaction and the reaction product causing solid yttrium hydride specimens to crack and crumble at room temperature. The principle surface phase is determined as YH_2 with nitrogen contamination causing an autocatalytic grain boundary reaction resulting in powdering. 8 ref. (N12, M22g, 3-69; Y-b, H, N)

409-N. (German.) Precipitation Processes at Low Temperatures in an Aluminum Alloy Containing 10 Wt.% Magnesium. Hildegard Cordier and Klaus Detert. Zeitschrift fur Metallkunde, v. 52, May 1961, p. 321-328.

Measurement of electrical resistivity and elongation in investigating precipitation hardening during aging at temperatures from 150 to -35° C. of 0.5-2 mm. diameter MgAl (9.88% Mg) worked and 420° C. homogenized wire specimens as influenced by cooling conditions. (N7, P15g, Q23p; Al-b, Mg, 4-61)

410-N. Nitrogen as an Alloying Element in Steel. The Effect of Nitrogen on the Tempering of Cold Worked Steels. Yunoshin Imai and Tetsuro Ishizaki. Tohoku University, Research Institutes, Science Reports, Series A, v. 13, Apr. 1961, p. 57-66.

Magnetic and electrical properties are measured for steels containing various percentages of N, Mn, Al and Ti after cold working and tempering from 50-700° C. Relation of nitrogen to strain aging, tempering susceptibility, deformation recovery and workability. 21 ref. (N7d, P15, P16, 2-60; AY, N)

411-N. Special Control of Malleable Iron by the Mutual Relations Between Silicon, Manganese and Sulfur. Masao Homma, Yoshihiko Abe, Hiroshi Meguro and Akira Minato. Tohoku University, Research Institutes, Science Reports, Series A, v. 13, Apr. 1961, p. 82-90.

A special malleable cast iron is produced by breaking the normal balance of Mn and S in ordinary malleable iron and increasing the Si and C contents. Improvement in mechanical properties is observed with increase in graphitization reaction rates. 6 ref. (N8s, Q-general, 2-60; CI-s)

412-N. (German.) Investigation of Atomic Faults in Copper, Silver and Gold by Electrical Resistance. Wolfgang Schule, Alfred Seeger, Falko Ramsteiner, Dieter Schumacher and Kenneth King. Zeitschrift fur Naturforschung, v. 16a, Mar. 1961, p. 323-325.

Measurement of recovery of electrical resistance above -40° C. of polycrystalline and at -80° C. of deformed and quenched Cu, Ag and Au disks (0.23 mm. thick). Interpretation of reaction mechanism of recovery in terms of migration of voids. (N3, N4, M26s, P15g, 2-63; Au, Ag, Cu)

413-N. The Martensite Transformation in Thin Foils. Zenji Nishiyama, Kenichi Shimizu and Kazuo Sugino. Osaka University, Institute of Scientific and Industrial Research, Memoirs, v. 18, 1961, p. 71-79.

Martensite transformation is studied by transmission electron microscopy using thin foils of austenite of orientation (001) made by electrolytic polishing from bulk Fe-30.64% Ni alloys. 7 ref. (N8p, M21e; Fe-b, Ni, 4-56)

414-N. (Russian.) Influence of Alpha and Epsilon Phases on Hardening of Austenitic Steels During Deformation. I. N. Bogachev and A. F. Sachavskii. Izvestiya VUZ--Chernaya Metallurgiya, Feb. 1961, p. 100-108.

Investigation of the hardening process during cold plastic deformation of an unstable austenitic steel as accompanied by phase transformation, particularly formation of deformed martensite and epsilon phases. Difference in the kinetics of hardening of Mn and Ni unstable austenitic steels. 5 ref. (N7e, N8p, 3-68; SS-e, Mn, Ni)

415-N. (Russian.) Investigation of the Diffusion Kinetics of the Carbide Phase During Heating of Iron-Nickel-Carbon Alloys by Electricity. A. V. Belotskii and V. N. Gridnev. Izvestiya VUZ--Chernaya Metallurgiya, Feb. 1961, p. 114-121.

Investigation of diffusion kinetics and austenite homogenization. Data given for chemical composition, structure uniformity, characteristics of hardened steels and alteration of austenite lattice. (N1, N8r, J2g; Fe-b, Ni, C)

416-N. (German.) Investigation of Transition Behavior, Notch Impact Strength and Susceptibility to Intercrystalline Corrosion of Iron-Chromium Alloys With Chromium Contents Up to 30%. Ewald Baerlecken,

Wilhelm Anton Fischer and Klaus Lorenz. Stahl und Eisen, v. 81, June 8, 1961, p. 768-778.

Thermomagnetic measurements from 700-1400° C. notch impact testing from 720-800° C. and microstructural investigation of variously heat treated air and vacuum melted Fe-Cr alloys (0-30.9% Cr, 0-0.2% C, 0-2.3% Si, 0-1.2% Al, 0-4.8% Ni, 0.006-0.29% N) for determination of transition temperatures, ferrite and austenite distribution and grain decomposition. (N8, M-general, Q6, Q23r, R2h, 2-60, 2-62; AY)

417-N. X-Ray Study on the Precipitation Process in Magnesium-Rich Magnesium-Silver Alloys. Shin'ichi Nagashima. Osaka University, Institute of Scientific and Industrial Research, Memoirs, v. 18, 1961, p. 129-133.

Sequence of precipitation from hexagonal solid solutions is investigated by oscillation and stationary crystal methods, Laue method and small angle diffraction method. (N7b, M22g; Mg-b, Ag)

418-N. The Effect of Hydrostatic Pressure on the F.C.C. ⇌ B.C.C. Reactions in Iron-Base Alloys. Larry Kaufman, A. Leyenaar and J. S. Harvey. Paper from "Progress in Very High Pressure Research". John Wiley & Sons, Inc., New York 16, 1961, p. 90-108.

Investigation of f-c-c.-b-c-c. reactions in the Fe-Ni and Fe-Cr systems to evaluate the thermodynamic and kinetic effects of hydrostatic pressure and effects on the nucleation of martensitic reactions. Experiments are conducted on specimens of Fe-Ni and Fe-Cr alloys and pure Fe single crystals from 400-1000° C. and under 1-50 K-atm. pressure. 13 ref. (N-general, N8p, M24b, P12, P13, 3-74; Fe-b, Ni, Cr)

419-N. The Effect of High Pressures on Transformation Rates. J. E. Hilliard and J. W. Cahn. Paper from "Progress in Very High Pressure Research". John Wiley & Sons, Inc., New York 16, 1961, p. 109-125.

Prediction of pressure effects on the various factors influencing the rate of solid-state transformations. Use of an activation volume model to describe the pressure dependence and of a graphical construction for estimating the pressure displacement of phase boundaries in a binary system. Data are given for the austenite to pearlite transformation and the rate of precipitation in Al-Cu, Au-Ni and Pb-Sn alloys. 14 ref. (N6q, N7, M27f, Q25m, 3-74)

420-N. Research and Development on the Effects of High Pressure and Temperatures on Various Elements and Binary Alloys. E. W. Goliber and K. H. McKee. Paper from "Progress in Very High Pressure Research". John Wiley & Sons, Inc., New York 16, 1961, p. 126-151.

Investigations of the pressure-temperature effects on the properties and transformation kinetics in various alloys and systems such as Cr, Cr-Ni, Fe-Ni, Fe-Al, Ni-Cu, Co-Al, Cr-Al, Ni-Al, Ni-Ti, Ni-Mo, TiMg, Ni-Al_2O_3 and high-speed toolsteel. Studies include the formation or stabilization of phases and intermediate phase suppression and displacement of a gamma loop with pressure. Results are analyzed by X-ray diffraction, light and electron microscopy and Rockwell hardness tests. 21 ref. (N-general, M-general, Q25m, 2-61, 3-74)

421-N. Melting and Other Phase Transformations at High Pressure. H. M. Strong. Paper from "Progress in Very High Pressure Research". John Wiley & Sons, Inc., New York 16, 1961, p. 182-194.

The fusion curves of the four Group VIII metals Ni, Fe, Pt and Rh and the phase diagrams of Bi and Rb are determined to 100,000 atm. Calculation of the volume changes which occur at the melting points for the Group VIII elements from the initial slopes of their fusion curves using Simon's formula. Study of alpha to gamma phase transformations in Fe. 12 ref. (N12, M24, P12n, P10d, 2-61, 3-74)

422-N. Effect of Hydrostatic Pressure Up to 8000 Atm. on the Self-Diffusion Rate in Silver Single Crystals. C. T. Tomizuka. Paper from "Progress in Very High Pressure Research". John Wiley & Sons, Inc., New York 16, 1961, p. 266-270.

Measurements of the self-diffusion coefficient of single crystal Ag at 906° C. and 1-8000 atm. pressure. The activation volume is calculated as a measure of the volume relaxation around a vacancy. 7 ref. (N1d, 2-61, 3-74; Ag)

423-N. Some Fixed Points on the High Pressure Scale. G. C. Kennedy and P. N. LaMori. Paper from "Progress in Very High Pressure Research". John Wiley & Sons, Inc., New York 16, 1961, p. 304-313.

The pressures of polymorphic transitions of Bi, Tl and Cs are determined at 25° C. by volume measurements in a supported tungsten carbide pressure vessel using a free piston gage. 12 ref. (N-general, 3-74; Bi, Tl, Cs)

424-N. A Solid-Solution Model for Inhomogeneous Systems. M. Hillert. Acta Metallurgica, v. 9, June 1961, p. 525-535.

A solid-solution model allowing compositional variations in one dimension is developed from the zeroth approximation of nearest-neighbor interactions. It predicts the existence of periodically modulated structures in ordering and in precipitation systems, provides a method for calculating the diffuse structure of grain and domain boundaries, indicates the existence of an activation energy for boundary movement and presents a new approach for treating homogeneous nucleation. 19 ref. (N-general, M24e, 17-56)

425-N. Formation of Modulated Structures in Copper-Nickel-Iron Alloys. M. Hillert, M. Cohen and B. L. Averbach. Acta Metallurgica, v. 9, June 1961, p. 536-546.

The formation of modulated structures with periodic variations in composition due to a simple interchange of atoms is studied in ternary alloy specimens, as a function of composition, temperatures and time using X-ray diffraction and a kinetic and a Guinier model. The activation energies for the transformation, evaluated at the first detectable stage and for a later stage, show that both stages are diffusion-controlled inside as well as outside the spinodal. 21 ref. (N-general, M24e, M-general, 2-60, 2-61, 3-67; Cu-b, Ni-b, Fe)

426-N. Interdiffusion in Dilute Aluminum-Copper Solid Solutions. J. B. Murphy. Acta Metallurgica, v. 9, June 1961, p. 563-569.

Investigation of the interdiffusion of Cu from an alpha solid solution into Al with special attention to minimizing experimental and computational errors. The form of the concentration-distance curves obtained show that interdiffusion is independent of concentration at 0-0.5 wt.% Cu. The activation energy is calculated with the frequency factor and related to the tracer diffusion of Cu in Al. 18 ref. (N1; Cu-b, Al, 14-67)

427-N. Pre-Precipitation in Al-Mg-Ge and Al-Mg-Si. A. Lutts. Acta Metallurgica, v. 9, June 1961, p. 577-586.

Single crystals of high-purity Al-base alloys (Al-0.7% Mg_2Si, Al-1.0% Mg_2Ge and Al-1.4% Mg_2Ge) are studied by a crystal monochromated X-ray technique and hardness measurements during isothermal aging from 135-300° C. to determine clustering or segregation of solute atoms in the matrix. The G.P. zones are formed in two steps, the first having no internal periodicity and possessing a high vacancy concentration, the second having a linear periodicity parallel to one of the matric cube directions with abruptly decreased vacancy concentration. 13 ref. (N7, M26s, 2-61, 2-65; Al-b, Mg, Ge, Si)

428-N. The Growth of Gamma Prime-Fe_4N Iron Nitride Precipitates in an Alpha-Iron Matrix. G. R. Booker. Acta Metallurgica, v. 9, June 1961, p. 590-594.

Gamma prime-Fe_4N plates are isolated in extraction replica and examined by electron microscopy and "selected-area" electron diffraction. Individual plates comprise a single crystal lattice and exhibit two sets of fine structures, giving a characteristic single crystal "spot" pattern in which the "spots" are drawn out into two sets of lines which intersect, arising from relaxation of the diffraction condition in directions perpendicular to the two sets of fine structure. Orientation and growth directions are attributed to misfit in atom spacing. 5 ref. (N7, M26q, 2-64, 3-72; Fe-a)

429-N. The Martensite Transformation in Thin Foils. Z. Nishiyama, K. Shimuzu and K. Sugino. Acta Metallurgica, v. 9, June 1961, p. 620-622.

Foils of Fe-30.64% Ni alloy in austenite state are transformed by immersion into liquid nitrogen with transmission electron microscopy and electron diffraction study of the orientation relationships of the resultant martensite crystals in the microstructure. (N6q, M-general; Fe-b, Ni, 4-56)

430-N. (French.) Crystallization of Selenium. G. Blet. Journal de Physique et le Radium, v. 22, Feb. 1961, p. 17A-26A.

Effects of holding time and temperature on electrical conductivity of high-purity cast selenium samples relative to Ge and crystallization. Structure and hardness tests. (N12, P15g, 2-61, 3-67, M27, Q29; Se, 5)

431-N. Physical Metallurgy of Refractory Metals (The Kinetics of Formation of Niobium-Zinc Compounds on Niobium in Zinc Vapor). G. Sandoz and T. C. Lupton. Report of NRL (Naval Research Laboratory) Progress, June 1961, p. 25-26. (Available as PB 1713109 from U. S. Office of Technical Services, Washington 25, D. C.) $1.25.

Kinetics study of the effects of the Cb source and the Zn source on the thickness, nature and composition of Cb-Zn coatings formed by vapor deposition from 1700-2100° F. (N15g, L25, 2-62; Cb, Zn)

432-N. Physical Metallurgy of Refractory Metals (Zinc-Vapor Coating of Binary Niobium Alloys). J. Stoop. Report of NRL (Naval Research Laboratory) Progress, June 1961, p. 26-27. (Available as PB 1713109 from U. S. Office of Technical Services, Washington 25, D.C.) $1.25.

Arc-melted binary alloys of Cr containing 13% Fe, 13.5% Co, 13.5% Ni, 7% Al and 3-12% Cr are reacted with Zn vapor from 1900-2200° F. for study of the thickness and oxidation resistance of the coatings formed as a function of alloy composition and vapor deposition temperature. (N15g, R1h, 2-60, 2-62; Cb-b, Fe, Co, Ni, Al, Cr, Zn, 17-57)

433-N. (Japanese.) Behavior of Titanium in White Iron and Its Role in Graphitization. Taira Okamoto and Masao Ibaraki. Imono (Japan Foundrymen's Society, Journal), v. 33, May 1961, p. 340-346.

The nature and amounts of Ti compounds in white iron, containing 2.55% C, 1.06% Si, 0.30% Mn and 0.093% S, are investigated by chemical analysis and X-ray diffraction methods. Relations are derived for formation of oxides, nitrides, carbides and sulphides of Ti and for graphitization reactions in terms of carbon-austenite solubility as a function of composition and temperature. 10 ref. (N8s, M26q, M-general, 2-60, 2-61; CI, Ti)

434-N. (Japanese.) Effect of Deformation Temperature on Anneal-Hardening of Type 304L Stainless Steel. Yuzo Hosoi. Tetsu-to-Hagane (Iron and Steel Institute of Japan, Journal), v. 47, May 1961, p. 721-727.

Anneal-hardening phenomena in specimens deformed by rolling from -60 to 600° C., with subsequent annealing to 900° C., are determined by measuring the change in mechanical properties. Transformation mechanisms and microstructures and deformation structures are examined by metallography and magnetic property measurement. Hardening is observed to increase with decreasing temperature. Data are given for tensile and hardness properties and effects of austenite-martensite transition. 13 ref. (N7a, N-general, M27, Q-general, 2-61, 2-64, 3-68; SS-e)

435-N. (Translation-Brutcher no. 4980.) Strain Aging of Soft Structural Steels During Static Extension. F. Althoff, D. Bohm and F. Erdmann-Jesnitzer. Metallovedenie i Termicheskaya Obrabotka Metallov, Oct. 1959, p. 6-16.

Effect of static tensile loads within the elastic range and influence of time on strain aging of low-carbon structural (openhearth and basic Bessemer) steels. Results of tensile, impact and hardness tests. Effect of dynamic loads on quench aging. (N7e; ST)

436-N. Low Temperature Ageing of Iron and Low-Carbon Steel. Ivan Hrivnak. Metal Treatment and Drop Forging, v. 28, June 1961, p. 233-240, 247.

Precipitation mechanisms for nitrides and oxides in Fe and CSN 11370.3 steel are studied in terms of the dislocation model of the high-angle grain boundaries as a synthesis of parallel Burgers boundaries. 29 ref. (N7a, M26b, 2-61; Fe-b)

437-N. (Translation-Brutcher no. 4965.) The Inhomogeneity of Martensite in Cr-Mn-Si Steel 30KhGSA After Induction Hardening. Ya. I. Spektor and A. P. Gracheva. Metallovedenie i Termicheskaya Obrabotka Metallov, Sept. 1959, p. 12-17.

Previously abstracted from original. See item 610-N, 1959. (N8p, 2-64; AY)

438-N. (Translation-Brutcher no. 4969.) Recrystallization Behavior of Solid Solutions of Metals. L. P. Kurilekh. Metallovedenie i Termicheskaya Obrabotka Metallov, Sept. 1959, p. 35-38.

Previously abstracted from original. See item 611-N, 1959. (N5f, Q29n, 2-64; Fe-b)

439-N. (Translation-Brutcher no. 4970.) Strain-Hardening and Softening of Vanadium-Alloyed Ferrite. L. I. Mirkin. Metallovedenie i Termicheskaya Obrabotka Metallov, Sept. 1959, p. 39-41.

Previously abstracted from original. See item 612-N, 1959. (N7e, N5, 2-64, 3-68; Fe-b, V)

440-N. (Translation-Brutcher no. 4971.) Phase Changes in Iron Alloys. S. A. Eliseev and B. G. Livshits. Metallovedenie i Termicheskaya Obrabotka Metallov, Sept. 1959, p. 42-43.

Previously abstracted from original. See item 613-N, 1959. (N10a, Q29n, P15g, P16r, 2-64; Fe-b)

441-N. (Translation-Brutcher no. 4972.) The Change in Phase Composition of 18-8 Type Steels With Temperature and Plastic Deformation. A. N. Chukhleb and V. P. Martynov. Metallovedenie i Termicheskaya Obrabotka Metallov, Sept. 1959, p. 44-46.

Previously abstracted from original. See item 614-N, 1959. (N8p, Q27a, 2-61, 3-68; SS)

442-N. (Translation-Brutcher no. 4973.) Formation of a Lamellar Graphite Eutectoid. R. P. Todorov and G. I. Koshovnik. Metallovedenie i Termicheskaya Obrabotka Metallov, Sept. 1959, p. 47-48.

Previously abstracted from original. See item 615-N, 1959. (N8s, 2-60, 3-67; CI, Si)

443-N. (Translation-Brutcher no. 4983.) Strength Increase of Titanium Base Alloys by Cold Working. E. V. Petunia and V. L. Poplavskaya. Metallovedenie i Termicheskaya Obrabotka Metallov, Oct. 1959, p. 24-27.

Previously abstracted from original. See item 6-N, 1960. (N7e, Q27a, 2-64, 3-68; Ti-b)

444-N. (Translation-Brutcher no. 4990.) Research on Transformations and Treatment of Titanium and Titanium Alloys. A. A. Gol'denberg. Metallovedenie i Termicheskaya Obrabotka Metallov, Oct. 1959, p. 51-60.

Previously abstracted from original. See item 8-N, 1960. (N7c, Q27a, Q23p; Ti)

445-N. (Translation-Brutcher no. 4987.) Recrystallization of Cold Worked Tungsten. V. A. Lavrenko and I. E. Shiyanovskaya. Metallovedenie i Termicheskaya Obrabotka Metallov, Oct. 1959, p. 42-44.

Previously abstracted from original. See item 7-N, 1960. (N5, Q29n, M27c, 2-64; W)

446-N. (Translation-Brutcher no. 5004.) On a Hypothesis About Changes in "Krauz-Tarnavskii Bands". M. V. Rastegaev. Metallovedenie i Termicheskaya Obrabotka Metallov, Dec. 1959, p. 19-23.

Previously abstracted from original. See item 71-N, 1960. (N8, 3-68; CN)

447-N. (Translation-Brutcher no. 5009.) Distribution of Manganese and Nickel Between the Phases in White Cast Iron. I. E. Lev. Metallovedenie i Termicheskaya Obrabotka Metallov, Dec. 1959, p. 44-47.

Previously abstracted from original. See item 72-N, 1960. (N8, 3-67; CI-p, Mn, Ni)

448-N. (Translation-Brutcher no. 5139.) Diffusion of Hydrogen in Semifinished Steel. S. Ya. Povolotskii. Izvestiya VUZ--Chernaya Metallurgiya, Oct. 1960, p. 79-83.

Previously abstracted from original. See item 285-N, 1961. (N15d, N1, 2-64; ST, H)

449-N. Study on Carbides in Iron and Steel by the Electrolytic Isolation Method. Pt. 3. Behavior of Cementite During Cold Working and Subcritical Annealing. Tomo-o Sato and Taiji Nishizawa. Tohoku University, Technology Reports (Japan), v. 25, Feb. 1961, p. 181-192.

Electron microscope studies are made to investigate the mechanisms of deformation and spheroidization during annealing, cold rolling and subsequent annealing. 13 ref. (N8r, M21e, 2-64, 3-68; ST, 1-53)

450-N. Order in Alpha Brass. L. M. Clarebrough, M. E. Hargreaves and M. H. Loretto. Australian Institute of Metals, Journal, v. 6, May 1961, p. 104-114.

Nature and extent of order in alpha brass is investigated by calorimetry and by measurements of density, electrical resistivity and hardness. It is shown that short-range order exists in slowly cooled specimens. The degree of order can be increased by annealing at

low temperatures and decreased by deformation. 13 ref. (N10, P12, 2-64, 3-68; Cu-n)

451-N. (Japanese.) Observations of Aluminum Nitride in Steel by Electron Microscopy. Pt. 1. Study of Aluminum Nitride in Steel. Shigeo Hasebe. Tetsu-to-Hagane (Iron and Steel Institute of Japan), v. 47, June 1961, p. 809-817.

Precipitates in low-Mn steels, an Al-killed low-C steel and a medium-C steel containing 0.005-0.02% N and 0.03-0.12% Al and electron microscopy after various heat treatments from 900-1350° C. and different modes of deformation. Structures and shapes of the AlN compounds are given with precipitation kinetics along austenite and ferrite grain and subgrain boundaries. Lattice spacing is determined by electron diffraction. 23 ref. (N7, M21e, M26q, 2-62, 2-64, 3-68; ST, Al, N)

452-N. (Japanese.) Mechanical Properties of Isothermally Transformed Mn-Cr Spring Steel. Manabu Ueno, Iku Uchiyama and Akihiko Hoshino. Tetsu-to-Hagane (Iron and Steel Institute of Japan), v. 47, June 1961, p. 817-822.

The isothermal transformation diagram and the mechanical properties are determined for specimens austenitized at 850° C. and isothermally heat treated from 300-650° C. Data are given for tensile, yield, impact and impact tension strengths, Rockwell hardness, endurance limit, elongation, reduction of area and stress-strain relations. Bainitic, pearlitic, austenitic, carbide and martensitic transformation microstructures are observed by electron microscopy. 14 ref. (N8g, M27, Q-general, 2-64, 3-68; AY, Mn, Cr)

453-N. (Japanese.) Effect of V, Al and Zr on Properties of 18 Cr-12Ni Austenitic Stainless Steel. Ryuichi Nakagawa and Yasuo Otoguro. Tetsu-to-Hagane (Iron and Steel Institute of Japan), v. 47, June 1961, p. 828-833.

Aging behavior, microstructure, precipitation and precipitate structures, grain size and tensile properties are examined for specimens as a function of V, Al and Zr contents after aging and solution treatments from 600-1000° C. (N7, M27, Q27, 2-60, 2-64; SS-e, Ni, Cr, V, Al, Zr)

454-N. (Russian.) Apparatus Indicating the Start of Martensite Formation in Quenching. F. N. Tavadze and E. K. Kovshikov. Metallovedenie i Termicheskaya Obrabotka Metallov, Apr. 1961, p. 2-5.

Use of electrical apparatus to detect the start of martensitic transformation in steel parts quenched in water so that the correct instant, after which further cooling in oil must follow, can be ascertained. This provides for martensitic structure and prevents warping and cracking. (N8q, 1-53, 1-54)

455-N. (Russian.) Microscopic Investigation of Martensitic Transformation in 1KH18N9T Steel When Deep Cooled. S. G. Chernyavskaya and I. D. Kedrin. Izvestiya VUZ--Chernaya Metallurgiya, Apr. 1961, p. 89-92.

Austenitic stainless steel is cooled in liquid nitrogen. Formation of martensite, peculiarity of its structural form and arrangement and hardness. 4 ref. (N8p, M27, Q29n; SS)

456-N. (Russian.) Formation of Titanium Carbonitrides in Steel. Yu. G. Gurevich and E. D. Mokhir. Izvestiya VUZ--Chernaya Metallurgiya, Apr. 1961, p. 107-113.

Interaction of Ti with nitrogen in 1KH18N9T steel and the formation of Ti nitrides and Ti carbides as dependent on deoxidation, C and N content, heat treatment, cooling and subsequent rolling. 6 ref. (N8r, 2-60, 2-64, 3-68; AY, 14-68)

457-N. (Russian.) Complex Modification of Magnesium Cast Iron by FeSi and Al. Yu. N. Taran and A. V. Chernovol. Izvestiya VUZ--Chernaya Metallurgiya, Apr. 1961, p. 134-140.

Influence of FeSi and Al on the formation of cementite in castings. Eutectic transformation is studied by thermal analysis and micro-analysis of hardened specimens. Determination of correct sequence of modifier additions. 8 ref. (N8k, 2-60; CI, Mg, Fe, Si, Al)

458-N. Diffusion in Refractory Metals. N. L. Peterson. Advanced Metals Research Corp. (Wright Air Development Division). U. S. Office of Technical Services, AD 257860, Mar. 1961, 178 p. $3.

Data on diffusion in W, Ta, Mo, Cb, Pt, Hf, Zr, V, Cr and Ti. Information for 95 binary systems and 13 ternary or higher order systems. (N1; EG-d37, SGA-h)

459-N. Discussion on Martensite. Iron and Steel Institute, Journal, v. 198, June 1961, p. 165-169.

Study of the martensitic transformation of austenite steel alloys. An alloy containing 14% Cr, 14% Mn and 0.1% C is H_2O quenched at 1050° C. and the structural transformation is studied by X-ray examination. Data are also presented for an 18-8 austenitic stainless steel. 17 ref. (N8p; SS-e)

460-N. (Japanese.) Influence of Preheating on Recrystallization of Aluminium and Its Alloys. Takashi Ikeno and Kizo Skibata. Light Metals, v. 11, May 1961, p. 158-164.

Recrystallization temperature, grain size and microstructure of pure Al, 2S alloy and several alloys containing 0.5% Fe, Mn or Mg, or 2.2% Si, after preheating from 350-600° C., isothermal annealing and 85% cold rolling reduction. 4 ref. (N5, J23s, M27c, 2-64, 3-68; Al-b)

461-N. (Translation.) Coefficients of Self-Diffusion in Alloys. B. Ya. Pines and I. V. Smushkov. Soviet Physics--Solid State, v. 3, July 1961, p. 105-109. (Translation of Fizika Tverdogo Tela, v. 3, Jan. 1961, p. 3-310).

Calculation of coefficient of diffusion of atoms of one of the components into the alloy and the coefficient of self-diffusion of "average" atoms of the alloy as a function of composition. The relations include activity coefficients. 10 ref. (N1d, P12b, 2-60)

462-N. (Russian.) Effect of Tempering on the Diffusion and Solubility of Hydrogen in Steel. E. P. Nechai, K. V. Popov and L. S. Panenkova. Fizika Metallov i Metallovedenie, v. 10, Dec. 1960, p. 838-840.

U7A steel sheet of 0.7 mm. thickness is quench hardened and subsequently tempered at 100-700° C. after which the sample is electrolyzed using a Pt spiral as the anode in a normal solution of H_2SO_4 containing 3 mg. per l. As with a current of 0.06 amp. per sq. cm. density. Hydrogen diffusion is determined by measuring the quantity penetrating the sample and solubility is measured by vacuum heating at 600° C. after electrolysis. 14 ref. (N1, P12e, 1-54, 2-64; ST, H)

463-N. (Russian.) Self-Diffusion in Metals. S. D. Gertsriken. Fizika Metallov i Metallovedenie, v. 10, Dec. 1960, p. 873-878.

Computation of self-diffusion within the grain and close to the grain boundaries based on the melting temperature, boiling temperature, heat of evaporation at boiling temperature, melting heat, linear expansion coefficient and the activation energy of self-diffusion. 11 ref. (N1d, M27f, P-general)

464-N. (Russian.) Radiographic Determination of Diffusion Coefficients in the Nickel-Chromium System. B. Ya. Pines, I. P. Grebennik and I. V. Smushkov. Fizika Metallov i Metallovedenie, v. 10, Dec. 1960, p. 879-885.

Ni-Cr alloys with up to 50% Cr are examined at 450-1000° C. by electron and X-ray diffraction. Diffusion is determined as a function of concentration and temperature. 11 ref. (N1, 2-60, 2-61, M22; Ni-b, Cr)

465-N. (Russian.) Decomposition of the Beta Solid Solution in a Titanium-Manganese Alloy. M. A. D'yakova and I. N. Bogachev. Fizika Metallov i Metallovedenie, v. 10, Dec. 1960, p. 896-902.

Samples containing 6.5% Mn are slowly heated up to 900° C. in a vacuum and cooled to 650-300° C. in liquid saltpeter or lead. Beta phase decomposition in subsequent slow heating is studied by dilatometry. Hardness and electrical resistivity are determined as a function of cooling temperatures and holding times. 5 ref. (N-general, N7d, M23b, Q-general, 2-61, 2-64; Ti-b, Mn, 4-67)

466-N. (Russian.) Dispersion Hardening and Crystal Structure of a Carbon Steel With Small Vanadium Additions. S. G. Guterman, M. I. Gol'dshtein and A. M. Noskov. Fizika Metallov i

Metallovedenie, v. 10, Dec. 1960, p. 903-906.

ST40 steel is melted in a basic-lined induction furnace with 0.01-0.093% vanadium added in the ladle or the furnace. Ingots are cast, forged into bars which are normalization annealed, quenched from 840-950° C. and tempered at 400-650° C. Mechanical properties, size of atomic blocks and vanadium contained in carbide precipitates are determined as a function of the vanadium content. 6 ref. (N7a, M26, Q-general, 2-60, 2-64; ST, V)

467-N. (Russian.) Carbide Transformation in the Tempering of Carbon Steel. M. V. Belouc and V. T. Cherepin. Fizika Metallov i Metallovedenie, v. 10, Dec. 1960, p. 912-924.

U8A and U12A steel samples are heated up to 1000° C., water quenched and immersed in liquid oxygen or in a mixture of solid CO_2 and benzine at -78° C. During rapid resistance heating or induction heating followed by rapid cooling, transformation of epsilon carbide into cementite is investigated by dilatometric and electrical resistance measurements and X-ray diffraction. 32 ref. (N8a, N8r, M-general, 2-61; CN)

468-N. (Russian.) Connection Between Parameters of Carbide Coagulations and Carbon Solubility in the Austenite of Iron-Carbon Alloys. V. I. Psarev. Fizika Metallov i Metallovedenie, v. 10, Dec. 1960, p. 925-930.

Computation of the mean radius of coagulation based on the surface tension of phase boundaries, molecular weight of the dispersed phase, specific volume and the carbon concentration in the austenite at the carbide particle surface. 15 ref. (N8r, P12, 2-60; Fe-b, C)

469-N. (Russian.) Strain Aging of Nickel and Its Effect on Anomalies Observed in the Temperature-Velocity Dependence of the Deformation Resistance. V. F. Sukhovarov and R. P. Kharlova. Fizika Metallov i Metallovedenie, v. 10, Dec. 1960, p. 938-941.

Specimens of N1 Ni containing traces of Co, Fe, Cu and Si and 0.05% C are vacuum heat treated at 900° C., air cooled and compression tested at velocities of 2-2400% per hr. at 20-350° C. Anomalies in the flow diagrams are explained by the formation and decay of Cottrell clouds composed of carbon atoms. 13 ref. (N7e, M26b, Q23q, 2-61, 3-67; Ni-b)

470-N. Study on Precipitation Phenomena in Thin Films of Supersaturated Gold-Nickel Alloy. Yasushige Fukano. Physical Society of Japan, Journal, v. 16, June 1961, p. 1195-1204.

Structure changes in supersaturated Au-Ni alloy after successive agings are studied by electron diffraction and electron microscopy. Specimens are prepared by vacuum evaporation and subsequent quenching. 18 ref. (N7, M-general, 2-64, 2-65; Au-b, Ni, 14-62)

471-N. (German.) Electrical Transport of Gold in Silicon. B. I. Boltaks, G. S. Kulikow and R. Sch. Malkowitsch. Physikalische Abhandlungen aus der Sowjetunion, v. 4, May 1961, p. 249-254.

Investigation of diffusion and solubility of Au in Si by studying electrical transport of radioactive Au^{198} isotopes at 1088-1363° C. Relation of the diffusion mechanism to effective electron mobility. 10 ref. (N1, P12e, 2-61; Si, Au)

472-N. (Russian.) Coagulation of Carbide Particles in Carbon Steels Below the A_1 Temperature. V. I. Psarev. Izvestiya VUZ--Chernaya Metallurgiya, Dec. 1960, p. 91-96.

Formation and coagulation of cementite particles are investigated in U10, U12, U17, I10, I12 and I17 alloy steels. Particle size and number are related to carbon content, heat treatment and coagulation temperature. Brinell hardness as dependent on carbide phase surface area. 7 ref. (N8r, N8k, Q29b, 2-60, 2-61, 2-64; CN)

473-N. (Russian.) Effect on Volume of the "Third Transformation" During Tempering of Quenched Steel. V. G. Permyakov and M. V. Belous. Izvestiya VUZ--Chernaya Metallurgiya, Dec. 1960, p. 99-105.

Specimens of U8A, U10A and U12A steels are austenitized, quenched and reheated in a dilatometric furnace to 600° C. and slow cooled. Residual austenite is measured by ballistic magnetometer and data given for dilatometric curves and specific volume of carbide. 15 ref. (N8a, N8n, P10d, M23, 1-53; CN)

474-N. (Russian.) Effect of Dendritic Liquification of Silicon on Phase and Structure Transformations in Spring Steel. Ya. N. Malinochka. Izvestiya VUZ--Chernaya Metallurgiya, Dec. 1960, p. 106-110.

Cast and rolled steels are austenitized, quenched and tempered by various methods. Nital and sodium picrate are compared as etchants of partially austenitized steel for effectiveness in showing dendritic structure. Microstructure is investigated as a function of time and temperature of heat treatment. (N12b, J22, M-general, 2-64; ST, Si)

475-N. (Russian.) Nature of the Secondary Martensitic Transformation in Steels. G. V. Korotushenko. Izvestiya VUZ--Chernaya Metallurgiya, Dec. 1960, p. 114-123.

Austenitization at 1240-1260° C., quenching and heat treating from -150 to 570° C. of steels containing 0.85% C, 12.3-14.6% Cr and 0-1.63% Ni. Residual austenite measured by magnetic anisometer. X-ray diffraction analysis and dilatometric measurements. Secondary microhardness, martensite transformation temperature and lattice parameters are investigated as functions of steel composition and final heat treatment. 20 ref. (N8p, J-general, M-general, Q29q, 2-60; ST)

476-N. Investigation of the Sputtering of Silicon. S. P. Wolsky and E. J. Zdanuk. Journal of Applied Physics, v. 32, May 1961, p. 782-786.

A vacuum microbalance is used to determine the sputtering yield for the ArSi system energies of 34-800 ev. Variation of the discharge voltage yields the relative sputtering effectiveness of monovalent and divalent Ar ions. The data indicates that the sputtering surfaces are clean and reproducible. 18 ref. (N15g; Si, Ar)

477-N. Self-Diffusion in Silver During Plastic Deformation in Torsion. J. B. Darby, Jr., C. T. Tomizuka and R. W. Balluffi. Journal of Applied Physics, v. 32, May 1961, p. 840-848.

Study of self-diffusion in Ag polycrystals at 700-800° C. using a sectioning technique before and after deformation. Effect of strain rate and dislocation interaction on diffusivity. 18 ref. (N1d, M26b, 2-61, 3-68; Ag)

478-N. Mercury Ion Beam Sputtering of Metals at Energies 4-15 Kev. G. K. Wehner and D. Rosenberg. Journal of Applied Physics, v. 32, May 1961, p. 887-890.

Sputtering yields for 14 metals from the 4th, 5th and 6th periods are measured for normally incident Hg ions. The sputtering rate is determined by measuring the time required for the ion beam to pierce the target foil. 17 ref. (N15g)

479-N. Experimental Study of Intermetallic Diffusion in Large Temperature Gradients. C. J. Meechan. Journal of Applied Physics, v. 32, May 1961, p. 945-950.

Chemical diffusion in Kirkendall diffusion couples as influenced by temperature gradients of 2000-3000° C. per cm. imposed across the interface of couples fabricated from fcc. metal systems including Au-Ni, Cu-Ni, gamma Fe-Ni, gamma Fe-Pd and Ni-Pd. 16 ref. (N1e, 2-61; Au-b, Cu-b, Fe-b, Ni, Pd)

480-N. (Czech.) Retained Austenite. Ales Kalivoda. Hutnicke Listy, v. 16, Feb. 1961, p. 135-138.

CSN 16341 steel containing Cr, Ni and Mo is hardened at 820-1000° C., water or oil quenched to 200-100° C. and held at these temperatures for 10-24 hr. Effect of subsequent tempering at 20-400° C. and of previous heat treatment on quantity of retained austenite. 12 ref. (N8n, 2-64; AY)

481-N. (Russian.) The Role of Surface Phenomena During Hydrogen Redistribution Between the Metal and the Gas Phase. V. B. Dzhoshi, A. F. Vishkarev and V. I. Yavoiskii. Izvestiya VUZ--Chernaya Metallurgiya, Mar. 1961, p. 23-30.

Investigation of hydrogen behavior during melting of Armco steel. The regularity and speed of hydrogen absorption and adsorption are shown to depend on the gaseous film composition of the boiling metal, entrance of hydrogen into the metal through the slag and the influence of C, O and Si on surface tension in the presence of H. 14 ref. (N16m, P13h; ST, C, O, Si, H)

482-N. (Russian.) Examination of the Metal Composition at Different Levels of a Martin Furnace Bath. E. V. Chelishchev, D. I. Turkenich, N. P. Zhetvin and V. P. Tunkov.

Izvestiya VUZ--Chernaya Metallurgiya, Mar. 1961, p. 31-36.

Investigation to find the zone of the most active development of decarbonization, the distribution of carbon and oxygen according to the depth of the metal bath and the amount of each that is present and the mechanism of diffusion as a function of metal-slag proportions and temperature. (N16m, N1c, D11n, 2-61, 3-69)

483-N. (Russian.) The Influence of Carbon Content on the Diffusion of Hydrogen Into Carbon Steels. G. I. Batalin and A. L. Balyasnyui. Izvestiya VUZ--Chernaya Metallurgiya, Mar. 1961, p. 120-125.

Experimental investigation of the speed of hydrogen diffusion into various steels (grade 20, 30, 40, U8, 20KH) as dependent on carbon content and temperatures (400-935° C.) 5 ref. (N1, 2-60, 2-61; CN, H)

484-N. (Russian.) Investigation of the Recrystallization Temperature of Bimetallic Nickel Alloys. S. S. Gorelik, E. N. Spektor and S. N. Minkina. Izvestiya VUZ--Chernaya Metallurgiya, Mar. 1961, p. 138-147.

Investigation of Ni-Be, Ni-Cu, Ni-Al systems where Be, Cu and Al have smaller atomic radii than Ni, to find the influence of this difference on the temperature of recrystallization, the influence of the diffusibility of the added elements on the cohesive forces of the alloy and the influence of small additions of Cr on the temperature of recrystallization. 8 ref. (N5, 2-60; Ni-b, Be, Cu, Al, Cr)

485-N. (Russian.) Recrystallization of 40Kh Steel During Deformation at High Temperatures. V. P. Severdenko and P. P. Ankut. Izvestiya VUZ--Chernaya Metallurgiya, Mar. 1961, p. 148-153.

Investigation of grain size as a function of deformation area and speed, chemical composition, temperature and thermal treatment before and after deformation. (N5, M27c, 2-60, 2-61, 3-68; ST)

486-N. (Italian.) Diffusion of Metals. T. Federighi. Metallurgia Italiana, v. 53, June 1961, (Atti-Notizie, v. 16, May-June 1961, p. 126-129.)

Mechanism of diffusion and auto diffusion phenomena of metals are studied. Determination of diffusion coefficient and activation energy. Kirkendall effect and movement of atoms with respect to their lattice structure are described. (N-general)

487-N. The Effect of Titanium Upon Austenitic Spheroidal Graphite Cast Iron. Irving B. Elman. Current Engineering Practice, v. 3, May 1961, p. 23-27.

Cr-free austenitic spheroidal gray cast iron specimens are tested to determine necessary Mg content for providing spheroidal graphite structure in irons having various Ti contents. Effect of section size and Ce additions. (N8q, 2-60, 3-73; CI-r, Ti, Mg, Ce)

488-N. (Translation-Brutcher no. 4992.) The Martensitic Transformation in Steel. A. P. Gulyaev. Metallovedenie i Termicheskaya i Obrabotka Metallov, Nov. 1959, p. 5-18.

Previously abstracted. See item 85-N, 1960. (N8p, 2-61, 2-63, 3-68; ST)

489-N. (Translation-Brutcher no. 4993.) Changes in Strength and Plasticity During Direct and Reverse Martensitic Transformations. M. E. Blanten and A. K. Mashkon. Metallovedenie i Termicheskaya Obrabotka Metallov, Nov. 1959, p. 13-19.

Previously abstracted. See item 86-N, 1960. (N8p, Q27a, Q23, M26, Q29n, 3-68, 2-63; Fe-b, Ni, Mn, C)

490-N. (Translation-Brutcher no. 4994.) Transformations in Steel During Heating. N. N. Lipchin. Metallovedenie i Termicheskaya i Obrabotka Metallov, Nov. 1959, p. 19-23.

Previously abstracted. See item 87-N, 1960. (N8, 2-64; AY)

491-N. (Translation-Brutcher no. 5001.) Carbide Transformation in Alloy Steels. A. P. Gulyaev. Metallovedenie i Termicheskaya Obrabotka Metallov, Nov. 1959, p. 54-61.

Decomposition of Me23C6 carbide in tungsten steel; carbide transformations in Cr-W-V die steels; carbides formed during tempering of 12% chromium steel; carbide transformations in molybdenum steels. (N8r; AY)

492-N. (Ukranian.) Study of the Effect of Small Inclusions of Cadmium on Volume

and Border Diffusion of Cadmium in Copper. A. L. Revo. Ukrainskii Fizichnii Zhurnal, v. 6, no. 1, 1961, p. 143-144.

Diffusion of Cd in pure Cu and in Cu with 0.1% inclusion of Cd at 340-900° C. is determined using isotope Cd^{115} (N1, 1-59, 2-60; Cu-b, Cd)

493-N. Degassing and Permeation of Gases in Tube Materials. R. H. Collins and J. C. Turnbull. Paper from "Advances in Electron Tube Techniques" Fifth U. S. National Conference, Proceedings (Sept. 1960). Pergamon Press Inc., New York 22, 1961, p. 186-190.

Permeation by H, N, CO, He and CO_2 is studied for Monel, Inconel, Ni, 52 alloy, Kovar and stainless steel. Thermal outgassing of 403 Monel and 304 stainless steel after various degreasing and firing procedures is measured during heating to 1000° C. (N15, P11m, 2-62, T1; Ni-b, SS, 17-57)

494-N. Thermal Degassing of Tube Materials. R. H. Collins and J. C. Turnbull. Paper from "Advances in Electron Tube Techniques". Fifth U. S. National Conference, Proceedings (Sept. 1960). Pergamon Press Inc., New York 22, 1961, p. 191-195.

Gas evolution rates are measured for Ni, cold rolled or clad steel, Ta, Cu, Mo, N, Ti and various ceramic materials during degassing by continued heating at 400-1000° C. (N15, P11m, 2-60, T1; ST, Ni-b, EG-d37, NM, 17-57)

495-N. Kirkendall Effect and Diffusion in the Gold-Platinum System. Pt. 1. A. Bolk. Acta Metallurgica, v. 9, July 1961, p. 632-642.

Measurement of the Kirkendall effect as a function of time temperature in a number of "sandwich type" couples consisting of pure Au and Pt, polycrystalline and monocrystalline, and of pure Au and a Au-rich alloy. Phenomena associated with the Kirkendall effect including porosity, dimensional and structural changes and phase boundary displacement. 22 ref. (N1; Au, Pt)

496-N. Kirkendall Effect and Diffusion in the Gold-Platinum System. Pt. 2. The Concentration Penetration Curves and the Diffusion Coefficients. A. Bolk. Acta Metallurgica, v. 9, July 1961, p. 643-652.

The over-all diffusion coefficient is calculated from concentration penetration curves by the Matano graphical method. From the observed Kirkendall displacement and the data concerning the concentration gradient and the concentration in the marker interface, partial diffusion coefficients are calculated. Method for expressing the Kirkendall effect in a numerical value between 1 and 0. 18 ref. (N1; Au, Pt)

497-N. A Study of the Recrystallization and Grain Growth of Cold Rolled and Annealed Titanium -10% Molybdenum Alloy. T. H. Schofield and A. E. Bacon. Acta Metallurgica, v. 9, July 1961, p. 653-669.

Distribution of dislocations in a Ti-10% Mo alloy after cold deformation and annealing is studied using a decoration technique to reveal dislocation sites. Specimens are deformed at various degrees of strain by the cold rolling between 4 and 80% reduction and subsequently reheated at 820-850° C. for increasing periods in the beta phase field followed by cooling at the critical rate. (N5, N3, 2-64, 3-68; Ti, Mo)

498-N. Investigation of Strain Ageing of Quench-Aged Alpha Iron Containing Nitrogen, Using Internal-Friction Techniques. W. S. Carswell. Acta Metallurgica, v. 9, July 1961, p. 670-677.

The strain aging of alpha iron containing nitrogen quench-aged from 60-180° C. for 6 to 17 days is examined after slight strain by torsional pendulum damping. Changes in damping after strain are described in three stages. Variation in density of dislocations with strain and quench-aging temperature is explained by Koehler's model for the generation of dislocations. 19 ref. (N7e, M26q, X28q; Fe)

499-N. Dendritic and Spheroidal Growth. G. Horvay and J. W. Cahn. Acta Metallurgica, v. 9. July 1961, p. 695-705.

Exact solutions to the diffusion equation are obtained which correspond to diffusion controlled growth of elliptical paraboloids (dendrites; forward growth with linear time dependence)

and spheroids (growth with square root of time dependence). The elliptical dendrite includes as special cases the dendrite of circular cross section and the dendrite platelet. 17 ref. (N8q, N12b)

500-N. The Crystallography of the Martensite Reaction in Steel. A. G. Crocker and B. A. Bilby. Acta Metallurgica, v. 9, July 1961, p. 678-688.

Computer programs are prepared and used to examine the crystallographic features of the martensite reactions in steels. The criteria of low or minimum values of the shape shear and the slip or twinning shear are used in assessing the predictions. 30 ref. (N8p, M27; ST)

501-N. (German.) Chemical Influences on Thermally Controlled Structural Changes in Thin Film Single Crystals of Gold. P. A. Thiessen and E. Zabel. Monatsberichte der Deutschen Akademie der Wissenschaften zu Berlin, v. 3, Jan. 1961, p. 22-26.

Structural changes are observed microscopically and electron microscopically on single crystals heated in Au leaves. Transition temperature as influenced by surrounding atmosphere (nitrogen, oxygen, ozone). (N11h, M26, 2-60, 2-61, 2-66; Au, 14-61, 14-62)

502-N. (German.) Observation of Phase Formation in Cathodic Spraying of Metals. P. A. Thiessen and Chr. Stolpe. Monatsberichte der Deutschen Akademie der Wissenschaften zu Berlin, v. 3, Jan. 1961, p. 26-29.

Microscopic investigation in cathodic spraying of Pt and Au on Al_2O_3 films, submicroscopic asbestos fibers and undercooled (200° K.) ice under pure nitrogen atmosphere. Mechanism of crystal growth. (N15g, L25h, M26; Pt, Au, Al)

503-N. Basic Studies of the Metallic State (The Recalescence of Supercooled Liquids on Freezing). M. E. Glicksman. Report of NRL (Naval Research Laboratory Progress, July 1961, p. 20-21. (Available as PB 171320 from U. S. Office of Technical Services, Washington 25, D. C.)

Nonisothermal solidification in supercooled liquid metals is discussed as a materials-energy balance within an adiabatic system. An equation expressing the total mass friction solidified at the end of recalescence is developed and graphed for a number of pure metals. 8 ref. (N12n, 1-54)

504-N. (Russian.) Crystallization of a Binary Alloy for the Assumed Case of Stability. V. T. Borisov. Doklady Akademii Nauk SSSR, v. 136, Mar. 1961, p. 583-586.

Crystallization under the assumed condition that the temperature and concentration on the phase boundaries correspond to those of the equilibrium diagram. An intermediate binary zone located between the liquid and solid phases is assumed. Diffusion and heat exchanges. (N12)

505-N. (German.) Improved Method for X-Ray Determination of Retained Austenite in Hardened Steels. Gerhard Lucas and Hans Nutzel. Siemens Zeitschrift, v. 35, May 1961, p. 445-451.

Nondestructive analysis of retained austenite in hardened steels (100 Cr 2 steel and 100 CrMn 6 steel) by Debye-Scherrer technique eliminating Fe radiation. Determining calibration curves for mixtures of steel filings and austenitic deep drawing steel strip. (N8n, 1-53, S11p; SS-c)

506-N. The Ledge Theory of Recrystallization in Polycrystalline Metals. P. W. Davis, A. P. Greenough and B. Wilshire. Philosophical Magazine, v. 6, June 1961, p. 795-799.

Ledges forming at grain boundaries in plastically deformed metals (corresponding to slip lines formed on the surface) are related to grain boundary migration, energy density and nucleation during deformation as a function of temperature for polycrystalline Ag, Au, Al, Cu and Pb. Recrystallization, grain size, orientation and growth are related to temperature of strain on this basis. 11 ref. (N5, N3, Q24, 2-61, 3-68; Ag, Au, Al, Cu, Pb)

507-N. (Japanese.) Effect of Nickel and Copper Addition on Carbide Precipitation in Hadfield Steel. Pt. 3. Study of Austenitic High-Manganese Steel. Yunoshin Imai and Toshio Saito. Tetsu-to-Hagane (Iron and Steel Institute of Japan, Journal), v. 47, July, 1961, p. 929-935.

Hadfield steels containing 12. 44-14. 87% Mn with additions of

3.02% Cu and 2.79-3.16% Ni are examined microscopically after solutioning and isothermal heat treatments. Carbide and pearlite precipitation on grain boundaries and within grains is noted with data given for tensile properties and Vickers hardness as a function of composition. 13 ref. (N7, N8r, Q-general, 2-60, 2-64; ST, Mn, Cu, Ni)

508-N. (Russian.) Effect of Cooling in Solidification on the Quantity of Eutectic in Aluminum Alloys. V. S. Zolotorevskii and I. I. Novikov. Izvestiya Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk, Metallurgiya i Toplivo, Jan. 1961, p. 39-43.

Alloys with 2-5% Cu and 6% Mg are heated and allowed to cool in crucibles of graphite fireclay or steel of varying wall thickness, in the furnace, in air or in water. Effect of cooling rate on eutectic structure, dendritic liquation and the microhardness of dendritic cells measured at their center and circumference. 12 ref. (N9, N12b, N12q, 3-67; Al-b, Cu, Mg)

509-N. (Russian.) Effect of Previous Aging on the Graphitization of White Cast Iron. I. E. Brainin, Ya. A. Smolyanitski and S. I. Shapovalov. Izvestiya Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk, Metallurgiya i Toplivo, Jan. 1961, p. 49-54.

Cylindrical samples containing 2.73-2.97% C, 1% Si, 0.52-0.68% Mn, 0.17-0.20% S and 0.052-0.054% Cr are aged at 200-700° C. for 0.5-192 hr. and subsequently malleablized at 930° C. for 3-6 hr. Effect of aging and malleablizing temperatures and times on size and shape of graphite inclusions. 9 ref. (N8s, 2-65, J23b; CI-p, 9-69)

510-N. (Russian.) Coalescence, Spheroidizing and Closing of Micropores and Microcracks in Iron Alloys. E. N. Pogrebnoi. Izvestiya Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk, Metallurgiya i Toplivo, Jan. 1961, p. 58-63.

A cast steel is homogenization annealed at 900-1200° C. for 0-10 hr. in the cast state after a 30% cold deformation or previous water quenching from 1100° C. Effect of homogenization temperature and time on number and shape of graphite inclusions and the disappearance of microcracks and pores caused by crystallization, deformation or quenching. 6 ref. (N3, N8q, N12, 2-64, 3-68; ST, 5, 9-69)

511-N. (Russian.) Kinetics of the Recrystallization of Technical Iron During Continuous Rapid Heating. V. I. Ivanov. Izvestiya Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk, Metallurgiya i Toplivo, Jan. 1961, p. 74-77.

Hollow cylinders with a wall thickness of 1 mm. are manufactured from 99.76% pure Fe subjected to a cold deformation of 55%. Determination of the temperatures and times of starting and completed recrystallization during induction heating at 1-1450° C. per sec. Computation of average recrystallization speed. (N5f, 2-64; Fe)

512-N. (Russian.) Redistribution of Carbon in Iron Alloys With Ferritic Austenitic Structure. B. I. Bruk. Izvestiya Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk, Metallurgiya i Toplivo, Jan. 1961, p. 78-86.

Bimetals composed of carbon steel with 0.1-0.2% carbon on one side and austenitic Kh22N15 steel, a Fe-Cr-Ni alloy with 18% Cr and 4-18% Ni, an Fe-Ni alloy with 3.2-23% Ni or carbon steel with 1.08% carbon on the other side are held at 500-1200° C. for 1-100 hr. Effect of heating on final distribution of carbon over the two metals in contact is determined autoradiographically making use of the radioactive isotope C^{14}. 14 ref. (N1e, N8r, 2-64, M23q; CN, AY, C)

513-N. Strain Aging Effects in Columbium Due to Hydrogen. B. A. Wilcox and R. A. Huggins. Paper from "Columbium Metallurgy". v. 10. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 257-278.

The activation energies calculated for strain aging of both as-received commercial arc-melted Cb and hydrogenerated Cb are found to be in close agreement with the activation energy for the diffusion of hydrogen in Cb. It is therefore concluded that hydrogen is the interstitial element responsible for strain aging in Cb at low temperatures.

Hydrogen-charging Cb to the point of forming an internal hydride second phase is shown to cause severe embrittlement. (N7e, P13a, Q26s, 2-61, 3-69; Cb, H)

514-N. Recovery and Recrystallization of Columbium-1.0% Zirconium Alloy. J. R. Stewart, W. Lieberman and G. H. Rowe. Paper from "Columbium Metallurgy". v. 10. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 407-432.

Behavior follows classical theory in that increasing cold work results in decreasing temperature for initiation of recovery and recrystallization. Tests in the as-cold-worked condition show that the elevated temperature yield strength decreases and primary creep rate increases with increasing cold work. The best combination of properties is obtained by a 1200° C. anneal following a cold reduction of 20-40%. (N4, N5, Q-general, 2-61, 2-64, 3-68; Cb-b, Zr)

515-N. The Recrystallization Behavior of Columbium--Vanadium Alloys. B. S. Shabel, F. W. Kunz and D. L. Douglass. Paper from "Columbium Metallurgy". v. 10. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 435-457.

A grain size effect is noted on the recrystallization kinetics in one alloy. A Fourier analysis of the (110) line provides a qualitative description of line broadening in the cold rolled specimens; the application of this technique to annealed specimens suggests that the particle size contribution, probably the result of polygonization, increases to a measurable extent as the temperature is raised above 900° C. The cold rolled textures are similar to those obtained in other b-c-c. metals. 7 ref. (N5, N4, 2-59; Cb-b, V)

516-N. (Translation.) Diffusion of Tungsten in a Cobalt-Based Alloy. I. I. Kovenskii. Soviet Physics--Solid State, v. 3, Aug. 1961, p. 252-254. (Translation of Fizika Tverdogo Tela, v. 3, Feb. 1961, p. 317-670).

A radioactive tracer method, with W-185, is used to determine the diffusion coefficients for tungsten diffusion in a binary alloy (98.66% Co, 0.82% W) at 1100-1350° C. 4 ref. (N1e, 1-55; Co-b, W)

517-N. A High Temperature X-Ray Study of Ordexing in Iron-Aluminium Alloys. A. Lawley and R. W. Cahn. Physics and Chemistry of Solids, v. 20, Aug. 1961, p. 204-221.

The variation with temperature of long-range order in Fe-Al (19-50%Al) solid solutions is studied up to 800° K. using a high temperature diffractometer and short-range order is studied at room temperature by measuring diffusely scattered X-rays. The order disappears gradually during heating with no sudden drop at the critical temperature. The degree of order at a given temperature below critical temperature depends on the thermal history. Magnetic properties at high temperature are given with superlattice and atomic configurations and a proposed phase diagram. 47 ref. (N10, M22g, 2-61, P16; Fe-b, Al)

518-N. Germanium Dendrite Studies. Pt. 1. Studies of Twin Structures and the Seeding Mechanism. J. W. Faust, Jr., and H. F. John. Electrochemical Society, Journal, v. 108, Sept. 1961, p. 855-860.

Review of orientation and twin requirements of suitable seeds for dendrite growth of long ribbons of semiconductors. Study of seeding mechanisms, growth buttons and button wings and the initiation and mechanism of spontaneous and controlled dendritic growth from buttons. 10 ref. (N12b, Q24a, 3-72; Ge)

519-N. Germanium Dendrite Studies. Pt. 2. Lateral Growth Processes. J. W. Faust, Jr., and H. F. John. Electrochemical Society, Journal, v. 108, Sept. 1961, p. 860-863.

Ge dendritic ribbons are studied by metallographic techniques, showing, that the formation of a ribbon is a complex process involving the lateral extension of arms from the central core to give, at one stage, and H-shaped cross section, which is not dependent on the twin structure. 12 ref. (N12b, M-general; Ge)

520-N. Germanium Dendrite Studies. Pt. 3. Dislocations. J. W. Faust, Jr., and H. F. John. Electrochemical

Society, Journal, v. 108, Sept. 1961, p. 864-868.

The dislocation arrays in fractured and etched Ge dendritic ribbons are described with the three main areas where they can occur. The source is entrapped molten Ge which causes plastic deformation on freezing. 15 ref. (N12b, M26b; Ge)

521-N. Single Crystal Silicon Overgrowths. Albert Mark. Electrochemical Society, Journal, v. 108, Sept. 1961, p. 880-885.

The pyrolytic process for the vapor phase deposition of single crystal Si overgrowths on parent substrates is described. The method utilizes the dissociation of $SiCl_4$ by H in an open tube flow process at 1150-1200° C. with flow rates of 250-2000 milliliters per min. Free energy and vapor pressure data and the dissociation relationship are discussed with the dependence on temperature of the Si morphologies. (N15g, M26, 2-61; Si, 14-61)

522-N. Grain-Boundary Diffusion. A. E. Austin and N. A. Richard. Journal of Applied Physics, v. 32, Aug. 1961, p. 1462-1471.

Diffusion of Ni into grain boundaries of various tilt angles in Cu bicrystals is studied. Concentration contours from the grain boundary and the lateral lattice diffusion are measured by means of electron-probe microanalysis. The product of grain boundary width and diffusion coefficient is calculated and comparisons made with theoretical solutions. The grain boundary coefficient is concentration dependent above 3% Ni in a 45° tilt boundary. With lower tilt angles, the coefficient is concentration dependent above 0.5% nickel. 17 ref. (Ni, N10; Cu, Ni)

523-N. Surface Kinetics and Physics Investigation of the Reaction Between Single-Crystal Germanium and Iodine. W. J. Heinecke and S. Ing, Jr. Journal of Applied Physics, v. 32, Aug. 1961, p. 1498-1504.

The kinetics of the reaction and the resulting electrical surface are studied. Activation energy of 18.5 kcal/mole is found; however, frequency factors are found to differ with orientation. Aging effect of the surface is found through field-effect surface measurements. A surface acceptor-like trap with an energy level of 0.44 ev. is investigated with an indicated density of 1.4×10^{12}/cm.^{2} 13 ref. (N15e; Ge, I)

524-N. Single-Crystal Tin Films. Richard W. Vook. Journal of Applied Physics, v. 32, Aug. 1961, p. 1557-1561.

High-purity films made in ultra high vacuum by evaporation on (001) faces of NaCl yield single-crystal formation at liquid nitrogen temperature, using cleaved surfaces and short successive evaporation times. With substrates at 0° C., or with one continuous evaporation rate of more than 10 sec., films are polycrystalline and (100) oriented. Factors influencing grain growth are discussed. (N15g, N3, 2-61; Sn, 14-62)

525-N. Ferromagnetic Nucleation Sources on Iron Whiskers. R. W. De Blois. Journal of Applied Physics, v. 32, Aug. 1961, p. 1561-1563.

A temperature-dependent shift of nucleation-field contour, increases in nucleation field following electropolishing and a correlation between microscopic surface imperfections and regions of nucleation-field minima are observed. Results indicate that abrupt surface contour variations are primarily responsible for reducing the observed nucleation fields for iron whiskers to below the ideal value. 8 ref. (N2q, 2-61; Fe, 14-61)

526-N. Study of Electron Bombardment of Thin Films. G. B. Gilbert, T. O. Poehler and C. F. Miller. Journal of Applied Physics, v. 32, Aug. 1961, p. 1597-1600.

Methods of changing physical properties of thin metallic films including alterations of crystal structure resulting from electron bombardment. Films vapor deposited on amorphous substrates are bombarded by a 35-kev. electron beam in a Zn recrystallization process. X-ray diffraction photographs and photomicrographs indicate substantial crystal growth in films of In, Bi and Ge. 8 ref. (N3, P-general, 2-67; In, Bi, Ge, 14-62)

527-N. X-Ray Diffraction Study of Interdiffusion in Cu-Ni Powder Compacts. Bertina Fisher and P. S. Rudman. Journal of Applied Physics, v. 32, Aug. 1961, p. 1604-1611.

Interdiffusion in Cu-Ni powder compacts studied by X-ray diffraction line

shape analysis. The dominant mechanism from 750-950° C. is grain boundary diffusion. At 1050° C. a new mechanism with a higher activation energy dominates, identified as bulk diffusion. Metallographic observation indicates that, prior to appreciable interdiffusion, the Cu, by surface diffusion, envelopes the Ni particles with subsequent interdiffusion between the Ni-rich core and Cu-rich shell. 7 ref. (N1c, 2-61; Cu, Ni)

528-N. Polygonization in Bent Zinc Crystals. P. P. Sinha and Paul A. Beck. Journal of Applied Physics, v. 32, July 1961, p. 1222-1226.

A dislocation etching technique for revealing the edge dislocations produced by bending is used to examine mechanical polygonization mechanisms in annealed and unannealed high purity Zn crystals. Low angle boundaries are formed in bending suitiably oriented specimens, the process being independent of thermal activation. 12 ref. (N4, N5, M26b, 3-68, 3-72; Zn, 14-61)

529-N. The Sub-Critical Graphitization of Steels and Related Alloys. J. E. Harris, J. A. Whiteman and A. G. Quarrell. Paper from "Steels for Reactor Pressure Circuits". no. 69. Iron and Steel Institute, London SW 1, England, 1961, p. 54-76.

Graphitization characteristics of a number of vacuum melted pure Fe-C and Fe-C-Si alloys. Increasing the impurity contents, raising the Al levels and quenching to martensite accelerate graphitization. Little advantage is to be gained from making Ni-Mg additions to a hypereutetoid steel; the stablizing effect of the Mg is counter balanced by the graphitizing action of the Ni. (N8s, 2-60, 2-64, 3-69; ST)

530-N. The Decomposition of Cementite in Low-Carbon Steels. G. V. Jeminson and G. T. Higgins. Paper from "Steels for Reactor Pressure Circuits". no. 69. Iron and Steel Institute, London SW 1, England, 1961, p. 77-88.

The extent of graphitization in 0.15% C steels at 600° C. is critically dependent upon the nucleation rate and in particular upon the strain energy term associated with the formation of a graphite nucleus. Above 600° C. the restricted nucleation gives rise to a reversion in the graphitization rate. At lower temperatures nucleation occurs more readily and the growth rate assumes greater importance in the over-all control of the graphitization rate. Growth is controlled initially by the rate of carbon diffusion and in the later stages by the rate of solution of cementite. (N8s, N8k, N2, 2-60, 2-62; CN-g)

531-N. The Graphitization of Low-Carbon Steels. M. Farrow. Paper from "Steels for Reactor Pressure Circuits". no. 69. Iron and Steel Institute, London SW 1, England, 1961, p. 89-100.

Importance of deoxidation technique on the susceptibility of a particular steel to graphitization. Certain alloying elements are shown to enhance graphitization (Al, Si, Ni, Cu and Co) while others (Cr, Ti, V and Mo) retard the process. The importance of nitrogen as a graphitization inhibitor. (N8s, 2-60; CN-g)

532-N. (Ukranian.) Analysis of Experimental Data of Metal and Alloy. S. D. Hertzriken. Ukrainskii Fizichnii Zhurnal, v. 6, Jan. 1961, p. 138-139.

Equation and tables for diffusion parameters of Ag in AgSn, AgCd and AgCu systems and for the diffusion of Fe in FeAl system at the solidus temperature. (N1e; Ag-b, Fe-b, Al)

533-N. (English.) Diffusion of Nitrogen in Iron-Titanium Alloys. T. Konkoly. Periodica Polytechnica, v. 5, Jan. 1961, p. 5-12.

Alloys of Armco iron with 0-4.25% Ti and having Ti/C ratios between 0 and 85 are nitrided for 5 hr. at 460-660° C. with determination of microhardness, microstructure, diffusion coefficient and case properties as a function of Ti/C ratio. (N1, J28k, M27, Q29, 2-60; Fe-b, Ti)

534-N. (German.) Age Hardening of Lead-Antimony Alloys Containing 2-16% Antimony. H. Borchers and K. Bunnenberg. Metall, v. 15, Aug. 1961, p. 765-771.

Investigation of age hardening of cast, air cooled or quenched, as-cast or diffusion-annealed (160-240° C.) and (-60 to 100° C.) aged specimens with and without pre-aging at 0 to -60° C. by hardness, microhardness and tensile testing and by microscopic examination. (N7a, M-general, Q-general, 2-61, 2-65; Pb-b, Sb)

535-N. Self-Diffusion in 50-50 Gold-Cadmium. H. B. Huntington, N. C. Miller and V. Nerses. Acta Metallurgica, v. 9, Aug. 1961, p. 749-754.

Studies on annealed specimens by the standard sectioning technique using radioisotopes Cd^{115} and Au^{198} at 303-601° C. The ratio of the diffusivities is roughly 4:3 throughout and is consistent with a mechanism of nearest neighbor vacancy jumping. Data are given for diffusion coefficients and the activation energies for diffusion as a function of temperature. 16 ref. (N1d, M26s, 1-59, 2-61; Au-b, Cd-b)

536-N. Diffusion. P. H. Sutter. Chapter 7 from "Thermoelectricity--Science and Engineering". Interscience Publishers, Inc., New York 1, 1961, p. 154-180.

Various diffusion processes which occur in thermoelectric materials are discussed, giving coefficients for several semiconductors (S, Se, Te, Ge, In, Ga, Si, Sb, Cd) in InAs, InSb, GaSb, ZnSb, PbTe, PbSe, PbS, Bi_2Te_3 and Bi_2Se_3 at 200-1120° C. 45 ref. (N1e; EG-j)

537-N. Investigation of Aging of Welded Joints After Heat Treatment. V. F. Grabin, S. M. Gurevich, V. A. Rafalovskii and V. I. Trefilov. Avtomaticheskaya Svarka, v. 14, June 1961, p. 3-13.

Kinetics of aging of tempered weldments composed of three alloys containing different concentrations of beta stabilizing elements. Effect of aging on hardness, electrical resistance, dilatometry and microstructure. 17 ref. (N7d, M23b, M27, P15g; Ti-b, 7-51)

538-N. (Russian.) Crystallization Fissures Occurring in Weldments. N. F Lashko and S. V. Lashko-Avakyan. Avtomaticheskaya Svarka, v. 14, June 1961, p. 37-46.

Polygonization character of formation of hot cracks in welded austenitic steel weldments. Formation of fissures along the boundaries of crystallites in the solid state and propagation to the crystallization front. Etching methods and microstructure. 15 ref. (N5, M20q, M27f; SS, 7-51, 9-72)

539-N. Recrystallization of Iron and Iron-Manganese Alloys. W. C. Leslie, F. J. Plecity and J. T. Michalak. Metallurgical Society of AIME, Transactions, v. 221, Aug. 1961, p. 691-700.

Isothermal recrystallization and grain growth in zone and vacuum method Fe and Fe-Mn alloys with up to 0.60% Mn are studied at 480-650° C. after 60% cold reduction. The recrystallization is typical of a growth controlled process and rate of growth is determined by the extent of recovery, both processes being time, temperature and composition (Mn) dependent. 31 ref. (N3, N4, N5, 2-60, 2-61, 3-67; Fe-b, Mn)

540-N. The Growth of Large Single Crystals of 99.9% Iron of Controlled Orientation. D. F. Stein and J. R. Low. Metallurgical Society of AIME, Transactions, v. 221, Aug. 1961, p. 744-746.

Single crystals are grown from different lots of Ferrovac "E" iron at 825-940° C. in a temperature gradient furnace by the strain anneal method. Using a technique to seed the crystal similar to Dunn's for Si-Fe, it is possible to orient the crystals in both direction and plane of growth. Technique requirements include pre-annealing below growth temperature before straining, critical strain of 2.2-2.6% and growth temperature of 890° C. 6 ref. (N3r, M26c, 2-61, 2-64, 3-68; Fe-a)

541-N. Structural Relationships Between Precipitate and Matrix in Cobalt-Rich Cobalt-Titanium Alloys. R. W. Fountain, G. M. Faulring and W. D. Forgeng. Metallurgical Society of AIME, Transactions, v. 221, Aug. 1961, p. 747-751.

Precipitation of the phase Co_3Ti (Cu_3 Au Type) from a Co-5% Ti alloy is investigated using single-crystal X-ray and electron diffraction techniques. Oscillation and transmission Laue patterns of specimens aged for short times at 600° C. indicate the formation of Ti-rich and Ti-poor zones coherent with the (100) matrix planes. Longer aging times at 600° C. establish that the equilibrium phase also forms on the (100) matrix planes as platelets. 13 ref. (N7, M22g, M26c, 2-65; Co-b, Ti)

542-N. The Effect of Hydrostatic Pressure on Self-Diffusion in Lead. John B. Hudson and Robert E. Hoffman. Metallurgical Society of AIME, Transactions, v. 221, Aug. 1961, p. 761-768.

The self-diffusion coefficient of pure Pb is over a temperature range of about 150° C. near the melting point at five pressures between atmospheric and 40 kb. using a radiotracer technique. The coefficient is represented by an equation for constant temperature. 24 ref. (N1d, 1-59, 2-61, 3-74; Pb)

543-N. The Thermal Diffusion of Hydrogen in Alpha-Delta Zircaloy-2. J. M. Markowitz. Metallurgical Society of AIME, Transactions, v. 221, Aug. 1961, p. 819-824.

The movement of hydrogen in two-phase Zircaloy-2 under the influence of a thermal gradient is studied in tubular specimens at 250-500° C. in a thermal gradient. A gross displacement of hydrogen toward the cooler regions of the specimen is observed with consequent copious precipitation of delta zirconium. The kinetics of the diffusion are analyzed. 8 ref. (N1c, N7, 2-61; Zr-b, H)

544-N. Recrystallization of a Silicon-Iron Crystal as Observed by Transmission Electron Microscopy. Hsun Hu and A. Szirmae. Metallurgical Society of AIME, Transactions, v. 221, Aug. 1961, p. 839-844.

The early stages of recrystallization during 550-600° C. annealing of a 70% cold rolled, 3% Si-Fe crystal of the (110) (001) orientation are studied with a Siemens electron microscope and compared with previous electron diffraction texture analysis. The driving energy for recrystallization and the critical radius for growth are calculated from the dislocation energy and the energy of the subgrain boundaries. The recrystallization characteristics are discussed for crystals with different initial orientations. 15 ref. (N5, N3, M26, M21e, 2-64, 3-68, 3-72; Fe-b, Si)

545-N. Solute Segregation During Dendritic Growth. F. Weinberg. Metallurgical Society of AIME, Transactions, v. 221, Aug. 1961, p. 844-850.

Measurements of solute segregation in Pb and Sn-based binary alloys during dendritic growth using radioactive Ag^{110}, Tl^{204}, Zn^{65}, Sb^{124}, Sn^{113} and Co^{60} solute elements and measuring the activity of dendrites cut from decanted specimens. The ratio of the dendrite to matrix concentration is dependent on the equilibrium distribution coefficient. 8 ref. (N12b, 1-59, 2-60, 9-69; Sn-b, Pb-b, Ag, Tl, Zn, Sb, Co)

546-N. The Hardening Mechanism in Nitralloy-N Steel. G. C. Gould and H. J. Beattie. Metallurgical Society of AIME, Transactions, v. 221, Aug. 1961, p. 893-895.

A low-alloy Ni-Al age hardening steel, Nitralloy-N, in the tempered martensitic or carbide spheroidized conditions is variously heat treated at 975-1750° F. with extraction replica, X-ray diffraction and electron microscopy studies and Rockwell C hardness measurements of resulting structures. The age hardening mechanism is attributed to an Ni-Al precipitate which goes in and out of solution reversibly without losing coherency. 4 ref. (N7a, N7b, M-general, Q29n, 2-60, 2-64, 2-65; AY)

547-N. The Strain Ageing of Mild Steel Flat Rolled Products. W. J. S. Roberts. South Wales Institute of Engineers, Proceedings, v. 76, June 1961, p. 71-80.

Aging induced by cold work is discussed in terms of the mechanical and working properties, aging rate and strain-aging propensity of a given steel with means for elimination or reduction of the effect. 9 ref. (N7e, 3-68, 1-67; CN, 4-53)

548-N. The Recovery and Recrystallization of Copper and Aluminum Under Stress. P. H. Thornton and R. W. Cahn. Institute of Metals, Journal, v. 89, Aug. 1961, p. 455-463.

Tensile and microhardness tests, with metallographic examination, on single and polycrystal high purity Al and Cu annealed and deformed in creep after various amounts of prestrain. Hardness changes and grain growth are used as indexes of recrystallization and recovery as a function of stress. 21 ref. (N3, N4, N5, Q-general, 3-66, 3-68; Cu-a, Al-a)

549-N. (Translation-AIP.) Pulsations in the Growth Rate of a Crystal and Their Effect on the Structure and Properties of Material Produced by the Czochralski Method. L. S. Milevskii. Soviet Physics--Crystallography, v. 6, Sept-Oct. 1961, p. 193-198.

The conditions for the formation of crystal lattice defects in striated impurity

distribution in a grown Si crystal are investigated, showing that impurity accumulation, particularly oxygen, on the crystallization front may result in a modulation of the growth rate and, in the case of unsymmetical thermal conditions, in spiral growth of the crystal. 9 ref. (N3, 3-67, 3-69; Si)

550-N. (Translation-AIP.) Some Aspects of the Crystallization of Germanium-Silicon Alloys During Zone Melting. V. G. Fomin, A. V. Ovodova, O. V. Bogorodskii and S. Sh. Shil'shtein. Soviet Physics--Crystallography, v. 6, Sept-Oct. 1961, p. 199-201.

X-ray metallography showing that various imperfections occur in Ge-Si monocrystals grown by zone melting. The etch figures increase in number and decrease in size along the length of the crystal; the block size becomes smaller and the angle between blocks increases. The effects are caused by the increase in Si and by the rise in the microscopic inhomogeneity with the continuous accumulation of defects resulting in a polycrystal. 12 ref. (N12, M26s, C28k, 2-60; Ge-b, Si, 14-61)

551-N. (Russian.) Investigation of Interdiffusion in Powder Mixtures by the Method of Concentrated Distributions. A. I. Raichenko. Fizika Metallov i Metallovedenie, v. 11, June 1961, p. 870-877.

Investigation of Cu-Ni alloy powders to develop a mathematical method for calculating concentrated distributions for binary powder systems having an homogeneous diffusion. 11 ref. (N1, 1-54; Ni-b, Cu, 6)

552-N. (Russian.) Solidification of Binary Alloys in the Interval of Temperatures. M. K. Likht and S. B. Kuz'minskaya. Fizika Metallov i Metallovedenie, v. 11, June 1961, p. 878-882.

The crystallization process of binary alloy is considered to be an interaction between diffusion and heat exchange. Equations indicate conditions for the existence of a solid-liquid zone and its development in an alloy assumed to be stationary. 7 ref. (N12)

553-N. (Russian.) Phase Transformations During Oxidation of Metallic Uranium. A. F. Bessonov and V. G. Vlasov. Fizika Metallov i Metallovedenie, v. 11, June 1961, p. 957-959.

Radiographic investigation during oxidation in air and CO_2 at different temperatures and time periods. Radiogram analysis by the Debye-Sherrer method. 8 ref. (N-general, R1h, 2-61, 2-66, 3-67; U)

554-N. (German.) Influence of Tensile Stresses on Temperature of Starting Martensite Formation. Heinrich Beisswenger and Erich Scheil. Archiv fur das Eisenhuttenwesen, v. 32, July 1961, p. 501-502.

Magnetic measurement of the temperature of the start of martensite formation during cooling of tensile-stressed wire specimens (0.5 mm. diameter) of Fe-Ni alloy (26% Ni) from the austenite temperature under protective atmosphere. (N8p, 2-61, 3-66; Fe-b, Ni)

555-N. (Russian.) Nickel Distribution Between Phases in White Iron. K. I. Vashchenko, R. P. Todorov and G. I. Koshovnik. Liteinoe Proizvodstvo, Feb. 1961, p. 25-26.

Samples cast from white iron (2% Ni) show different distribution of Ni in ferrite, austenite and cementite phases. Arrest points and temperature changes in eutectoid transformations as influenced by Ni contents. (N8, 1-53, 2-60; CI-p, Ni)

556-N. (Russian.) Influence of Some Factors on Graphitization of Ductile Iron. P. I. Stepin. Liteinoe Proizvodstvo, Feb. 1961, p. 34-37.

Experiments with molten iron in an autoclave to study nodularization, growth, diffusion and decomposition of graphite, kinetical changes in microstructure, composition of matrix and distribution of graphite and Mg under heat, cooling and pressure. 5 ref. (N8s, 2-60, 2-61, 3-74; CI, Mg)

557-N. (Translation-Brutcher no. 5076.) Gases in Ferroalloys. R. Limpach and B. Marincek. Archiv fur das Eisenhuttenwesen, v. 31, Nov. 1960, p. 639-643.

Previously abstracted. See item 110-N, 1961. (N15, 2-60; Fe-b)

558-N. (Translation-Brutcher no. 5145.) Effect of Alpha and Epsilon Phases on the Strain Hardening of Austenitic Steels While Being Worked. I. N. Bogachev and A. F. Sachavskii. Izvestiya VUZ--Chernaya Metallurgiya, Feb. 1961, p. 100-108.

Previously abstracted. See item 414-N, 1961. (N7e, N8p, 3-68; SS-e, Mn, Ni)

559-N. (Translation-Brutcher no. 5183.) Solidification and Crystallization of Steel in the Mold as a Source of Defects in Ingots and Forgings. V. Koselev and S. Burda. Hutnik, v. 11, Mar. 1961, p. 110-117.

Review of defects found in steel forgings and caused by shrinkage during solidification in the mold, the change from the liquid to the solid state. Dimensions of the main pipe and micropipes; formation of voids and shrinkage cracks. (N12; 9, 4-51, 5-59; ST)

560-N. (Translation-Brutcher no. 5128.) Effect of Additional Alloying of Silicon-Manganese Steel Upon Austenite Transformation. M. P. Braun. Dopovidi Akademii Nauk Ukrainskoi RSR, v. 3, Apr. 1961, p. 335-339.

Investigation of isothermal austenite decomposition in Si-Mn constructional steels (0.60% Si, 1.30% Mn) additionally alloyed with Ni, Si, Cr, Cu, Mo and Ti, either jointly or separately in part, to improve ductility and toughness of the steel and the austenite stability in the upper and intermediate temperature ranges. (N8, 2-60; ST)

561-N. Activation Energy Determination of Secondary Carbide Growth During Malleabilizing. D. S. Eppelsheimer and D. S. Gill. Indian Institute of Metals, Transactions, v. 14, Mar. 1961, p. 53-60.

The activation energy of the carbide growth process is determined for an Fe-1.45% Si-2.45% C alloy from the measured degree of graphitization produced by annealing at various temperatures. 5 ref. (N8, J23b, P13a, 2-61; CI-s)

562-N. (German.) A Remarkable Deformation Mechanism of Lamellar Pearlite. Karl Wellinger and Manfred Proger. Naturwissenschaften, v. 48, June 1961, p. 451-452.

Deformation tests on small cylindrical specimens of CK 35 steel (0.35% C) after annealing 5 1/2 hr. at 970° C. and subsequent microscopic investigation of deformation mechanism. (N8h, Q24, 2-64; ST)

563-N. (Ukranian.) Determination of Dislocation Density Formed During Deformation of Armco Iron and Magnesium. S. D. Herzricken, N. N. Novicov and N. Y. Horidko. Ukrainskyi Fizychnyi Zhurnal, v. 6, Mar-Apr. 1961, p. 229-232.

Volume changes during annealing of samples, deformed by bending at 100-750° C. for various degrees of deformation. Density of dislocations is studied as a function of lattice structure. (N10, P10d, 3-68; Fe, Mg)

564-N. (Ukranian.) Effect of Calcium on Form of Graphite Inclusions in Fe-C-Si Alloy. V. M. Svechnikov. Dopovidi Akademii Nauk Ukrainskoi RSR, July 1961, p. 911-914.

Microstructure and mechanical properties of Fe-C-Si cast iron and especially the formation of spheroid and lamellar graphite grains are studied as functions of Ca additions and cooling rate. 7 ref. (N8, Q-general, 2-60, 3-67; CI)

565-N. Self-Diffusion in Body-Centered Cubic Zirconium. G. Kidson and J. McCurn. Canadian Journal, Physics, v. 39, Aug. 1961, p. 1146-1157.

Measurement of self-diffusion coefficients in crystal-bar Zr by sectioning techniques at 1100-1500° C. using radioactive Zr^{95} as the tracer. The diffusion mechanism is explained in terms of vacant lattice sites. 18 ref. (N1d, 1-59, 2-61, 3-73; Zr)

566-N. Effect of Solute Atoms on Grain Boundary Migration in Pure Metals. E. L. Holmes and W. C. Winegard. Canadian Journal, Physics, v. 39, Aug. 1961, p. 1223-1226.

Investigation of grain growth in zone refined Sn with 0.002-0.10 at.% Pb added. Effect of solute concentration on grain boundary migration and activation energies. 5 ref. (N3, 2-60; Sn, Sb)

567-N. (Japanese.) Metallurgical Behavior of Magnox Alloy. Pt. 1. Grain Growth and Mechanical Properties. Ryukichi Nagasaki and Kensuke Shiraishi. Atomic Energy Society of Japan, Journal, v. 3, Aug. 1961, p. 623-633.

Changes in microstructure and room and elevated temperature mechanical properties of extruded specimens of Magnox E, C and A12 and Mg-1% Al alloys after annealing and soaking heat treatment as a function of composition,

strain rate, temperature (20-720° C.) and heat treatment time. Data are given for hardness, tensile and creep properties, strain and age hardening effects, fracture modes, stress-strain relations, plasticity, recrystallization grain growth and grain size. 4 ref. (N3, N-general, M27, Q-general, 2-60, 2-64, 3-68; Mg-b, Al, 4-58)

568-N. Transformations in the Ta-H and Ta-D Systems. W. E. Wallace, Per Kofstad and L. J. Hyvonen. Pure and Applied Chemistry, v. 2, no. 1-2, 1961, p. 281-285.

X-ray and neutron diffractions and measurements of electrical resistance, magnetic susceptibility, internal friction, heat capacity, residual entropy and vapor pressure of Ta_2H and Ta_2D compounds. Determination of the mechanism of transformation of the solid solution of H in Ta (alpha-phase) to Ta_2H (beta-phase) as a rearrangement of the H atoms, rather than as a magnetic phenomenon. 5 ref. (N15e, P-general; Ta)

569-N. Growth of Metal Crystals From the Vapor Phase. Technical News Bulletin (National Bureau of Standards), v. 45, Aug. 1961, p. 130-131.

Zn, K and Hg are crystallized from a high purity, supersaturated phase under controlled conditions to determine rate and pattern of growth. 5 ref. (N15g, N3r, 1-54; Hg, K, Zn)

570-N. (English.) Grain Boundary Migration in Recrystallized Armco Iron During Grain Growth. Wu Cheung-hung and Chuang Yu-chih. Scientia Sinica, v. 10, June 1961, p. 182-188.

Use of the vacuum-etching method to study effects of time, temperature, interfacial energy of the grains and presence of grain substructures on the rate and direction of grain growth in specimens heat treated at 770-810° C. for various times. 10 ref. (N3, N5, 2-61, 2-64, 3-67; Fe-a)

571-N. Application of Rare Earths to Ferrous and Nonferrous Alloys. J. F. Collins, V. P. Calkins and J. A. McGurty. Chapter 20 from "The Rare Earths". John Wiley & Sons, Inc., New York 16, 1961, p. 499-511.

Determining the effects of yttrium and rare-earth metal additions on the properties of ferrous-base alloys, Cr-base alloys and V. Grain growth and rates of oxidation for Fe-Cr-Al and Fe-Cr-Y alloys are determined at 1475-2300° F. 36 ref. (N3, Q-general, R1h, 2-60; Fe, Cr, AD-n, EG-g45)

572-N. Diffusion Kinetics. Aron Kuppermann. Nucleonics, v. 19, Oct. 1961, p. 38-42.

A mathematical model of the diffusion kinetic or radical diffusion process is formulated for a dilute aqueous solution in order to calculate the amounts of each chemically stable product formed. The theory is tested experimentally with graphical analysis showing the influence of linear energy transfer and solute concentration of Co^{60} gamma rays on the molecular yield. 33 ref. (N1c, 1-54)

573-N. (German.) Behavior of Nodular Cast Iron as a Material for Dies in Aluminum Pressure Die Casting. A. T. Balewsky and J. Dimov. Freiberger Forschungshefte, no. B 59, 1961, p. 7-25.

Microscopic investigation and impact testing of nodular cast iron specimens containing Mg, after annealing at 600-800° C. to determine effect of precipitation of Mg-phosphide along ferrite grain boundaries on impact cracking. (N7d, Q6, W19n, 17-57; CI-r, Mg, Al)

574-N. (German.) Material Problems in Die Casting of Steel. Joseph Czikel and Gunter Quapil. Freiberger Forschungshefte, no. B59, 1961, p. 27-44.

Microstructure investigation and mechanical testing of sand and die cast GS 52 steel to study mechanical properties and normalizing time as influenced by solidification rate. (N12, J24, Q-general, 3-67; ST)

575-N. (German.) Prerequisites for Production of Castings of High-Strength Cast Iron. Miklos Csiszar. Freiberger Forschungshefte, no. B 59, 1961, p. 64-83.

Investigation of microstructure and mechanical properties of cast iron, as influenced by composition, inoculation with Si and Cr and cooling rate. (N8, Q-general, 2-60, 2-64, 3-67; CI, Si, Cr)

576-N. (German.) Influence of Manganese on Stabilization and Kinetics of Decomposition of Cementite in Malleable Cast Iron.

Stanislav Drapal. Freiberger Forschungshefte, no. B 59, 1961, p. 84-98.

Microscopic and X-ray examination and electrolytic carbide isolation applied to malleable cast iron specimens (1.26-2.25% C, 0.77-1.40% Si, 0.019-0.290% S, 0.02% Cr and 0.2-1.6% Mn) after heat treatment at 720-960° C., to determine stability and decomposition rate of cementite as a function of Mn content. (N8, 2-60, 2-64, M21, M22; CI-s, Mn)

577-N. (German.) Interaction of Al, V and N in Al-Killed, V and N Alloyed Weldable Constructural Steels Containing Approximately 0.2% C and 1.5% Mn. Paul Konig, Werner Scholz and Horst Ulmer. Archiv fur das Eisenhuttenwesen, v. 32, Aug. 1961, p. 541-556.

Acid steel is studied after various heat treatments at temperatures from 500-1350° C. to determine Al-N and V-N equilibria and the precipitation and dissolution of Al and V nitride. (N1e, N7, 2-64; ST, 1-64, Al)

578-N. (German.) Crystallographic Mechanism of Iron Nitride Precipitations in Ferrite. Wolfgang Pitsch. Archiv fur das Eisenhuttenwesen, v. 32, Aug. 1961, p. 573-579.

Theoretic interpretation of iron nitride precipitations in ferrite, in terms of the formation of Fe_8N by diffusion and the precipitation of Fe_4N by martensitic transformation. (N1, N7, N8)

579-N. (Russian.) Kinetics of the Growth of Grains in Alpha-Iron of High Purity. V. I. Ivanov and K. A. Osipov. Doklady Adademii Nauk SSSR, v. 138, Feb. 1961, p. 338-341.

Investigations on cold deformed, heat treated Fe. 24 ref. (N3; Fe)

580-N. (Russian.) General Rules for the Stabilization of a Beta Solid Solution in Titanium Alloys. N. V. Ageev and L. A. Petrova. Doklady Akademii Nauk SSSR, v. 138, Feb. 1961, p. 359-360.

Influence of the electron concentration in a binary and ternary alloy on the formation of a metastable phase during fast cooling. 6 ref. (N5, N12; Ti-b)

581-N. (Russian.) The Possibility of Formation of Solid Solutions in Some Quaternary Systems. N. A. Goryunova, A. V. Voitsekhovskii and V. D. Prochukhan. Vestnik Leningradskogo Universiteta, v. 16, Oct. 1961, p. 156-158.

Investigation in Cu-Te-In-Sb solid solutions based on the principle of the heterovalent substitution. (N12p, 1-54)

582-N. (Russian.) X-Ray Study of Liquid Eutectic Alloy Systems. A. S. Lashko and A. V. Romanova. Izvestiya Akademii Nauk SSSR--Metallugiya i Toplivo, 1961, p. 135-137.

Experimental and theoretical study of the structural correlations of binary alloys in solid and liquid states including the disappearance of quasi-eutectic structure in Pb-Sn, Al-Ag and Au-Sn systems due to the mixing of atoms at 200-400 C. 11 ref. (N12q; Al, Ag, Au, Pb, Sn)

583-N. (French.) Monoclinic Phases in Uranium-Molybdenum Alloys. J. Lehmann. Journal of Nuclear Materials, v. 4, July 1961, p. 218-225.

Martensitic transformation and formation of phases with a monoclinic structure in U-Mo alloys containing 4.8-9.9 at.% upon quenching. The lattice parameters of these phases, designated alpha-b double prime are determined by X-ray diffraction with results being used to plot the parameters as a function of increasing Mo content. 14 ref. (N6q, M26, 2-60, 2-64; U-b, Mo)

584-N. Role of Crystal Structure in Diffusion. Pt. 1. Diffusion Paths in Closest-Packed Crystals. L. V. Azaroff. Journal of Applied Physics, v. 32, Sept. 1961, p. 1658-1662.

The effect of crystal structures of the ZnO, alpha ZnS, BiO_3, $CrCl_3$ and CdI_2 types and anion size, interstices and voids on the diffusion paths are discussed. 12 ref. (N1, M26, 1-54)

585-N. Role of Crystal Structure in Diffusion. Pt. 2. Activation Energies for Diffusion in Closest-Packed Structures. L. V. Azaroff. Journal of Applied Physics, v. 32, Sept. 1961, p. 1663-1665.

The effect of diffusion paths on the activation energies and vacancy formation energies of crystals of the beta AgI, gamma AgI, ZnO, BiSe and Bi_2Se_3 structure types is calculated. 13 ref. (N1, M26, P13a, 1-54)

586-N. Precipitation Sites in Aluminum Alloys. G. R. Frank, Jr., and D. L. Robinson. Journal of Applied Physics, v. 32, Sept. 1961, p. 1763-1764.

Sessile dislocation in the region of a stacking fault are shown to be nucleation sites for gamma prime phase precipitation in Al-Ag alloys and the Ag segregation is explained in terms of extinction fringe contrast. Grain boundary diffusion is observed. 12 ref. (N7, M26, 1-54; Al-b, Ag, 9-69)

587-N. Slip Patterns on Boron-Doped Silicon Surfaces. H. J. Queisser. Journal of Applied Physics, v. 32, Sept. 1961, p. 1776-1780.

High concentrations of B are diffused into Si surfaces and the etch patterns developed are interpreted as slip lines introduced by stress from the nonuniform B distribution in the Si lattice. 25 ref. (N1, 1-54, 3-66; Si, B, 14-61)

588-N. Vapour Deposition of Metals. C. H. J. Johnson. Australian Journal of Applied Science, v. 12, Sept. 1961, p. 303-323.

Calculations are made using thermodynamic and flow theory for the metal deposition rate in a vapor deposition process using a parallel plate cell. The rate is found to be a function of filament temperature and examples include curves for Th, Zr and Ti. (N15g, 1-54)

589-N. (German.) Grain Size Relations in Steels. A. Legat, F. Kubik and A. Moser. Radex Rundschau, no. 4, Aug. 1961, p. 657-663.

Review of role of Al in the production of fine-grain steel with emphasis on austenitic grain size and secondary ferrite grain size as influenced by precipitated aluminum nitride. Amount of aluminum nitride as influenced by temperature (800-1200° C.), soaking time and heating rate in heat treatment. (N3, N8, 2-61, 2-64; Al)

590-N. The Influence of Impurity Atoms on the Annealing Kinetics of Electron Irradiated Copper. D. G. Martin. Philosophical Magazine, v. 6, July 1961, p. 839-846.

Spectroscopically pure Cu and dilute Cu alloys containing 0.05% of Ag, Cd and Be are irradiated with 4 Mev. electrons at -196° C. and annealed at temperatures up to 50° C. The recovery of the irradiation damage is measured by changes in electrical resistance, measured in liquid helium. Annealing peaks are observed in pure Cu and in the dilute alloys as a function of temperature. 7 ref. (N7d, P15g, 2-61, 2-64, 2-67; Cu)

591-N. The Effect of Ordering on the Strength and Dislocation Arrangements in the Ni_3Mn Superlattice. M. J. Marcinkowski and D. S. Miller. Philosophical Magazine, v. 6, July 1961, p. 871-893.

The dislocation configurations and stacking fault behavior in thin foils of Ni_3Mn are examined by transmission electron microscopy for various intermediate states of long-range order and for complete long-range disorder. The flow and yield stress are measured and analyzed in terms of present theories of order strengthening. A mechanism is proposed which is associated with the destruction of the component of short-range order co-existing with long-range order. 30 ref. (N10, M21e, Q23b; Ni-b, Mn)

592-N. The Critical Temperatures of Binary Alloys With One Magnetic Component. G. M. Bell and W. M. Fairbairn. Philosophical Magazine, v. 6, July 1961, p. 907-928.

Binary alloys containing a ferromagnetic or antiferromagnetic component with an arbitrary number of Bohr magnetons such as Ni, Fe, Co and Mn and a component which is neither, such as Pt, Pd, Rh, Al, Si, V, Au or Zn, are studied by a statistical method. The effect of local order in the lattice distribution of the atoms on the Curie or Neel temperature is examined for equilibrium (annealed) alloys where the local order is temperature dependent and for quenched alloys where the lattice distribution is fixed. Values for critical temperatures are given as a function of composition and interaction energies. 20 ref. (N-general, M24b, P16d, 2-61, 2-63)

593-N. Effect of Carbon and Manganese Contents on the Stability of Austenite in Hadfield-Type Manganese Steels. H. R. S. Rao and V. G. Paranjpe. Tisco (Tata Iron & Steel Co., Journal), v. 8, Oct. 1961, p. 192-209.

Influence on carbide precipitation and transformation characteristics

as determined by standardized end-quench tests on steel specimens with Mn content ranging from 11-14%. Effect of cooling rate, cold working and prior precipitation illustrated with diagrams of test results. 20 ref. (N8, 1-53, 2-60, 3-68; ST, Mn)

594-N. Diffusion of Oxygen in Single Crystals of Nickel Oxide. Michael O'Keefe and Walter J. Moore. Journal of Physical Chemistry, v. 65, Aug. 1961, p. 1438-1439.

The diffusion of O^{18} is measured in monocrystals by following the exchange of gaseous O enriched in O^{18} with the NiO crystals, at an O pressure of 50 mm. from 1100-1500°. Entropy and diffusion coefficients are measured. 10 ref. (N1, 1-54; Ni, 14-68)

595-N. (German.) Investigation of Self-Hardening AlZnMg-Alloys. Pt. 2. W. Rosenkranz. Metall, v. 15, Sept. 1961, p. 894-899.

Investigation of recrystallization by examination of microstructure and macrostructure and by mechanical testing of extruded self-hardening Al-ZnMg alloys after various heat treating and warm aging operations. (N5, M27, M28, Q29, 2-64, 2-65, 3-68; Al-b, Zn, Mg)

596-N. (German.) Grain Boundary Migration of Germanium. Friedrich Erdmann-Jesnitzer, Gunter Hotzsch and Ernst Gunther. Bergakademie, v. 13, May 1961, p. 300-303.

Thermal vacuum etching at 500-800° C. of pure zone-melted disk specimens and microscopic investigation of grain boundary migration and formation of etch pits. Density of dislocation lines in front of and behind migrating grain boundaries. (N3, M20q, M21c, 1-54; Ge)

597-N. Crystal Filaments. W. S. Hollis. Production Engineer, v. 40, Sept. 1961, p. 611-661.

Growth mechanisms for crystal filaments of pure single crystal and metal whiskers (Fe, Cu, Be, Si, Sn, W, Ag, Cd, Zn) are explained by the presence of irregularities in the atomic structure of dislocations. Stress-strain patterns and relative strength of filament and bulk materials are given. 8 ref. (N3r, 1-54, Ag, Be, Cd, Cu, Fe, Si, Sn, W, Zn)

598-N. (German.) Investigation of Age Hardening in Discontinuous Precipitations. Horst Bohm. Zeitschrift fur Metallkunde, v. 52, Aug. 1961, p. 512-517.

Studies of internal stresses of discontinuously precipitated solid solution by hardness, microhardness and X-ray examination of cold worked and as-cast Cu-In specimens containing 12.5-15% In, aged at 300-400° C. (N7a, Q-general, 2-65, 3-66, 3-68; Cu, In)

599-N. (German.) Cause of Discontinuous Precipitation. Horst Bohm. Zeitschrift fur Metallkunde, v. 52, Aug. 1961, p. 518-524.

Microstructure investigation of discontinuous precipitation in aging of Cu-In alloy (12.5-20% In), Cu-Sb alloy (10% Sb) and Cu-Mg alloy (1.5-2.5% Mg) specimens at 300-450° C. Precipitation mechanism as controlled by kinetics and grain boundary diffusion. (N7, N1, M27f, 1-54; Cu, In, Sb, Mg)

600-N. Structural Changes During the Deformation of Copper, Aluminium and Nickel at High Temperature and High Strain Rates. D. Hardwick and W. J. McG. Tegart. Institute of Metals, Journal, v. 90, Sept. 1961, p. 17-21.

Structural changes during plastic deformation of heat treated specimens by hot torsion at 0.7 absolute melting temperature and strain rates of approx. 1 $sec.^{-1}$ are observed metallographically after quenching. Behavior of the metals is dependent on competition between polygonizations and recrystallization which is rationalized in terms of the relative magnitude of their stacking-fault energies. 14 ref. (N4, N5, 2-62, 3-68; Al, Cu, Ni)

601-N. The Occurrence of Recrystallization During High-Temperature Creep. D. Hardwick, C. M. Sellars, W. J. McG. Tegart. Institute of Metals, Journal, v. 90, Sept. 1961, p. 21-22.

Review of data for compression creep tests on Au and Ni at constant stress at 820-940° C. in which recrystallization is observed and comparison with tensile, torsion and compression creep data for Pb, Cu, Al, alpha and gamma Fe, Cd, Mg, Zn and Sn. Recrystallization during creep is proposed to be polygonization-dependent

as a function of dislocation annihilation and climb, plastic deformation and work-hardening, stacking-fault energy, impurity level, temperature and stress-strain conditions of the experiment. 24 ref. (N5, Q3, Q28, 2-61, 3-66, 3-68, 3-69; Fe, Al, Cd, Cu, Mg, Pb, Sn, Zn)

602-N. A Calorimetric Investigation of the Beta to Alpha + Gamma$_2$ Eutectoid Transformation in Certain Aluminium Bronzes. G. V. T. Ranzetta and D. R. F. West. Institute of Metals, Journal, v. 90, Sept. 1961, p. 22-23.

Effects of 0.5-1% tenary additions of Co, Fe or Mn on the eutectoid transformation in 11.6-11.9% aluminum bronze is studied for isothermally heat treated, pearlitic specimens. Data are given for specific heat and free energy and heat of transformation, as a function of composition with heating curves being derived and the transformation arrest being established as 568° C. for the binary alloys. 5 ref. (N9, M24, P12a, P12q, P12r, 2-60; Al-b, Cu-s)

603-N. The Mechanism of Boundary Migration in Recrystallization. Paul Gordon and R. A. Vandermeer. Illinois Institute of Technology, Technical Rept. no. 3 and 8, Aug. 1961, 50 p.

Recrystallization of polycrystalline, Zn-refined Al and Al alloys with specified percentages of Cu is considered in terms of the effect of Cu content and competing recovery process on migration rates. The mode and retardation of recrystallization are studied, giving correlative data for theory and experimentation. 16 ref. (N5, 1-53; Al-b, Cu)

604-N. The Diffusion of Metals in Relation to Glass Mould Equipment. E. G. Weatherley. Glass Technology, v. 2, Aug. 1961, p. 146-149.

A suggested composition for gray iron to promote a high strength, abrasion resistant surface by diffusion of Cr, Al and Si. (N1, T29a, 2-60; CI-n, Al, Cr, Si)

605-N. (Yugoslavian.) Continuous and Isothermic T-T-T Diagrams of C 35 and 37 Mn Si 5 Steels. M. Majdic, A. Podgornik and C. Rekar. Rudarsko-Metalurski Zbornik, no. 1, 1961, p. 21-31.

Metallographic analysis of C 35 and 37 MnSi 5 structural steels subjected to austempering and hardening to determine T-T-T diagrams, grain size, structure and hardness. (N8g, Q29; CN, SGB-s)

606-N. (English.) Quenched-In Vacancy in Solid Solution Alloys. Yoshikazu Hamaguchi. Physical Society of Japan, Journal, v. 16, Sept. 1961, p. 1692-1697.

Calculation of the binding energy for a vacancy and a solute atom from measurements of the resistivity change induced by quenching between pure Au and Au-Pd solid solutions. 12 ref. (N12p, N7d; Au, Pd)

607-N. New Ways to Strengthen Metals. Donald Peckner. Materials in Design Engineering, v. 54, Oct. 1961, p. 115-126.

Advances in precipitation hardening, order-disorder transformation, strain hardening, solid solution hardening and dispersed phase hardening processes. 18 ref. (N7, N10, N12p, Q29n, 1-53)

608-N. (German.) Precipitation Characteristics of Binary Copper Alloys as Influenced by Additions of a Third Element. Horst Bohm. Zeitschrift fur Metallkunde, v. 52, Sept. 1961, p. 564-571.

Investigation of continuous and discontinuous precipitation, after homogenizing at 600-750° C., in binary alloys of Cu with 1.5-2.5% Mg, 35-55% Mn, 0.8-1.5% P, 5-10% Sb and 15% Sn, with and without additions of 0.5 at.% Fe, Si, Be, In, Mg and Sb, respectively, by microstructure examination and hardness measurements. (N7d, Q29, 2-60; Cu-b)

609-N. (German.) Production of Tantalum Single Crystals by Electron Beam Melting. Barry L. Mordike. Zeitschrift fur Metallkunde, v. 52, Sept. 1961, p. 587-591.

Design of apparatus and method for electron beam melting of single crystals of refractory metals. Production, mechanical testing and investigation of crystal properties (active slip systems in compression) of Ta single crystals. (N3r, M26, 3-66; Ta)

610-N. (Czech.) Precipitation in Low-Carbon Steel During Cyclic Loading. Mirko Klesnil and Premysl Rys. Hutnicke Listy, v. 16, Aug. 1961, p. 565-572.

A low-carbon steel containing 0.05% C and 0.0042% N is held at 1000° C. for 1 hr. and subsequently allowed to cool in the furnace. CSN 12010 steel is normalization annealed to obtain a grain size of approx. 0.02 mm. Both steels are then alternate-bend tested, the first at a frequency of 400 cpm.,

the second at 1470 cpm., with or without previous heating and quenching from 700° C. Effect of cycling and previous heat treatment on microscopic surface structure, microhardness, hardness and carbide precipitation. 21 ref. (N7, M28p, Q7j, Q29, 1-54, 2-64; CN-g)

611-N. (Russian.) Electrodeposition of Zinc-Tin Alloy From Pyrophosphate Electrolytes. E. A. Prandetskaya and L. P. Nosova. Izvestiya VUZ--Tsvetnaya Metallurgiya, Mar. 1961, p. 136-139.

Study of composition, corrosion resistance and surface luster of an alloy layer electrolytically precipitated on a carbon steel electrode from complex pyrophosphate salts as a function of current density, electrolyte composition and effect of gelatine or glue additions. 4 ref. (N12d, 2-60, 2-66; Zn, Sn)

612-N. Metal Evaporation, "Cold Welding" in Vacuum of Space Studied at Hughes. Nat Wood. Western Metalworking, v. 19, Oct. 1961, p. 42-43.

Evaporation and condensation behavior of Cd, Zn, Mg alloys, Ti, Fe, steel, Pt and plastics is tested in simulated space conditions. Study of lubricant vaporization, effect of molecule adherence on friction rate and subsequent cold welding. (N16n, 1-73, K6, Q9p, T24e; ST, Cd, Zn, Mg-b, Ti, Fe, Pt, NM-d31)

613-N. Self-Diffusion of Lead, Thallium and Bismuth in the Solid Lead -Thallium System. H. A. Resing and M. H. Nachtrieb. Physics and Chemistry of Solids, v. 21, Oct. 1961, p. 40-56.

Radioactive tracer study and thermodynamic analysis of the self-diffusion of Pb and Tl and of diffusion of trace impurity Bi in solid solutions containing 0-87% Tl at 206-323° C. The results are compared with the predictions of the corresponding states principle and with theories based upon the Johnson vacancy-solute complex mechanism, with modification based upon lattice parameter deviations from Vegard's Law, showing dependence on alloy composition and some evidence of order. 36 ref. (N1d, N1e, 2-60; Pb-b, Tl-b, Bi)

614-N. Migration Energy of a Vacancy Adjacent to an Impurity. A. Ascoli and A. C. Damask. Physics and Chemistry of Solids, v. 21, Oct. 1961, p. 124-127.

Interpretation of impurity diffusion in terms of the migration of the impurity-vacancy molecule involving the interchange of the vacancy with a lattice atom for transporting the impurity. Calculation of the effect of altering the path on the lattice atom-vacancy interchange using a Morse function as a potential. 7 ref. (N3, N1, M26s, 3-69)

615-N. (French.) Preferential Nucleation of Chromium Carbide on Twin Dislocations in Stainless Alloys of the 18/8 Type. H. Hatwell and E. Votava. Acta Metallurgica, v. 9, Oct. 1961, p. 945-948.

The nucleation of precipitates on the coherent twin boundaries in austenitic stainless steels is interpreted in relation to the structure of recrystallization twins. Observations with the electron microscope suggest that the elastic field of the dislocations piled up on the coherent twin boundaries could induce the movement of partial dislocations during precipitation heat treatment which constitute sites for the preferential nucleation of the precipitate. 7 ref. (N2, N8r, N5, M26b, 2-64; SS-e)

616-N. (English.) Strain-Induced Diffusion and Precipitation in Aluminum-Lithium Alloy During Creep. R. P. Marshall. Acta Metallurgica, v. 9, Oct. 1961, p. 958-960.

Diffusion of solute Li with subsequent precipitation as LiAl in grain boundaries oriented 45-90° to the direction of stress are observed for binary, two-phase 12% Li-Al alloys during third stage creep under tensile loading at 50-250° C. The phenomena are associated with relief of stress concentration by the formation of a low-density beta phase. (N1, N7, Q3, 2-61, 3-66, 3-68; Al-b, Li)

617-N. (English.) Grain Boundary Mobility in Bismuth. M. J. Fraser, R. E. Gold and W. W. Mullins. Acta Metallurgica, v. 9, Oct. 1961, p. 960-961.

Measurement of the boundary migration in deformed single crystal specimens using a magnetic field exerting pressure on the boundary as the driving force. (N3, M27f; Bi, 14-61)

618-N. (French.) Kinetics of the Precipitation of the Hematite Phase From Oxygen-Rich Magnetite During Isothermal Tempering. J. Paidassi and J. Lopez. Acta Metallurgica, v. 9, Oct. 1961, p. 963-965.

Determination of the morphology and quantity of hematite precipitating as a function of time and temperature of tempering and impurity and oxygen content from magnetite specimens prepared by oxidation of Puron and Armco iron (or from FeO mixtures) heated at 200-1200° C. in air or water vapor. T-T-T diagrams are constructed for the reaction at 300-600° C. (N7, M-general, R1h, 2-60; Fe-a)

619-N. (English.) Phase Transformation of Cobalt. W. Bollmann. Acta Metallurgica, v. 9, Oct. 1961, p. 972-975.

Electron microscopy study at room temperature of the shift from f-c-c. to h-c-p. structures in Co on cooling with a dynamic mechanism being proposed in terms of stress fields produced at the intersection of stacking faults. Comparison is made with Seeger's kinematic screw dislocation mechanism. 5 ref. (N-general, M26, 3-66; Co)

620-N. (English.) X-Ray Study of Order in $CuAu_3$ Alloys. R. G. Davies and A. J. Funes. Acta Metallurgica, v. 9, Oct. 1961, p. 978-979.

Alloys containing 65-80% Au are equilibrated at 150-450° C. after quenching with lattice parameter measurements being made by X-ray diffraction. Data are computed for degree of order and domain size. 8 ref. (N10, M26; Cu-b, Au-b)

621-N. (English.) Effect of Cold Work Upon Order in Au_3Cu Alloys. R. G. Davies and A. J. Funes. Acta Metallurgica, v. 9, Oct. 1961, p. 979-980.

X-ray study of superlattice lines in deformed 65-75% Au-Cu alloys quenched from 450° C. Extent of ordering and antiphase domain size are related to elastic interaction between vacancies and dislocations and to dislocation density as a function of deformation. 4 ref. (N10, M26b, 3-68; Au-b, Cu)

622-N. (English.) Study of Substructures of the Martensite in Fe-Ni Alloy Using Transmission Electron Microscopy. Z. Nishiyama and K. Shimizu. Acta Metallurgica, v. 9, Oct. 1961, p. 980-981.

Twinning and stacking faults are observed in the fine structure of transformed martensite in a 30.64% Ni-Fe alloy by selected area electron diffraction and transmission electron microscopy. (N6q, M27e, M21e; Fe-b, Ni)

623-N. (English.) Precipitation of Niobium Carbide on Dislocations in Austenite. D. M. Haddrill, R. N. Younger and R. G. Baker. Acta Metallurgica, v. 9, Oct. 1961, p. 982-984.

Transmission electron microscopy and selected area diffraction examination of CbC precipitates in 18Cr/12Ni/1Cb stainless steel thin foil specimens after solution treating at 1300° C., 3% deformation in tension and aging for various times at 650-950° C. Precipitation occurs on dislocation lines as a function of plastic deformation and on dislocation loops formed either during straining or by the condensation of vacancies, with a unique orientation relationship between the precipitate and the austenite matrix. (N7, N8r, M26b, 2-60, 2-64, 3-68; SS-e, Cb)

624-N. Melting Ranges and Flow Points of Brazing Alloys. Karl M. Weigert. Assembly & Fastener Engineering, v. 4, Nov. 1961, p. 37.

Analysis of primary, binary and ternary phases for Ag, Cu, Zn, Sn, Ni and Cd alloys providing data on effective brazing temperatures, flow points and melting ranges. Phase identification by solidification mechanism and microscopy. (N12, P12h, K8; SGA-f, 17-57)

625-N. Evaporation Rates of Several Alloys in Vacuum at High Temperatures. R. C. Bates. Metal Treating, v. 12, Oct-Nov. 1961, p. 16-18, 42.

Weight loss, evaporation rate and oxidation resistance are determined for Cr, Fe, Ni, Co, Va, Mo, Cb, Ta and W alloys by heating at 850-1250° C. under 1 micron pressure for 2-32 hr. Composition of alloys meeting requirements of vacuum heating furnace components. (N16n, W27n, 1-73, 2-61; Cr-b, Ni-b, Co-b, Va-b, Mo-b, Cb-b, Ta-b, W-b, 17-57)

626-N. Marworking High-Speed Steel. Richard F. Harvey. Metal Treatment and Drop Forging, v. 28, Oct. 1961, p. 421-422.

Improvement of mechanical and physical properties of steels by working in the metastable austenite condition is investigated for high-speed steels by deformation at 900-1000° F. Data are given

for Rockwell hardness, transformation microstrutures and workhardening and grain size effects. (N-general, Q-general, 2-61, 2-64, 3-68; TS-m)

627-N. Investigation of Abnormal Structure in a 1.5% Mn Mild Steel. J. Nield. Iron and Steel Institute, Journal, v. 199, Sept. 1961, p. 22-26.

Discussion of abnormal structures and mechanical properties which are sometimes observed in normalized samples of 1.5% mild steel and may be associated with notch brittleness as caused by microsegregation of Mn and C. Methods are suggested for removing the microsegregation such as soaking near 1200° C. or corrective tempering at 630° C. 6 ref. (N-general, J-general, M27, Q23s, 9-69; CN)

628-N. (French.) Use of a Special Isothermal-Heat Treatment Furnace in Studying the Recrystallization of Cold Rolled Sheet. G. Jegaden and R. Tarriant. Revue de Metallurgie, v. 58, Aug. 1961, p. 667-684.

Rimming steel and killed steel subjected to cold deformations of 50-75% are isothermally heat treated at 460-740° C. The effect of annealing temperature on the recrystallization process is examined by means of hardness measurements and micrographs. (N5, J24, M-general, 1-52, 2-61; ST)

629-N. Effects of Grain Boundary Structure on Precipitate Morphology in an Fe-1.55% Si Alloy. S. Toney and H. I. Aaronson. Metallurgical Society of AIME, Transactions, v. 221, Oct. 1961, p. 909-917.

When the component grains of ferritic bicrystal specimens are disoriented through an angle "o" about a common (110) axis, the tendency for preferential growth of austenite crystals along the grain boundary during transformation at elevated temperatures is dependent on angle size indicating that grain boundary diffusion promotes preferential growth along large angle boundaries. Differences between crystals suggest that precipitate morphology can be dependent on the dislocation structure of the boundary. 27 ref. (N7, N1, M27, M26, 2-62; Fe-b, Si)

630-N. Metal Deposition Coefficients in Filament Bundles. J. H. Oxley, J. E. Oberle, C. E. Dryden and G. H. Kesler. Metallurgical Society of AIME, Transactions, v. 221, Oct. 1961, p. 927-936.

Heat-transfer rates are measured in a model of a multifilament vapor-deposition bulb for the preparation of high-purity metals. Local transfer coefficients for heat transfer from the filaments to the circulating process stream are determined as a function of gas flow rates and bulb, inlet and filament geometries and are converted to a mass-transfer basis to provide a method of correlating vapor-deposition rates and to predict the performance of commerical units. 13 ref. (N15g, L25, 1-54, 17-56)

631-N. Determination of Interstitial Solid-Solubility Limit in Tantalum and Identification of the Precipitate Phases. Dale A. Vaughan, Oliver M. Stewart and Charles M. Schwartz. Metallurgical Society of AIME, Transactions, v. 221, Oct. 1961, p. 937-946.

Solid-solubility limits at 1500, 1000 and 500° C. for C, N and O in high-purity Ta are determined by X-ray lattice-parameter and electron micrography methods. The phases Ta_2C, the low-temperature modification of Ta_2O_5 and Ta_xN of unknown composition but which has a superlattice structure based upon the original b-c-c. Ta lattice are identified as the initial precipitates in the respective systems. The etching behavior of Ta is discussed in terms of lattice imperfections and precipitate phases. 8 ref. (N12p, N7, N10, M-general, 2-60, 3-69; Ta-b)

632-N. Silver Diffusion in the Intermetallic Compound AgMg. W. C. Hagel and J. H. Westbrook. Metallurgical Society of AIME, Transactions, v. 221, Oct. 1961, p. 951-957.

Using a sectioning technique with Ag^{110} as the tracer, the diffusion of Ag in Ag-excess (45.8% Mg), near-stoichiometric (49.8% Mg) and Mg-excess (52.0% Mg) cylinders of CsCl-type AgMg is determined at 500-700° C. Diffusion coefficients, lattice-parameters, density, substitutional defects and activation energies for rate processes in the alloys are determined as a function of composition. 25 ref. (N1, M-general, 1-59, 2-60; Mg-b, Ag-b, 14-68)

633-N. Solid Solution Strengthening of Ag by Al. A. A. Hendrickson and M. E. Fine. Metallurgical Society of AIME,

Transactions, v. 221, Oct. 1961, p. 967-974.

The critical resolved shear stress and the strain rate dependence of the flow stress are reported for Ag-base single crystals containing up to 6% Al at 4.1-470° K. At room temperature the solid solution strengthening is attributed principally to an increase in the dislocation density on alloying. At 4.2° K. the alloys are relatively stronger because the dislocations widen on alloying and are more difficult to cut. 22 ref. (N12p, M26b, Q24, 2-60, 2-63; 3-68; Ag-b, Al, 14-61)

634-N. The Recrystallization of Dilute Alpha Iron-Molybdenum Solid Solutions. W. C. Leslie, F. J. Plecity and F. W. Aul. Metallurgical Society of AIME, Transactions, v. 221, Oct. 1961, p. 982-989.

During isothermal recrystallization, the rate of grain growth in dilute Fe-Mo alloys decreases rapidly with increasing Mo content up to 0.04% and less rapidly thereafter. Rate of growth also decreases sharply with time at constant temperature. The observed rates of boundary migration do not correspond to predictions of the Luke-Detert theory and it is proposed that the growth of recrystallized grains is inhibited by clustering of solute atoms at imperfections in the unrecrystallized matrix. 19 ref. (N5, N3, M26, 2-60, 2-61, 3-67; Fe-b, Mo, 14-67)

635-N. Quantity and Form of Carbides in Austenitic and Precipitation Hardening Stainless Steels. R. J. Bendure, L. C. Ikenberry and J. H. Waxweiler. Metallurgical Society of AIME, Transactions, v. 221, Oct. 1961, p. 1032-1039.

Carbon which is present as insoluble carbides in austenitic stainless steels is measured quantitatively by dissolving the steel in iodine methanol and analyzing the residue for carbon. Severe sensitization is observed in Type 302 due to precipitation of only 0.003% carbon. Both cold work and the presence of delta ferrite cause a marked acceleration in rate of carbide precipitation. Rates in 17-7 PH are studied for effects of austenite conditioning and also the aging heat treatment. 10 ref. (N8r, N7, 2-64, 2-65, 3-68; SS)

636-N. Measurement of the Surface Self-Diffusion Coefficient of Copper by the Thermal Grooving Technique. N. A. Gjostein. Metallurgical Society of AIME, Transactions, v. 221, Oct. 1961, p. 1039-1046.

The self-diffusion coefficient for a surface near the (100) plane in Cu is determined by the Mullins theory of thermal grooving and is found to obey an Arrhenius relationship. A model is presented which indicates that activation energy, as determined by a mass-transport technique, may involve both the activation energy needed to form an adsorbed atom from a ledge in the surface as well as that for the movement of the adsorbed atom. 31 ref. (N1d, M20, 2-64; Cu)

637-N. Strain Aging Effects in Arc-Cast Molybdenum. G. W. Brock. Metallurgical Society of AIME, Transactions, v. 221, Oct. 1961, p. 1055-1062.

Tensile tests at -186 to 985° C. on overstrained, aged and nitrided specimens on recrystallized arc-cast Mo. The strain aging behavior of Mo was found to be strongly dependent on the degree of plastic strain present in the lattice, the reason for this being the low solid solubility for the common interstitial elements in Mo. 22 ref. (N7e, N12p, M26, Q27, 2-61, 3-68; Mo-a)

638-N. Structural Transformations in a Ag-50 At.% Zn Alloy. H. W. King and T. B. Massalski. Metallurgical Society of AIME, Transactions, v. 221, Oct. 1961, p. 1063-1064.

X-ray diffraction study of the effect of cold work and annealing on the stability of the beta prime and zeta degree phases in alloys subjected to annealing, aging and quenching treatments at 20-630° C. with plastic deformation by filing. An h-c-p. zeta phase may be induced by cold working the beta prime phase but reverts to beta prime on aging. No change occurs when working the zeta degree phase, but beta prime is formed in the deformed alloy on room temperature aging, suggesting that ordered b-c-c. beta prime is the equilibrium structure at room temperature. 10 ref. (N-general, M-general, 2-60, 2-64, 3-68; Ag-b, Zn-b)

639-N. Aging of Supersaturated Alpha Phase in a Cu-Si Alloy. Gary A. Dreyer

and D. H. Polonis. Metallurgical Society of AIME, Transactions, v. 221, Oct. 1961, p. 1074-1080.

The aging processes at 200-525° C. are studied by metallography, microhardness and electrical resistivity measurements. During the initial stage of aging an anisotropic phase, kappa prime, which is visible as striations in the microstructure, forms prior to the appearance of the gamma phase and increases with aging temperature. The over-all precipitation reaction in this system involves four stages: formation of kappa prime, formation of gamma at alpha grain boundaries, growth of gamma particles in kappa prime regions and coagulation of gamma into large particles dependent on the temperature of aging. 7 ref. (N7a, N-general, 2-61, 2-65; Cu-b, Si)

640-N. The Composition of the Gold-Silicon Eutectic. E. G. Heath. Journal of Electronics and Control, v. 11, July 1961, p. 13-15.

Use of gravity segregation to determine the Si content of the eutectic as 3.15 ± 0.05 wt.% or 18.6 ± 0.3 at.%. Experiment verifies experience gained in the use of Au alloys in Si semiconductor devices that the liquidus curves are incorrect near the eutectic. (N9n, S11f, 1-54; Au, Si)

641-N. The Pearlite Reaction in a High Alloy Steel. R. R. Russell and W. C. Hagel. Metal Progress, v. 80, Nov. 1961, p. 107.

Nucleation sites for pearlite are saturated first at grain corners and edges, then along grain surfaces and finally at random points within the grain. The matrix is martensitic except for a short distance ahead of the advancing colonies of pearlite where carbon depletion permits the retention of austenite. (N8h; SS)

642-N. Strengthening Stainless Steel by Cold Working. Digest of "Strain Strengthening of Type 304 Stainless Steel". Paper (Preprint 83) presented at 64th Annual Meeting, A.S.T.M., Atlantic City, N.J., June 1961. Walter Hammer, Jr., Leonard Stemann and E. E. Weismantel. Metal Progress, v. 80, Nov. 1961, p. 178-180.

Bars of Type 304 can be strengthened to a minimum yield strength of 100,000 psi. by cold straining. After straining, the bars must be aged to prevent dimensional instability. (N7e, 1-52, 1-67; SS)

643-N. Cold Alloying to Germanium, Silicon and Aluminum-Silicon Eutectic Surfaces. L. Bernstein. Semiconductor Products, v. 4, Aug. 1961, p. 35-39.

Determining the mechanism for "purple plaque" phase formation in the synthesis of $AuAl_2$ and Au_2Al in sealed evacuated quartz capsules at 40-1100° C. The wettability of pure Au, AuSi(6%), Au-Ge(12%), AuSn(20%) and Au-In(1-2%) alloys is determined by alloying onto Al-Si eutectic at temperatures in excess of 400° C. 24 ref. (N12q, P13h, P12, 2-60, 2-61; Au-b)

SECTION P

PHYSICAL PROPERTIES and TEST METHODS

1-P. The Thermoelectric Power of Pure Copper. A. V. Gold, D. K. C. MacDonald, W. B. Pearson and I. M. Templeton. Philosophical Magazine, v. 5, Aug. 1960, p. 765-786.

High purity Cu samples with low residual resistivity ratios measured at 0.1-350° K. to show the effect of various scattering mechanisms on the thermo-electric power. 32 ref. (P15j, 2-61; Cu)

2-P. Strain-Broadening of Nuclear Magnetic Resonance Lines in Copper. E. A. Faulkner. Philosophical Magazine, v. 5, Aug. 1960, p. 843-851.

The mean-square-width of the nuclear magnetic resonance absorption line in Cu sheet is measured to show the effect of plastic deformation and stored energy. 11 ref. (P16f, 3-68; Cu, 4-53)

3-P. Measurements of Thermoelectricity Below 1° K. Pt. 4. D. K. C. MacDonald, W. B. Pearson and I. M. Templeton. Philosophical Magazine, v. 5, Aug. 1960, p. 867-870.

Thermoelectric power of alloys of Cu, Sn and Fe in Pd as a function of temperature and type of impurity. 7 ref. (P15j, 2-63, 3-69; Pd-b, Cu, Fe, Sn)

4-P. Rare Earths: Sixteen New Metals Are Ready to Use. Materials in Design Engineering, v. 52, Nov. 1960, p. 134-137.

Electrical, magnetic and mechanical properties and corrosion resistance of rare earth metals. (P-general, Q-general; EG-g45)

5-P. Solubility of Oxygen in Delta Iron. Edwin S. Tankins and Nev A. Gokcen. American Society for Metals, Transactions, Preprint no. 236, v. 53, 1961, p. 843-852.

Solubility of oxygen determined by equilibrium with gaseous mixtures of H_2O and H_2 in the range of 1420-1510° C. Results show that the solubility of oxygen increases with increasing temperatures. 16 ref. (P12e; Fe, O)

6-P. (German.) Atomic Heat Capacity of Magnesium Between 12 and 300° K. for Varying Hydrogen and Silicon Concentrations. Kurt Bornkessel. Bergakademie, v. 12, Sept. 1960, p. 506-507.

Isothermal measurements in a vacuum glass calorimeter using Nernst-Eucken's differential method on Mg containing 0-21 ml. H_2 per 100 g. Mg and 0.013-0.22% Si. 3 ref. (P12r, 2-60, 2-61; Mg, H, Si)

7-P. Advancements in Technical Ceramics--Performance of Refractory Materials to 5000° F. C. D. Pears and David S. Neel. Ceramic Age, v. 76, Nov. 1960, p. 30-35.

Measurement of thermal, electrical and mechanical properties of refractory metals and refractory oxide, carbide, boride, nitride and Si-bearing compounds at 5000° F. in an inert atmosphere. (P11, P15, Q-general, 2-62; EG-d37)

8-P. (German.) Growth of Uranium Bars in Aggressive Gases. I. V. Batenin, A. N. Rudenko and B. V. Sarov. Kernenergie, v. 3, June 1960, p. 532-535.

Dilatometric measurement of growth and X-ray analysis of technical uranium bars and Cu wires exposed to air, nitrogen and CO at 500-900° C. and 0-1 atm. pressure. (P10d, M23, 2-61, 2-66; U, 4-55, Cu, 4-61)

9-P. Composite Materials for Thermal Protection. E. Scala. Metals Review, v. 33 Nov. 1960, p. 4-9.

Physical properties of composites of Be, Cu, Ni and stainless steel and graphite for aircraft hot structures requiring high temperature strength. (P-general, T24; SGA-h, Be, Cu, Ni, SS, NM-k36, 8-66, 17-57)

10-P. Specific Heats and Enthalpies of Technical Solids at Low Temperatures. Robert J. Corruccini and John J. Gniewek. National Bureau of Standards Monograph 21, Oct. 3, 1960, 20 p. (Available from U. S. Government Printing Office, Washington 25, D. C.) $.20.

Data for specific heats and enthalpies from 1-300° K. of several metals, graphite, natural rubber, plastics and other material. (P12r)

11-P. (German.) Investigation of Heat Transfer for Turbulent Current of Liquid Heavy Metals in Tubes. M. Ch. Ibragimov, V. I. Subbotin and P. A. Usakov. Kernenergie, v. 3, Aug. 1960, p. 780-782.

Measurement of heat transfer from liquid 99.9% Hg (temperature 24-48° C.), liquid Pb (400-420° C.) and a liquid eutectic Pb-Bi alloy (25-340° C.) to water in a steel tube system under an Ar atmosphere. (P11k; Hg, Pb-b, Bi, 14-60)

12-P. Magnetic Domains. General Electric Research Laboratories Bulletin, Summer 1960, p. 17-20.

Effect of domain structure on the magnetization changes in metals and alloys. (P16c, M27f)

13-P. (German.) Thermal Expansion of Alpha Plutonium. N. T. Cebotarev and A. V. Beznosikova. Kernenergie, v. 3, June 1960, p. 561-562.

Measurement of lattice parameters and thermal expansion of 0.5 mm. diameter Pu wire by X-rays (Cu radiation) at -196 to 100° C. 3 ref. (P11g, 2-61; Pu, 4-61)

14-P. Time Decrease of Permeability of Substitutional Ferromagnetic Alloys. Chinji Kuroda. Physical Society of Japan, Journal, v. 15, Oct. 1960, p. 1898.

Measurement of the disaccommodation of Ni-Co alloys using a sinusoidal magnetic field. Dependence of magnetic permeability on time, activation energy and relaxation time. 5 ref. (P16q; Ni-b, Co-b)

15-P. Magnetic Properties of Malleable Irons. W. K. Bock and T. D. Hutchinson. American Society of Mechanical Engineers, Transactions, Paper no. 60-WA-218, 1960, 9 p.

Magnetic properties of ferritic, pearlitic and martensitic malleable Fe produced by heat treatment of white Fe are evaluated for establishing a compromise between loss of desirable magnetic properties and increased strength or hardness. 6 ref. (P16; CI-s)

16-P. (French.) Study of Heats of Precipitation of Eutectics Containing 11.3 at.% Si in the Aluminum-Silicon System and 17.3 at.% Cu in the Aluminum-Copper System. Marc Genot. Comptes Rendus, v. 251, Oct. 10, 1960, p. 1499-1501.

By a calorimeter technique involving simultaneous recording of temperatures. of specimen and calorimetric liquid, heat of eutectic fusion is determined to be 124 ± 2.5 cal. per g. for Al-Si and 85 ± 1.5 cal. per g. for Al-Cu, the figures coinciding (within 5%) with those obtained by study of equilibrium diagrams. 6 ref. (P12g, N12e; Al-b, Cu, Si)

17-P. (French.) Width of the Magnetic Resonance of the 4^3P1 Level of Zinc Excited by Electron Bombardment. Albert-David May. Comptes Rendus, v. 251, Oct. 3, 1960, p. 1371-1372.

Influence of parasite magnetic field in experimental laboratory and inhomogeneity of radiofrequency field on short life as determined in magnetic resonance experiments with Hertzian spectroscopy. (P16f; Zn)

18-P. Thermal Conductivity in Ceramic-Metal Laminates. R. K. Francis and J. R. Tinklepaugh. American Ceramic Society, Journal, v. 43, Nov. 1960, p. 560-563.

Thermal conductivity values parallel and perpendicular to laminates of forsterite-stainless steel laminates. Comparison with calculated values. 4 ref. (P11h; SS, NM-f, 7-68)

19-P. The Measurement of Thermal Conductivity. Defoe C. Ginnings. Chapter 8 from "Thermoelectric Materials and Devices". Reinhold Publishing Corp., New York, 1960. p. 113-132.

Principles and methods with emphasis on meaurements at moderate to high temperatures. Measurements limited to solids. (P11h, 1-54)

20-P. Basics Stressed--Republic Takes Analytic Road. Samuel Korman and Robert Bastian. Missiles and Rockets, v. 7, Nov. 28, 1960, p. 42-43.

Determination of physical and chemical properties of high-temperature metals, alloys, ceramics, plastics and composites through spectroscopy, gas chromatography, metallography, X-ray analysis, electron microscopy and application of solid-state theory. (P-general, M-general, S11; SGA-h)

21-P. (Russian.) Temperature Hysteresis of the Domain Structure in Silicon-Iron Crystals. Ya. S. Shur and I. E. Startseva. Zhurnal Eksperimentalnoi i Teoreticheskoi Fiziki, v. 39, Sept. 1960, p. 566-573.

The domain structure of mono and polycrystals of Fe-Si (3.5% Si) is studied by powder diffraction technique before and after heating from room to 550° C. temperature. Domain structure changes irreversibly with the cyclic temperature variations. 8 ref. (P16c, 2-61; Fe-b, Si)

22-P. (Russian.) Dependence of Germanium Surface Tension Upon Temperature. V. B. Lazarev and P. P. Pugachevich. Doklady Akademii Nauk SSSR, v. 134, Jan. 1960, p. 132-133.

Determination of surface tension by capillary rise method within the 980-1400° C. temperature range. Deviations of experimental measurements from theoretical computations are explained by structural changes of the melt taking place during temperature elevation. 15 ref. (P12h; Ge)

23-P. Frequency Characteristics of Anodized Film Formed on Several Metals. Akira Miyata and Akio Furuichi. Institute of Physical and Chemical Research (Japan), Scientific Papers, v. 54, June 1960, p. 184-193.

Frequency range and dielectric properties of anodized films of varying thicknesses on Al, Ta, Ti and Cb substrates are measured with an equivalent circuit. (P15n; Al, Cb, Ta, Ti, 14-62)

24-P. (German.) Measurement of Heat of Transformation of Martensite Formation for Iron-Nickel Alloys by a Dry Ice (Solid Carbon Dioxide) Calorimeter. Erich Scheil and Egon Saftig. Archiv fur das Eisenhuttenwesen, v. 31, Oct. 1960, p. 623-632.

Transformation heat for Fe-Ni alloys containing 5-28% Ni measured by calorimetry and microscopy. Determination of retained austenite by density measurements using the buoyancy method, comprising weighing in air and ethylene bromide at 20° C. (P12q, N8n; Fe-b, Ni)

25-P. (Japanese.) Magnetic-Field-Cooling Treatment at Low Temperature of Alnico-V Type Alloy. Sadao Koshiba and Terumi Nishinuma. Japan Institute of Metals, Journal, v. 24, July 1960, p. 433-436.

Formation of abnormal structures in cast alloys at room temperature due to gamma to alpha phase transformations; and adverse effects of these structures on magnetic properties. Effect of cooling in a magnetic field, in air and water to 850° C. from the monophase temperature (1250° C.) on magnetic properties and microstructure. 3 ref. (P16, M27, N-general, 2-64; Fe-b, Co, Ni, SGA-n)

26-P. (Japanese.) Solution Rate of Solid Nickel in Liquid Bismuth. Tadao Sano, Masanobu Miyake and Takao Konishi. Japan Institute of Metals, Journal, v. 24, July 1960, p. 452-456.

Solution rate and activation energy of dissolution at 300-400° C. as determined by electrical resistivity measurements and chemical analysis. 8 ref. (P12e; Bi, Ni)

27-P. (Japanese.) Effect of Isothermal Magnetic Annealing on the Magnetization and Magnetostriction at High and Room Temperatures in a Fe_3Cr Superlattice Alloy. Hakaru Masumoto, Hideo Saito and Minoru Takahashi. Japan Institute of Metals, Journal, v. 24, July 1960, p. 465-469.

Data for magnetic measurements at 20-577° C. on thermally demagnetized specimens, with continuous tracing of time change at constant temperatures under external fields of 71.3 and 285 Oersted. 10 ref. (P16, 2-64; Fe-b, Cr)

28-P. (Russian.) Magnetic Susceptibility of Molten Nickel, Cobalt and Iron at Elevated Temperatures. A. A. Vertman and A. M. Samarin. Doklady Akademii Nauk SSSR, Tekhnicheskaya Fizika, v. 134, Feb. 1960, p. 326-329.

Measurement of magnetic susceptibility at 800-1700° C. using the Faraday method and Curie-Weiss low. Effect

of molecular-polymorphic transformations, coordination number and chemical composition on degree of magnetic susceptibility. 13 ref. (P16n, P16p, 2-60, 2-62; Co, Fe, Ni, 14-60)

29-P. (Russian.) Activation Energy in Alpha-Iron and Alpha-Titanium During Creep Testing Under Vacuum. K. A. Osipov and A. L. Sotnichenko. Doklady Akademii Nauk SSSR, Tekhnicheskaya Fizika, v. 134, Feb. 1960, p. 333-336.

Limiting values for activation energy are determined taking into account the degree of loading, diffusionless transformations and slip of the atomic planes. 15 ref. (P13a, Q3, 1-73; Fe-a, Ti-a)

30-P. Lattice Frequencies and Specific Heats of Germanium and Silicon. B. Sharan and S. P. Singh. Journal of Scientific Research of Banaras Hindu University, v. 10, Dec. 1959, p. 60-66.

Calculation of specific heats and frequencies of vibration of Ge and Si crystals at 40-700° K. by Raman's theory of crystal vibration; comparison with experimental values at all temperatures. 12 ref. (P12r, M26, 2-61; Ge, Si, 14-61)

31-P. (French.) Some Transverse Characteristics of Resistors in the Form of Films. P. Thureau, B. Lemiere and A. Colombani. Comptes Rendus, v. 52, Oct. 17, 1960, p. 1618-1620.

Directional variations of resistivity, after deformation by bending and tensile stresses in thin films of Bi, Sn and Sb deposited by vacuum evaporation on glass and plexiglas supports. 8 ref. (P15g, 3-68; Bi, Sn, Sb, 14-62)

32-P. Solutions of Metals in Molten Salts. Daniel Cubicciotti. Journal of Chemical Education, v. 37, Oct. 1960, p. 540-544.

Data for miscibility, electrical conductivity, magnetic susceptibility, phase composition, activity and vapor pressure of metal systems in their molten halides. (P-general; 14-60)

33-P. (Japanese.) Changes in Magnetic Properties During Aging of Alnico V. Tatsuo Fujiwara and Tetsuo Kato. Japan Institute of Metals, Journal, v. 24, Aug. 1960, p. 526-530.

Magnetic measurements of Alnico V specimens aged at 550-900° C. with and without magnetic field. Aging effect on reversibility of properties is determined for coercive force, maximum energy product and demagnetization curve. 20 ref. (P16, 2-64; Fe-b)

34-P. (Japanese.) Surface Tension of Cu-Se and Cu-Te Alloys. Pt. 6. Kaizo Monma and Hajime Suto. Japan Institute of Metals, Journal, v. 24, Aug. 1960, p. 544-547.

The effects of dissolved Se and Te on the surface tension of liquid Cu measured by a sessile drop method at 500-1400° C. Effect of Se and Te high surface activity. Calculations of maximum surface excess and solute element adsorption. (P13h; Cu-b, Se, Te)

35-P. (Pamphlet.) Herculoy. ASARCO Bulletin No. 113 R. 4 p. American Smelting and Refining Co., 120 Broadway, New York 5, N. Y.

Mechanical and physical properties, corrosion resistance and foundry characteristics of a new Si bronze alloy. (P-general, Q-general, R-general, E-general; Cu-s, Si)

36-P. Thermoelectric and Crystallographic Properties of Ag_2Se. J. B. Conn and R. C. Taylor. Electrochemical Society, Journal, v. 107, Dec. 1960, p. 977-982.

Ag_2Se is prepared by fusion technique and found to be a good thermoelectric material. Seebeck coefficient, resistivity and thermal conductivity are measured as a function of temperature. Crystal lattice structure is determined by X-ray diffraction. (P11, P15, 2-61, M26, M22g; Ag-b, Se)

37-P. (Japanese.) Effects of Dissolved Sulphur on the Surface Tension of Iron, Cobalt and Nickel Saturated With Carbon. Kaizo Monma and Hajime Suto. Japan Institute of Metals, Journal, v. 24, Sept. 1960, p. 611-614.

Measurements by sessile drop method at 1300° C. Effect of surface excess of sulphur. 10 ref. (P13h; Co, Fe, Ni, C, S)

38-P. (Japanese.) The Influence of Aging Treatment on the Temperature Dependence of the Electrical Resistance of Alnico 5. Tatsuo Fujiwara and Tetsuo Kato. Japan Institute of Metals, Journal, v. 24, Sept. 1960, p. 597-600.

Electrical resistivity-temperature curves for specimens aged at 20-800° C. 12 ref. (P15g, 2-61, 2-65; Fe-b, SGA-n)

39-P. (Japanese.) Analysis of the Resistivity-Distribution Curve of Silicon Single Crystal. Masabisa Sammonyi. Japan Institute of Metals, Journal, v. 24, Sept. 1960, p. 593-597.

A segregation equation is used for mathematical analysis of the resistivity distribution of pulled Si single crystals of N and P type conductivity. Application to determination of impurity concentration in specimens containing boron. 5 ref. (P15g, 3-6a; Si, 14-61)

40-P. (Japanese.) Sintered Fe-Al-Ni System Magneta. Pt. 6. Masataka Sugiyama and Kunio Shida. Japan Institute of Metals, Journal, v. 24, Sept. 1960, p. 569-570.

Effect of 0.2-0.5% TiH_2 addition to sintered permanent magnet MK3 alloy (11% Al, 18% Ni, 12.5% Co, 6% Cu, balance Fe) on linear shrinkages, density, magnetic properties and pore size distribution. 6 ref. (P10, P16, H-general; Fe-b, SGA-n, AD-n32)

41-P. (Japanese.) Effects of Various Factors on the Nitrogen-Absorption of 20% Cr-Fe Alloys in Nitrogen. Masazo Okamato and Omi Miyakawa. Japan Institute of Metals, Journal, v. 24, Sept. 1960, p. 573-577.

Effect of heating time and temperature, specimen surface condition and the purity of the gas employed on the nitrogen absorption of specimens heated at 1000-1300° C. for one-half to 4 hr. in very pure nitrogen. Data are given for weight gain and hardness distribution. 11 ref. (P13d, Q29n, 2-61, 3-67; Fe-b, Cr, N)

42-P. (French.) Electrical Properties of Gallium-Sodium Alloys. E. Rinck and P. Feschotte. Comptes Rendus, v. 251, Aug. 8, 1960, p. 869-871.

Resistivity of Ga-Na alloys confirms existence and composition of a compound having the formula Na_5Ga_8, resistivity of which is 1000 times greater than that of Ga. Experimental apparatus is described. 5 ref. (P15g; Ga-b, Na)

43-P. (German.) Effect of Irradiation on Metals. Erich Schmid and Karl Lintner. Zeitschrift fur Metallkunde, v. 51, Nov. 1960, p. 615-620.

Ge, 5.4% Cr steel and a steel containing 22.4% Ni and 3.48% Mn are neutron irradiated while Al, Zn, Cu and Au are subjected to alpha irradiation. Data for effect of irradiation on electrical resistance and austenite-martensite transformation. (P15g, N6, N8, 2-67; Al, Au, Cu, ST, Zn)

44-P. (Russian.) Thermodynamic Properties of Chromium-Tantalum. H. O. Piloyan, A. M. Evseev and Ya. I. Herasimov. Zhurnal Fizicheskoi, v. 34, Aug. 1960, p. 1768-1772.

Determination by measuring the pressure of saturated vapor at 1228-1303° C. Determination of liquidus and solidus temperatures for Ta in presence of ground Cr particles. Discussion of the possibility of existence of intermediate $TaCr_2$ phase. 8 ref. (P12; Cr-b, Ta-b)

45-P. (Russian.) Heat Treatment of Low Carbon Electrotechnical Steels. N. P. Zhetvin, L. N. Podvoiskii, A. I. Paisov and E. P. Kapustina. Metallovedenie i Termicheskaya Obrabotka Metallov, Nov. 1960, p. 20-24.

Effect of annealing temperature and time and rate of cooling on the coercive force and its tendency to magnetic aging in killed and rimming steels. 5 ref. (P16a, 2-64, ST-c, ST-d)

46-P. Molybdenum. Richard F. Allen. Cornell Engineer, v. 26, Nov. 1960, p. 36-41.

Review of the physical and mechanical properties of Mo. Description of a method for rapid growing of Mo single crystals. 5 ref. (P-general, Q-general, N12; Mo)

47-P. Note on the Interaction of Interstitially Dissolved Carbon Atoms in Alpha-Iron. A. J. Bosman, P. E. Brommer, L. C. H. Eykelenboom, C. J. Schinkel and G. W. Rathenau. Acta Metallurgica, v. 8, Oct. 1960, p. 728-729.

Effect of interstitial carbon interaction on the relaxation phenomena observed in time decrease of permeability in alpha iron is measured at 273° K. 4 ref. (P16q, M26s; Fe-a)

48-P. Method for Measuring the Free Energy of a Solid Surface. M. J. Fraser. Acta Metallurgica, v. 8, Oct. 1960, p. 732-734.

Thermodynamic calculation method applicable to solids that evaporate by a lamellar mechanism in which a crystal loses atoms from the edge surfaces of lamellae whose flat surface are low index crystallographic planes. Calculation are made in terms of the equilibrium

shape of the lamella edge surface, as a function of its surface free energy, temperature and partial pressure of the vapor above the surface. 16 ref. (P12a)

49-P. (German.) Detection of Structural Changes in Metals by Exoelectrons. Herbert Steiner. Anzeiger, v. 96, Oct. 1959, p. 177-181.

Exoelectron emission measurements with counting tubes under hydrogen, argon and hydrogen-argon-alcohol mixtures are used to study liquid-to-solid phase changes in pure Sn, beta-to-alpha phase changes in pure solid Tl and aging of duraluminum. (P15k, N-general; Al-b, Sn, Tl)

50-P. (German.) Exoelectron Emission of Aluminum After Alpha Radiation. Peter Koss. Anzeiger, v. 96, Oct. 1959, p. 182-189.

Emission measurements are made on alpha irradiated Al after various oxidizing treatments using a Gieger-Mueller counting tube under Ar-alcohol gas. Results are interpreted in terms of oxide structure. (P15k, 3-71; Al)

51-P. Electrical and Optical Properties of p-Type Cadmium Telluride Crystals. Shoji Yamada. Physical Society of Japan, Journal, v. 15, Nov. 1960, p. 1940-1944.

Effect of heat treatment on the electrical and optical properties of synthetic single crystals. Measurement of intrinsic energy gap, ionization energy of acceptors and Hall mobility of holes. 10 ref. (P15, P17a, 2-64; Cd, Te, 14-61)

52-P. Concentration Dependence of the Hall Coefficient on Magnesium-Cadmium Alloys. Seiichiro Noguchi and Takao Sato. Physical Society of Japan, Journal, v. 15, Nov. 1960, p. 1945-1949.

Measurement of Hall coefficient as a function of composition at 20-300° C. with magnetic field strength of 6.5 kg. A relation between energy gap and concentration is determined from these data. 7 ref. (P15p, 2-60; Mg-b, Cd-b)

53-P. Theory of Resistance Minimum in Dilute Paramagnetic Alloys. Kensuke Tani. Physical Society of Japan, Journal, v. 15, Nov. 1960, p. 1960-1962.

Electrical resistance of Cu and Mn alloys is calculated to determine whether the resistance minimum could arise from the short range order of the spins of the solute atoms. (P15g; Cu-b, Mn-b)

54-P. Antiferromagnetic Resonance in NiO in Far-Infrared Region. Hisamoto Kondoh. Physical Society of Japan, Journal, v. 15, Nov. 1960, p. 1970-1975.

Measurements of the optical absorption are made on a single crystal composed of NiO at wave-lengths from 210-385 microns and at 90-470° K. using a far-infrared spectrometer. The constant of the anisotropy energy which constrains the sublattice magnetizations in the easy plane is calculated and compared with the theoretical value. 23 ref. (P17a; Ni, 14-61)

55-P. Magnetostriction and Crystal Anisotropy of Nickel-Chromium and Nickel-Vanadium Alloys. Toluo Wakiyama and Soshin Chikazumi. Physical Society of Japan, Journal, v. 15, Nov. 1960, p. 1975-1981.

Magnetostriction constants are measured at room and liquid nitrogen temperatures by a strain gage method and expressed as a function of alloy composition. Data are analyzed on the basis of Neel's theory. 17 ref. (P16b, 2-60; Ni-b, Cr, V)

56-P. The Magnetic Anisotropy of Single Crystals of Chromium Telluride. Tokutaro Hirone and Shoko Chiba. Physical Society of Japan, Journal, v. 15, Nov. 1960, p. 1991-1994.

The anisotropy of a ferromagnetic single crystal of CrTe with NiAs structure is studied by magnetic torque measurements. Axis of easy magnetization is measured as a function of temperature. 6 ref. (P16, 2-60; Cr-b, Te-b, 14-61)

57-P. Magnetic Properties of Cr_2As and Cu_2Sb. Motoyoshi Yuzuri. Physical Society of Japan, Journal, v. 15, Nov. 1960, p. 2007-2012.

Thermomagnetic properties of the above compounds and a phase diagram of the Cr-As System are used to determine Neel point, reciprocal susceptibility and heat absorption due to the vanishing of antiferromagnetic order in the spin arrangement. 6 ref. (P16, M24b; Cr-b, As)

58-P. Effect of Plastic Deformation on Cluster Formation in an Al-Cu 4% Alloy.

Keisuke Matsura and Shigeyasu Koda. Physical Society of Japan, Journal, v. 15, Nov. 1960, p. 2106-2107.

Effect of plastic deformation on the clustering of solute atoms is determined by measuring the electrical resistivity. Discussion of the role of dislocations and vacancies in the process. 8 ref. (P15g, 3-68; Al-b, Cu)

59-P. Magnetic Properties of $NiBr_2$. Ichiro Tsubokawa. Physical Society of Japan, Journal, v. 15, Nov. 1960, p. 2109.

The magnetic susceptibility and its variation with temperature, the inverse susceptibility above the Neel point, the asymptotic Curie temperature, the Curie constant and the effective Bohr Magneton number are calculated for $NiBr_2$ crystals. 5 ref. (P16, 2-61; Ni, 14-61)

60-P. The Resistance Anomaly of Dilute Zinc Alloys at Low Temperatures. Yoshio Muto. Physical Society of Japan, Journal, v. 15, Nov. 1960, p. 2119-2120.

Effect of temperature on the specific resistance of dilute Zn-Mn, Zn-Cr and Zn-Sn alloys prepared by melting small amounts of Mn, Cr and Sn with high-purity Zn. 4 ref. (P15g, 2-61; Zn-b, Cr, Mn, Sn)

61-P. (German.) Yttrium, Scandium and the Rare Earths. Survey on Present State of Research. Pt. 2. K. Strnat and H. Weik. Metall, v. 14, Dec. 1960, p. 1163-1170.

Electron confirguration, physical and mechanical properties of La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu. Casting, extrusion, forging, hot and cold rolling and machining methods. Industrial applications. (P-general, Q-general, F-general, G-general; EG-g45)

62-P. (German.) Metallic and Ceramic Materials for Aircraft and Missile Engineering. E. Meckelburg. Metall, v. 14, Dec. 1960, p. 1182-1189.

Physical properties, with emphasis on heat resistance, of cast and sintered Al and Mg alloy with and without Al_2O_3 additions, corrosion resistant steels, Ti and Be alloys, super alloys, workable cermets and sandwich structures composed of Al alloy and Ti or corrosion resistant steel. Protective coatings are used to control heat conductance, erosion, lubrication and vibration damping. (P12r, T24; Al-b, Be-b, Mg-b, ST, Ti, SGA-h, 17-57)

63-P. (Japanese.) Thermodynamic Studies of Lead-Bismuth Alloys. Kichizo Niwa, Mitsuo Shimoji and Osamu Mikuni. Japan Institute of Metals, Journal, v. 24, Oct. 1960, p. 668-672.

Electromotive force measurements of Pb-Bi specimens at 370-480° C. using electrode concentration cells are applied to calculated heats of mixing, deviation from Raoult's Law and excess free energy and entholpy. 11 ref. (P12; Bi-b, Pb-b)

64-P. (Japanese.) Thermodynamics of the Iron-Chromium System. Pt. 1. Activity of Chromium in Liquid Iron-Chromium Systems. Hanue Wada, Yasuji Kawai and Tunezo Saito. Japan Institute of Metals, Journal, v. 24, Oct. 1960, p. 684-688.

Activity coefficients at up to 40% Cr in the system and in systems saturated with carbon are determined by a vaporization method at 1630° C. using radioactive Cr^{-51}. Data are given for interchange energy, effect of carbon on interaction parameter and deviation from Raoult's Law. 15 ref. (P12b; Fe-b, Cr-b)

65-P. Why Cobalt for Magnetic Development. E. Ascher and A. Janner. Cobalt, Dec. 1960, p. 22-26.

Effect of crystalline anisotropy and magnetostriction on the coercive force, initial susceptibility, relative retentivity and response to magnetic annealing of Co and magnetic substances containing Co. (P16; Co)

66-P. High-Temperature Bearing Properties and Cobalt-Base Alloys. M. F. Amateau. Cobalt, Dec. 1960, p. 27-33.

Mechanical and physical properties and corrosion resistance of high-temperature bearing alloys. (P-general, Q-general, R-general; SGA-c, SGA-h)

67-P. Survey of Materials Problems Resulting From Low-Pressure and Radiation Environment in Space. Robert A. Lad. NASA Technical Note D-477, Nov. 1960, 18 p.

Effect of pressure and radiation on the optical transmission, emissivity, coefficient of friction and composition of Cr, Pt, Al, W, Cu and Ni, plastics and ceramics. Ultraviolet radiation impairs the transparency of the materials while surface sputtering affects emissivity. 12 ref.

(P17a, 2-67, 3-74; Al, Cr, Cu, Ni, Pt, W, NM-d30)

68-P. (English.) Effects of Molybdenum, Wolfram and Copper on the Solubility of Graphite in Liquid Iron and a Method for Calculation of the Activity Coefficient of Carbon in Multicomponent Alloys. Toshisada Mori, Kan Aketa, Hitoshi Ono and Hiroshi Sugita. Kyoto University, Memoirs of the Faculty of Engineering, v. 22, Oct. 1960, p. 401-421.

Iron alloys containing 4.23-5.28% C, 0-16.6% Mo, 0-16.7% W and 0-4.6% Cu are heated in a graphite crucible, held at 1550° C. and analyzed chemically. Graphite solubility and carbon activity coefficient determined as functions of composition. Interaction parameters are calculated at graphite saturation. 24 ref. (P12b, P12e, 2-60; Fe-b, C)

69-P. (German.) Contact Resistance of Stationary Heavy-Current Sintered Alloy Point Contacts at High Temperatures. Anton Wollenek. Elektrotechnische Zeitschrift, v. 12, Oct. 31, 1960, p. 533-536.

Contact resistance for sintered symmetric and unsymmetric W-Cu and W-Ag alloy contacts at 20-800° C. and for varying contact pressures as a function of composition. Effect of Cu precipitation at high temperature as influenced by tungsten content of W-Cu contacts and influence of Ag plating on resistance. (P15g; W-b, Cu, Ag, SGA-r)

70-P. Composite Material Does Double Duty. Steel, v. 148, Jan. 9, 1961, p. 65.

Physical and electrical properties of a Cu plated steel for use in contact arms for open type fuse cutouts on rural power lines. (P-general, P15; ST, Cu, 8-62)

71-P. Some Equilibrium Constants of Transition Metal Halides. M. W. Lister and P. Rosenblum. Canadian Journal of Chemistry, v. 38, Oct. 1960, p. 1827-1836.

Study of the formation of complex ions $CoCl^+$, $NiCl^+$, $CuCl^+$ and $CuBr^+$ using a spectrophotometric method for Cu and a cell voltage method with Ni and Co. Various explanations are given for the anomalous variation of the equilibrium constant with temperature. 21 ref. (P12d, 2-61, M25; Co, Cu, Ni, 14-68)

72-P. Nonferrous Metals. Pt. 2. Frank A. Crossley. Midwest Engineer, v. 13, Oct. 1960, p. 6-11.

History, physical properties and applications of pure metals, compounds and alloys of Mn, Hg, Mo, Ni, Pt, Os, Ir, Ru, Td, Te, Se, Rh, Ag, Ta, Cb, Sn, Ti, W, U, V, Zr and Zn. 4 ref. (P-general; EG-a38)

73-P. Solubility of Nitrogen in Liquid Iron Alloys. 1. Thermodynamics. Robert D. Rehlke and John F. Elliott. Metallurgical Society of AIME, Transactions, v. 218, Dec. 1960, p. 1088-1101.

The solubility of nitrogen in liquid pure Fe and liquid Fe alloys is studied by the Sievert's Method and by sampling, as a function of temperature, pressure and composition. The solubility is decreased by Al, C, Co, Cu, Ni, O, Si and Sm and it is increased by Cr, Cb, Mn, Mo, Ta, W and V. Data are given for interaction coefficients and the temperature coefficient of solubility. 32 ref. (P12e, P12b; Fe-b, N)

74-P. Vapor Pressure of Iron at 1600° C. E. T. Turkdogan and L. E. Leake. Metallurgical Society of AIME, Transactions, v. 218, Dec. 1960, p. 1136-1137.

The transportation method is used to measure the vapor pressure of high purity Fe heated in an argon atmosphere. Vapor pressure is calculated from the weight loss of the sample and the volume of the carrier gas as a function of gas flow rate. (P12c; Fe-a)

75-P. The Solubility of Nitrogen in Liquid Fe-Cr-Ni Alloys. J. C. Humbert and J. F. Elliott. Metallurgical Society of AIME, Transactions, v. 218, Dec. 1960, p. 1076-1088.

The solubility of nitrogen in liquid pure Fe, Cr and Ni in liquid Fe-Ni, Fe-Cr and Ni-Cr alloys and Fe-Cr-Ni alloys is measured by the Sievert's type apparatus at 1500-1800° C. Solubility data, activity coefficients, heats of solution and interaction coefficient of the several elements in Fe, Cr and Ni are reported. 13 ref. (P12e, P12b; Fe-b, Cr-b, Ni-b, N)

76-P. (Czech.) Hot Rolled Thin Transformer Sheet. Frantisek Kulhanek. Hutnicke Listy, v. 15, Nov. 1960, p. 884-886.

Magnetic properties of 0.35-1 mm. thick sheets rolled from GOST 802-58,

DIN 64400, CSN ESC 61-1950 and CSN A20230 steels. Allowable shape and thickness tolerances. (P16; ST, SGA-n, 4-53)

77-P. Electrical Resistivity of Metals. Magnesium Products, Nov. 1960, Insert.

Electrical resistivities of several Mg, Al and Ti alloys are compared to those of Ag, Cu, Al, Mg, brass bronze, Zn alloys, Sn alloys, steels, malleable and cast iron, Inconel, Nichrome and Hastelloy B. (P15g)

78-P. (Russian.) Factors Causing Increase of Coercive Force With the Reduction of Thickness of Ferromagnetic Sheets. V. A. Zaikova and Ya. S. Shur. Fizika Metallov i Metallovedenie, v. 10, Mar. 1960, p. 350-358.

Study of domain structure changes by powder pattern methods and measurement of coercive force in heat treated Fe-Si and permalloy samples of various thickness and crystallographic orientation. Coercive force is determined as a function of temperature, thickness and magnetic field scattering on the surface of a sample. 13 ref. (P16a, P16c; Fe-b, Ni-b, SGA-n)

79-P. (Russian.) Irreversible Thermal Dimensional Changes in Zinc. N. N. Davidenko, V. A. Likhachev and G. A. Malygin. Fizika Metallov i Metallovedenie, v. 10, Mar. 1960, p. 412-424.

Review of literature. Experiments and computations of thermal stress, evaluation for U, Zn, Se, Cd, Sn, Zr, Sb, Bi, Mg and Te. Dimensional changes as influenced by composition, relaxation of microstructure thermal stresses, temperature, heat treatment parameters, grain size and texture. 19 ref. (P10d, P11, Q25p; Zn)

80-P. (English.) Thermodynamics of the System Chromium-Nickel. O. Kubaschewski, W. A. Dench and G. Heymer. Zeitschrift fur Elektrochemie, v. 64, June 1960, p. 801-805.

Thermochemical investigation of Cr-Ni alloy systems by a Mo effusion cell to determine partial free energy, calorimetric heat of formation, partial entropy of solution and phase boundaries. 13 ref. (P12, M24b; Cr-b, Ni-b)

81-P. (English.) Magnetic Susceptibilities of Sulphur, Selenium and Tellurium From Room Temperature to 1100° C. Shotaro Tobisawa. Chemical Society of Japan, Bulletin, v. 33, July 1960, p. 889-893.

Effect of temperature on the magnetic susceptibility of S, Se and Te is measured by a recording magnetic balance. 36 ref. (P16n, P16p, 2-61; Se, Te)

82-P. (Translation-ConBur.) A Study of the Thermodynamic Properties of Solid Solutions in the Nickel-Chromium System. E. Z. Vintaikin. Academy of Sciences of the USSR, Proceedings, Physical Chemistry Section, v. 129, Nov-Dec. 1959, p. 951-954.

A combination of the method of radioactive isotopes and the Knudsen procedure is used to determine the free energy, heat and enthalpy of the nickel-chromium system. (P12, 1-59; Cr-b, Ni-b)

83-P. (Translation-ConBur.) The Calculation of the Thermal Conductivities of Molten Metals. G. F. Butenko and M. I. Radchenko. Soviet Journal of Atomic Energy, v. 6, Sept. 1960, p. 122-123.

Extrapolation of data to high temperatures based on temperature dependence of the Lorentz function and values of electrical resistance. 5 ref. (P11h; 14-60)

84-P. (Translation.) Some Electrical Properties of the AlSb-InSb System. Ya. Agaev and D. N. Nasledov. Soviet Physics-Solid State, v. 2, Nov. 1960, p. 758-760. (Translation of Fizika Tverdogo Tela, v. 2, May 1960, p. 781-1032).

Investigation of the effect of temperature on the Hall effect and electrical conductivity and of changes in the electrical resistance in a transverse magnetic field for the AlSb-InSb system. Data are given for carrier mobilities, carrier densities and energy gap values. 5 ref. (P15, 2-61; Al-b, In-b, Sb-b)

85-P. (Translation.) An Investigation of the Semiconducting Properties in the Silicon-Cobalt System. E. N. Nikitin. Soviet Physics, Solid State, v. 2, Oct. 1960, p. 588-591. (Translation of Fizika Tverdogo Tela, v. 2, Apr. 1960, p. 561-780.)

Electrical conductivity and thermoelectric power of cobalt-silicides. Effect of elevated temperatures. 9 ref. (P15, 2-61, M24b; Co-b, Si)

86-P. (Translation.) Concerning the Effect of Heat Treatment on the Electrical

Properties of p-Type Silicon. I. D. Kirvalidze and V. F. Zhukov. Soviet Physics, Solid State, v. 2, Oct. 1960, p. 537-540. (Translation of Fizika Tverdogo Tela, v. 2, Apr. 1960, p. 561-780).

Influence of heat treatment on specific resistance and carrier concentration in p-type monocrystalline Si. Spontaneous recovery of resistivity with time. 15 ref. (P15, 2-64; Si, 14-61)

87-P. (German.) Temperature Dependence of "Hall" Effect of Ni_3Mn Alloy. N. W. Wolkenstein and G. W. Fedrow. Physikalische Abhandlungen aus der Sowjetunion, v. 3, Feb. 1960, p. 128-134.

Hall voltage for rolled sheets of 1000° C. homogenized Ni_3Mn (23.8 at.% Mn) of varying order is measured at 4.2-296° K. using Cu electrodes and a direct current compensator with cooling and holding at constant temperatures by liquid He, N_2 and H_2. Influence of state of order and of temperature on spontaneous and common Hall constant. (P15p, 2-61; Ni-b, Mn)

88-P. Silicon Iron--The Influence of Carbon and Nitrogen on Its Magnetic Properties. Iron & Coal Trade Review, v. 181, Oct. 28, 1960, p. 935-937.

Effect of carbon and nitrogen content on specimens of very pure vacuum-melted (3%) Si-Fe alloy. Influence of N_2 on the hysteresis loss of high-purity (3%) Si-Fe containing Ti (0.009%-0.025%). Static hysteresis loss and coercive force of the very pure Si-Fe alloy measured after heat treatment, high-temperature annealing and slow cooling to room temperature. (P16, 2-60; Fe-b, Si)

89-P. (German.) Specific Heat of Bismuth-Telluride at Low Temperatures. Je. S. Izkewitsch. Physikalische Abhandlungen aus der Sowjetunion, v. 3, Feb. 1960, p. 135-145.

Calorimetric measurements on a plastic coated Bi_2Te_3 cylinder under high vacuum at 1.37-64.8° K. using liquid and gaseous hydrogen and helium for cooling and Pt, bronze and carbon resistance thermometers to measure temperature. Data are given for specific heat, crystal structure, "Hall" effect and electrical resistance of Bi_2Te_3. (P12r, P15, M27; Te-b, Bi)

90-P. Soft X-Ray Emission From Potassium Metal in the 40-1000 Å Range. R. S. Crisp. Philosophical Magazine, v. 5, Nov. 1960, p. 1161-1169.

Emission in the 40-1000 Å range excited in a K target by electron bombardment is examined using a grazing incidence photon counting spectrometer. A total of seven lines and bands are observed of which two are identified as the L and M valence spectra, three are identified as diagram lines and two broad lines remain unidentified. (P17d; K)

91-P. Equipment and Procedures for Evaluation of Total Hemispherical Emittance. Joseph C. Richmond and William N. Harrison. American Ceramic Society Bulletin, v. 39, Nov. 1960, p. 668-673.

Apparatus and procedure for determining the total hemispherical emittance of coated or uncoated sheet metal specimens of Inconel Al-clad Fe, bright Ni, carbonized Ni, 430 stainless steel and 321 stainless steel. Method consists of heating a metal strip in vacuum equilibrium, then measuring the temperature of and power input to the specimen. (P17d; Fe, Ni, SS, 4-53, 8)

92-P. A Critical Review of Viscosity of $CaO-MgO-Al_2O_3-SiO_2$ Melts. E. T. Turkdogan and Patricia M. Bills. American Ceramic Society Bulletin, v. 39, Nov. 1960, p. 682-687.

Review of the effects of alumina, silica, magnesia, CaO content and temperature on the viscosity of blast furnace slags. Data on the $CaO-SiO_2$, $CaO-Al_2O_3-SiO_2$ and $CaO-MgO-Al_2O_3-SiO_2$ melts. 27 ref. (P10f, 2-60, 2-61; RM-q)

93-P. (German.) Use of Magnified Magneto-Optical "Kerr" Effect to Visualize Magnetic Element Areas of Polycrystalline Cobalt and Nickel. Jakob Kranz and Alois Schauer. Naturwissenschaften, v. 47, Sept. 1960, p. 392-393.

Evaporation of a ZnS interference film on electrolytically polished and high-vacuum annealed Co and Ni specimens to make visible the magneto-optical rotation or "Kerr" effect. (P16e; Co, Ni, 8-72)

94-P. (English.) Magnetic Susceptibilities of Nonferromagnetic Transition Metals. Masao Shimizu and Takeshi Takahashi. Physical Society of Japan, Journal, v. 15, Dec. 1960, p. 2236-2242.

Increase of the paramagnetic susceptibility with temperature of Se, Ti, V, Cr, Mn, Fe, Co and Ni is investigated theoretically using the band picture. Theoretical results are compared with data on susceptibilities of pure Cr and dilute alloys of Fe in Cr. 12 ref. (P16n, P16p, 2-61; Cr-b, Fe)

95-P. The Magnetic Properties of Single Crystals of Chromium Selenide. Ichiro Tsubokawa. Physical Society of Japan, v. 15, Dec. 1960, p. 2243-2247.

Magnetic susceptibilities of single crystal and powder specimens of Cr selenides are measured from 4-900° K. Asymptotic Curie temperature, Curie constant and spin quantum number are determined from susceptibility data. 5 ref. (P16, 2-61; Cr, 14-61, 14-68)

96-P. The Change of the Curie Temperature of Iron-Nickel Alloys Due to Hydrostatic Pressure. Tokijiro Kaneko. Physical Society of Japan, Journal, v. 15, Dec. 1960, p. 2247-2251.

Variation in Curie temperature is measured for Fe-Ni alloys containing 30 and 32% Ni, with hydrostatic pressure produced by an apparatus of Bridgman's type and measurement magnetization by the ballistic method. 6 ref. (P16d, 3-74; Fe-b, Ni-b)

97-P. (Japanese.) Alloying Elements for Mg-Zr System Alloys. Pt. 1. Riei Ichikawa. Light Metals, v. 10, Sept. 1960, p. 353-359.

Solubility of Zr in molten Mg alloy and the grain refining effect of Zr on the cast structure of such alloys when a third metal is included as an alloying element. Solubility studies are made at 700° C. with 18 alloying metals. 10 ref. (P12e, E25q, 2-60; Mg, Zr)

98-P. Measurement of Tellurium Vapour Pressure Using Electrical Discharge. Journal of Scientific Instruments, v. 37, Dec. 1960, p. 491-492.

Te vapor pressure is measured at 10^{-6}mm. Hg and 762° C. by a silica apparatus consisting of a discharge chamber having electrodes of tungsten with 4 mm. in diameter hemispherical ends. (P12c; Te)

99-P. Compound Is Magnetic When it Is Heated. Steel, v. 148, Jan. 16, 1961, p. 78.

Effect of temperature on the magnetic properties of CrMn antimonide. Effect of the Cr content on the transition temperature of the compound. (P16, 2-61, Q23r, 2-60; Cr, Mn, 14-68)

100-P. (English.) Solution-Rate Studies of Solid Metals in Liquid Metals. Pt. 1. Nickel in Bismuth. Masanobu Miyaki, Takao Konishi and Tadao Sano. Osaka University, Technology Reports, v. 10, Mar. 1960, p. 453-461.

Solution rate of dissolution measured under static and isothermal conditions at 300-450° C. by electrical resistivity variation and as a function of concentration. Equations are derived for activation energy. 6 ref. (P12e, P15g, 2-60; Bi, Ni, 14-60)

101-P. (German.) Antiferromagnetic Properties of Ni_3Fe Alloy Depending on Atomic State of Order. M. W. Dechtjar. Physikalische Abhandlungen aus der Sowjetunion, v. 3, Mar. 1960, p. 187-196.

Isothermal measurement of magnetization for ordered and unordered specimens obtained by heating to 1200° C. (with subsequent water quenching) in a Pt furnace by an astatic magnetometer (at compensated earth field) from room temperature to transition temperature to paramagnetic state. (P16p, N10; Ni-b, Fe)

102-P. (German.) Heats of Formation in the Aluminum-Zinc System at 330, 370 and 430° C. Pt. 15. Contributions to Energetics of Metallic Systems. Franz Eberhard Wittig and Leopold Schoffl. Zeitschrift fur Metallkunde, v. 51, Dec. 1960, p. 700-707.

Calorimetric measurements of heats of solution for alloys with 4.43-88.65 at. % Zn (bal. Al) and computation of heats of formation by means of an auxiliary function. Interpretation of results derived from expected values in terms of dislocation formation and dilation of lattice. (P12q, M24b, M26; Al-b, Zn-b)

103-P. (German.) Magnetic After Effects in Age-Hardenable Nickel-Beryllium and Iron-Molybdenum Alloys. Hans-Dieter Hahlbohm and Karl Heinz Bornig. Zeitschrift fur Metallkunde, v. 51, Dec. 1960, p. 708-710.

Age hardenable Ni-Be (2% Be) and Fe-Mo (19.6% Mo) alloys are quenched from solid solution temperatures (for

Ni-Be = 1110° C.) and subsequently annealed to 450 and 600° C. with measurement of magnetic properties at varying annealing times. Evaluation of type and cause of magnetic after effect. (P16e, 2-64; Fe-b, Mo, Ni-b, Be)

104-P. (German.) Conductivity and Hall Constant. Pt. 12. Long Range Order in Cu-Ni-Zn Solid Solutions. Werner Koster. Zeitschrift fur Metallkunde, v. 51, Dec. 1960, p. 716-721.

Measurement of electrical resistance, Hall constant and modulus of elasticity in 95% cold deformed or recrystallized Cu-Ni-Zn specimens with a Ni/Zn ratio of 1:1 and 43-72% Cu at 20-800° C. Structure determination of a long range order phase by X-ray (Cu-K-alpha radiation) examination. (P15g, P15p, M-general, N10, 2-61; Cu-b, Ni, Zn)

105-P. On Thermal Conductivity of Aluminum at Low Temperatures. H. N. Patil. Indian Journal of Physics, v. 34, Aug. 1960, p. 395-396.

Temperature variation of the thermal conductivity of Al at 2-12.5° K. is explained in terms of variation in the Debye characteristic temperature and lattice conduction effects. (P11h, 2-61; Al)

106-P. (German.) Wetting of Oxides by Metals. W. Schatt. Planseeberichte fur Pulvermetallurgie, v. 8, Dec. 1960, p. 122-129.

Wetting test by measuring border angle for Hg, Sn and Ag on 0-16% Cr_2O_3 containing Al_2O_3 in air and hydrogen atmosphere resistance of Al_2O_3 containing 0-8% Cr_2O_3 at room temperature. Wetting theories including those of Naiditsch-Eremenko and of Williams and Murray. (P13h, 2-61; 14-68, Hg, Sn, Ag)

107-P. Measurement of Debye-Waller Temperature for Silver and Alpha Iron. C. W. Haworth. Philosophical Magazine, v. 5, Dec. 1960, p. 1229-1234.

Variation with temperature of X-ray diffraction line intensities from Ag and Fe at 286-1190° K. is measured to determine Debye-Waller temperature factor. Diffraction intensities show no discontinuity at the Curie temperature and there is no anomaly in the spacing of the (110) planes. 10 ref. (P12r, M22g; Ag, Fe)

108-P. Magnetic Susceptibility of Vanadium-Chromium Solid Solutions. B. G. Childs, W. E. Gardner and J. F. Penfold. Philosophical Magazine, v. 5, Dec. 1960, p. 1267-1280.

Magnetic susceptibility of Cr in vanadium is measured at 20, 77 and 293° K. and found to be dependent upon composition. Fine structure is observed in several regions in the susceptibility-composition curve. 23 ref. (P16n, P16p, 2-60, M27; V-b, Cr-b)

109-P. Determination of the Specific Volume of Liquid Copper-Lead Alloys. Tore Malmberg. Institute of Metals, Journal, v. 89, Dec. 1960, p. 137-139.

A method for determining the density of liquid metals, based on the pyknometric principle used to measure Cu and Pb and their binary alloys at 972-1170° C. 17 ref. (P10a, P10d, M24b, 2-61; Cu-b, Pb-b)

110-P. The Heats of Formation in the Vanadium-Titanium-Aluminum System. O. Kubaschewski, C. Wainwright and F. J. Kirby. Institute of Metals, Journal, v. 89, Dec. 1960, p. 139-144.

Heats of formation determined by calorimetry are used to construct isoenthalpy diagram for 50 furnace cooled alloys in the system with examination of phase relationships by X-ray diffraction and microscopy. A correlation between ductility and heat of formation is indicated. 8 ref. (P12, M24c, Q23p; Al-b, Ti-b, V-b)

111-P. Transient Strain--Induced Electrode Potentials. Ken Nobe, Eric Baum and Wm. F. Seyer. Electrochemical Society, Journal, v. 108, Jan. 1961, p. 97-100.

Measurement of transient potentials produced when Cu and Zn-plated Cu wires are strained elastically in $CuSO_4$ and $ZnSO_4$ solutions. Experimental results are predicted by theoretical considerations of the electrical double layer. 4 ref. (P15j, 3-68; Cu, Zn, 4-60)

112-P. Electrical Conduction in Thin Films of Silver Telluride. W. M. Kone and C. Wood. Electrochemical Society, Journal, v. 108, Jan. 1961 p. 101-102.

Electrical contact is made to the films by pressure using a Pt wire or by painting on an In-Ga amalgam. Upon application of constant voltage, current

through the film is found to vary with time and dendrites appear in the area of the contacts. 5 ref. (P15g; Ag, 14-62)

113-P. High Temperature X-Ray Study of the Thermal Expansion of Pd_9Se_8 and Rh_9S_8. Arne Kjekshus. Acta Chemica Scandinavica, v. 14, July 1960, p. 1623-1626.

X-ray powder photography of Pd_9Se_8 and Rh_9S_8 at 20-940° C. to determine the linear thermal expansion coefficients and the volume expansion coefficients. 6 ref. (P11g; Pd, Rh, 14-68)

114-P. The Hydrides of Palladium and Palladium Alloys. F. A. Lewis. Platinum Metals Review, v. 5, Jan. 1961, p. 21-25.

Review of the physical properties of the Pd hydrides and the Pd alloy-H systems. Relationship between relative electrical resistance and hydrogen content. Isotherms are given for a series of Pt-Pd-H systems and for Ag-Pd-H systems. 19 ref. (P15g, P-general, 2-60, M24c; Pd, 14-68)

115-P. The Refractory Noble Metals and Rhenium. Platinum Metals Review, v. 5, Jan. 1961, p. 19-20.

Melting point, acid resistance, oxidation resistance and mechanical strength of the Pt group metals, Rh, Ru, Ir and Os and the neighboring transition metal Re. Effects of Re and refractory noble metal additions on the ductility, twinning and hardness of Mo, W and Cr. (P12n, R-general, Q27a; Ir, Os, Pt, Re, Rh)

116-P. The Critical Field of Superconducting Aluminium Under Pressure. D. Gross and J. L. Olsen. Cryogenics, v. 1, Dec. 1960, p. 91-95.

Effect of pressure on the critical field of Al is measured between 0.3° K. and the transition temperature to permit calculation of specific heat. Pressures up to about 1700 atmospheres are produced by the ice-bomb technique. Results are also reported for Zn, although in this case the technique used for creating the pressure does not yield a pressure which is sufficiently isotropic to allow quantitative conclusions. 20 ref. (P12r, P15g, 3-74; Al)

117-P. The Magnetic Susceptibility of Ag-Mn and Cu-Mn Solid Solutions Between 1.2 and 368° K. A. van Itterbeek, W. Peelaers and F. Steffens. Applied Scientific Research, v. 8, Apr. 1960, p. 337-348.

Determination of Curie constant and Curie temperature for the temperature region in which the alloys obey the Curie-Weiss law. Comparison of values calculated for the effective magneton number with other published values. Measurement of field dependence of the susceptibility. (P16, 2-60, 2-61; Ag-b, Cu-b, Mn)

118-P. Measurements on the Permeability of Hydrogen From H_2 and H_2O Through Steel, Stainless Steel and Aluminum. F. Boeschoten, W. van Egmond and H. M. J. Kinderdijk. Applied Scientific Research, v. 8, Apr. 1960, p. 378-386.

Permeation rate tests are conducted at 100-675° C. through 0.1 mm. tubes using H_2 at varying pressures and superheated steam at atmospheric pressure as sources of hydrogen. 11 ref. (P10m; Al, SS, ST, H)

119-P. (Slovakian.) Determination of Thermodynamic Constants of Solid Material With a Special Apparatus. Bohumil Zitnansky and I. Sebestian. Hutnicke Listy, v. 15, Dec. 1960, p. 951-955.

Study of evaporation kinetics, evaporation velocity, vapor pressures, diffusion coefficients, sublimation temperature and activation energies of Fe-Cr-Mn alloys as functions of temperature and composition, based on temperature measurements and the method of ion exchange. Central unit of the apparatus used is a vacuum furnace. 12 ref. (P12, P13a, N1, N16r, N15g, 2-60, 2-61; Fe-b, Cr-b, Mn-b)

120-P. Effect of Impurity Doping Upon the Electrical Properties of Cadmium Telluride. T. Ichimiya, T. Niimi, K. Mizuma, O. Mikami, Y. Kamiya and K. Ono. Solid State Physics in Electronics and Telecommunications, Proceedings of the International Conference, Brussels, Belgium, June 2-7, 1958, v. 3. Magnetic and Optical Properties, Pt. 1, 1960, p. 845-853.

Electrical resistivity, Hall coefficient and electron mobility at -140 to 250° C. of Cd-Te doped with Ag, In and As. (P15, 3-69; Cd, 14-68)

121-P. (English.) The Dissolving of Oxides in Carbon Steel Melts Under Vacuum. L. Tiberg. Jernkontorets Annaler, v. 144, Oct. 1960, p. 771-793.

The rate of solution for oxides, quartz glass and ceramic materials in a steel melt containing 0.8% C under a vacuum is investigated at 1600-1650° C. The relationship of gas evolution because of boiling at the crucible wall to the formation and growth of surface bubbles is analyzed theoretically. (P12e; CN, 14-68)

122-P. Thermodynamics of the Liquidus and Solidus Curves in System With Complete Solid Solubility; The System Silver-Gold. O. J. Kleppa. Acta Metallurgica, v. 8, Nov. 1960, p. 804-806.

A general expression is derived which permits the calculation of the free energy of formation of solid and liquid phases from the phase diagrams in binary systems. Application to determining the liquidus-solidus gap in Ag-Au alloys. 4 ref. (P12a, M24b, N12p; Ag-b, Au-b)

123-P. Porosity in Plastically Deformed Single Crystals. F. D. Rosi and M. S. Abrahams. Acta Metallurgica, v. 8, Nov. 1960, p. 807.

Single crystal specimens of Ag, Cu and a Cu-0.1% Al alloy are extended to fracture at room temperature and at uniform strain rate. Metallographic examination of porosity occurring parallel to the fracture surface and perpendicular to the stress axis as a function of multiple glide and vacancy coalescence. (P10m, M26s, Q24; Ag, Cu-b, Al, 14-61)

124-P. (German.) Means of Control of Magnetic Properties of Permalloys. Friedrich Pfeiffer. Elektrotechnische Zeitschrift, v. 81, Dec. 19, 1960, p. 945-949.

Permalloys (71-76% Ni, 4.5-14% Cu, 0-4% Mo, 0-2.4% Cr, rest Fe) are annealed under hydrogen at 600-1200° C. and heat treated at 300-750° C. to determine the variation of temperature coefficient of initially permeability, small hysteresis coefficient and rectangular hysteresis loop. (P16, 2-64; Ni-b, Cu)

125-P. Ultra-High Pressure Physics. William G. Field. American Society of Mechanical Engineers, Paper no. 60-WA-331, Dec. 16, 1960, 8 p. $1.

Ultra-high pressures and temperatures are applied to metals such as steel, Ta, W, Ni and Pt and nonmetals to determine the effect of geometry of the resulting crystal structure and on the material's melting point, rigidity and compressibility. (P12n, Q21e, 2-61, 3-71, 3-74; Mo, Ni, Pt, ST, Ta, W)

126-P. Reactive Metals. Donald R. Spink. I/EC (Industrial and Engineering Chemistry), v. 53, Feb. 1961, p. 97-104.

Physical and chemical properties and corrosion resistance of Ti, Zr and Hf as they affect chemical industry applications where strong oxidizing conditions prevail. (P-general, Q-general, R6, R7, T29; Hf, Ti, Zr, 17-57)

127-P. Less Common Elements--Relationship to the Chemical Industry. Ivor E. Campbell. I/EC (Industrial and Engineering Chemistry), v. 53, Feb. 1961, p. 112-114.

Physical and mechanical properties of Ta, Cb, Re, Mo, W, Cr, Ti, Zr and Hf. Effect of nonmetallic additions on properties. (P-general, Q-general; Cb, Cr, Hf, Mo, Re, Ta, Ti, W, Zr)

128-P. (German.) Solution Rate of Ferrochromium Alloys in Steel Baths and Behavior of Chromium Carbides During the Dissolution Process. K. Blankenstein and E. Plockinger. Technische Mitteilungen Krupp, v. 18, Nov. 1960, p. 37-43.

Dissolution behavior of Fe-Cr alloys containing 0.02-6.40% C, 61.7-71.7% Cr and the mixed carbide $(Cr, Fe)_{23}C_6$ at 0.40-60% and of Cr_7C_3 in nonboiling steel baths with 0.30 and 1.0% C. Examination of carbide microstructures during dissolution by microscopy and isolation of residues. 6 ref. (P12e, M-general, N8r; ST, Cr, 14-68)

129-P. (German.) Iron-Cobalt Permanent Magnetic Alloys With Additions of Vanadium and Chromium. Pt. A. Basic Investigation. W. Baran, W. Bruer, H. Fahlenbrach and K. Janssen. Technische Mitteilungen Krupp, v. 18, Nov. 1960, p. 81-90.

Magnetic and mechanical properties of a heavily cold worked 52% Co, 8% V, 4% Cr, balance Fe alloy heat treated at 20-700° C. Data are given for Vickers hardness, elastic modulus, tensile strength, thermal expansion and temperature and monoaxial anisotropy dependency of magnetic properties. (P16,

Q-general, 2-61, 3-72; Co-b, Fe, V, Cr, SGA-n)

130-P. (Japanese.) Plastics Coated Steel Sheet. Yoshio Yamagata. Metal Finishing Society of Japan, Journal, v. 11, Oct. 1960, p. 603-605.

Data are given for electrical, chemical and mechanical properties and wear, corrosion and heat resistance of plastic coated sheet. (P15, Q-general, R-general, Q9n; ST, NM-g33, 8)

131-P. (Book.) High Frequency Magnetic Materials, Their Characteristics and Principal Applications. W. J. Polydoroff. 215 p. 1960. John Wiley & Sons, Inc., 440 4th Ave., New York, N. Y.

Ferromagnetic and dielectric properties, resistivity, permeability and Curie point of magnetic alloys containing Fe, Al, Sn, Sb and Si. (P16; Al-b, Fe-b, Sb-b, Si-b, Sn-b)

132-P. (Translation.) The Equation of State of Metals by a Statistical Method. V. P. Trubitsyn. Soviet Physics--Solid State, v. 2, Nov. 1960, p. 820-823. (A translation of Fizika Tverdogo Tela, v. 2, May 1960, p. 781-1032.)

Derivation of an approximate equation of state for metals at pressure from 0-1X10^6 atm. and T=0^{o}K. with an explicit analytical expression for the dependence of the energy and pressure on the volume. Comparison of calculated and experimental values of sublimation energy, pressure and equilibrium volume for Mg. 6 ref. (P10, P12; Mg)

133-P. (Translation-ConBur.) Thermodynamic Properties of Indium Antimonide. A. V. Nikol'skaya, V. A. Geiderikh and Ya. I. Gerasimov. Academy of Sciences of the USSR., Proceedings, Physical Chemistry Section, v. 130, Jan-Feb. 1960, p. 163-166.

Enthalpy, entropy and free energy of formation of In-Sb are determined by an electrochemical technique. (P12; In, 14-68)

134-P. (Translation-ConBur.) The Interphase Surface Energy of a Metal at the Crystal-Metal Interface. S. N. Zadumkin. Academy of Sciences of the USSR., Proceedings, Physical Chemistry Section, v. 130, Jan-Feb. 1960, p. 103-105.

Theoretically calculated values of the interphase surface free energy compared with those determined experimentally for Ag, Au, Cu, Pb, Al, Pt, B-Ni and B-Co. (P13h; Ag, Al, Au, Co, Cu, Ni, Pb, Pt)

135-P. (Translation-ConBur.) Measurement of the Vapor Pressure of Solid Chromium by Means of Radioactive Indicators. An. N. Nesmeyanov and De Dyk Man. Academy of Sciences of the USSR, Proceedings, Physical Chemistry Section, v. 131, Mar-Apr. 1960, p. 373-375.

Measurement by an integral variant of the effusion method of Knudsen, using the radioactive isotope of Cr^{51} for determining the amounts of condensate. Chrome is exposed in sealed ampoules to neutrons in a nuclear reactor. 8 ref. (P12c; Cr)

136-P. (Translation-ConBur.) The Enthalpy of Formation of Compounds of Cadmium With Phosphorus, Arsenic and Antimony. S. A. Shchukarev, M. P. Morozova and M. M. Bortnikova. Journal of General Chemistry of the USSR., v. 28, Dec. 1958, p. 3315-3317.

Enthalpies of formation are determined for synthesized Cd_3P_2, Cd_3As_2 and Cd_3Sb_2 compounds by reaction with 1N KBr saturated with an excess of Br and measurement of the resulting reaction temperature. 14 ref. (P12; Cd, 14-68)

137-P. Design Information on Titanium Alloys for Aircraft and Missiles. W. P. Achbach and R. J. Favor. Defense Metals Information Center, Battelle Memorial Institute, DMIC Rept. 145, Jan. 10, 1961, 84 p. (Available as PB 151104 from U. S. Office of Technical Services, Washington 25, D. C.)

Design allowances and physical and mechanical properties of 8Mn, 4Al-3Mo-1V, 5Al-2Cr-2Mo-2Fe, 6Al-4Zr-1V and 5Al-5Zr-5Sn Ti alloys in sheet, plate, strip and bar form at temperatures up to 1000^{o} F. (P-general, Q-general, 17-51, T24; Ti-b)

138-P. Metallurgy in Nuclear Power Technology. J. C. Wright. Metal Treatment and Drop Forging, v. 28, Jan. 1961, p. 21-30.

Review of the physical and mechanical properties and corrosion and oxidation behavior of Al, Mg, Magnox alloys, Zr, Zircaloy and Cb in their application as fuel element canning materials.

(P-general, Q-general, R-general, T11; Al, Cb, Mg, Zr-b, 17-57)

139-P. (German.) Anode Potential of Zinc in Saturated Zinc-Sulphate Solution. K. Schwabe and F. Lohmann. Zeitschrift fur Physikalische Chemie, v. 215, Mar-Apr. 1960, p. 158-166.

Potential measurements are made in a saturated $ZnSO_4$ solution of pH=1.5 by an indirect method using a mechanical breaker. Theory is given to explain reaction mechanisms of anodic polarization. (P15; Zn)

140-P. (German.) Thermodynamic Properties of Several Copper Alloys. A. A. Wetscher and J. I. Gerassimow. Zeitschrift fur Physikalische Chemie, v. 215, Mar-Apr. 1960, p. 194-202.

Evaluation of free enthalpy and entropy of mixing in binary Cu-Ni, Cu-Pd and Cu-Sb solid solutions by electromotive force measurements at 400-750° C. using liquid iodine and chlorine salts as electrolyte. (P12; Cu-b)

141-P. (Russian.) Heat Treatment of Iron-Aluminum Magnetically Soft Alloys. G. V. Krasnoperov and N. I. Lapkin. Fizika Metallov i Metallovedenie, v. 10, May 1960, p. 668-671.

Effect of temperature of heat treatment and quenching media on magnetic properties and electrical resistivity of hot rolled Yu16 alloy samples containing 16% Al. Heat treatment parameters are developed for obtaining magnetic properties equivalent to those of Fe + 50% Ni alloys. 5 ref. (P15g, P16, 2-64; Fe-b, Al, Ni)

142-P. (Russian.) Temperature Dependence of Paramagnetic Susceptibility of Iron Nickel Alloys. V. I. Chechernikov. Fizika Metallov i Metallovedenie, v. 10, May 1960, p. 672-675.

Paramagetic susceptibility of Fe-Ni alloys containing 38.8-89.6% Ni at 200-1200° C. is measured as a function of temperature, composition and diamagnetic properties of the metal. 9 ref. (P16p, 2-60, 2-61; Fe-b, Ni-b)

143-P. (Russian.) Magnetic and Electrical Properties of Some Construction Steels in Relation to Structure and Tendency to Temper Brittleness. G. S. Tomilov. Fizika Metallov i Metallovedenie, v. 10, May 1960, p. 681-689.

45, 30KhGS and 45Kh NMFA steels are oil quenched from 850-1200° C. with subsequent tempering at 100-700° C. Hardness, impact strength, electric conductivity, coercive force, Hall constant, magnetic saturation and permeability are measured as dependent upon carbide transformations, initial grain size and tempering temperature. 11 ref. (P15, P16, Q29n, Q6n, 2-59, 2-64, 3-71; ST, SGB-s)

144-P. Alloys for Temperature Compensation of Electrical Instruments. C. A. Clark. Instrument Practice, v. 15, Jan. 1961, p. 56-61.

Physical properties of 70-30 Fe-Ni and 70-30 Ni-Cu base alloys at -50 to 200° C. with reference to applicability in temperature-compensation of instruments employing eddy-current damping control. Magnetic induction as a function of temperature and martensite transition point is measured for variously fabricated and heat treated alloys containing differing amounts of C, Si, Mn and Mo. (P16, P-general, N6q, X10; Fe-b, Ni-b, Cu, 17-57)

145-P. (German.) The Stabilizing Field of the Magnetic After Effect in Silicon Iron at High Temperatures. G. Hellbardt. Technische Mitteilungen Krupp, v. 18, Aug. 1960, p. 25-28.

Oscillographic recording of the stabilizing field of the magnetic after effect before and after stabilization at 500° C. in an Fe-Si alloy. Comparison with the H.-D. Dietze theory of domain wall stabilization by vacancies. Effect of induction, high temperature and grain boundary relaxation on disappearance of the field. 8 ref. (P16e, 2-62, 3-72; Fe-b, Si)

146-P. (Czech.) Transformer Sheet. Josef Teindl and Bohuslav Otta. Sbornik, v. 6, Mar-Apr. 1960, p. 297-302.

Various transformer sheets are tested by a special apparatus which measures magnetic permeability. Effect of storage at 5-30° C. for 85 days on hysteresis loss and permeability. (P16, 2-61; SGA-n)

147-P. Radiation Damage of Metals (Experimental Design to Study the Effect of Elevated Temperature on Neutron-Induced Changes in Steel). L. E. Steele and J. R.

Hawthrone. Report of N. R. L. (Naval Research Laboratory) Progress, Dec. 1960, p. 28-29. $1.25. (Available as PB 161288 from U. S. Office of Technical Services, Washington 25, D. C.)

An experimental multitemperature assembly, incorporating four units of steel specimens within a framework of Al and sheathed in stainless steel forming a controlled temperature capsule attaining progressively higher temperature from unit to unit, is exposed to irradiation in a water cooled reactor at 240-570° C. to study radiation damage and temperature effects. (P10d, 2-61, 2-67; ST)

148-P. (Czech.) Influence of Lattice Distortions and Characteristic Temperature on the Heat Resistance of Low Alloy Steel. Zdenek Bembenek and Vaclav Foldyna. Sbornik, v. 6, Jan. 1960, p. 33-49.

Wires of low alloy steel with 0.16% C, 0.09% Mn, 1.42% Mo, 0.024% P and 0.022% S are held at 1200° C. for 20 min. and subsequently annealed in a Sn bath at 400-700° C. Effect of annealing on distortions of the third order is tested by X-ray diffraction. 24 ref. (P12r, 2-64, 9-74; AY, 4-61)

149-P. Transient Heat Conduction in a Rod of Finite Length With Variable Thermal Properties. W. H. Chu and H. N. Abramson. Journal of Applied Mechanics (ASME, Transactions), Series E, v. 27, Dec. 1960, p. 617-622.

Theoretical solution for determination of thermophysical properties by replacing the ore-dimensional heat conduction equation with a difference equation. Temperature-dependent diffusivity of a Cu bar is determined for 300° K. 16 ref. (P11m, 10-51; Cu)

150-P. Solubility of Nitrogen in Molten Iron Manganese Alloys. Sylvan Z. Beer. Metallurgical Society of AIME, Transactions, v. 221, Feb. 1961, p. 2-8.

The solubility of nitrogen in molten Fe-Mn alloys is measured as a function of concentration of Mn, temperature and pressure. Experimental values for the solubility and heats of solution are compared with those obtained from excess free energies calculated using a ternary Gibbs-Duhem relationship. 14 ref. (P12e, P12q, 2-60, 2-61, 3-74; Fe-b, Mn-b, N)

151-P. Thermal Diffusivity of Armco Iron. G. D. Cody, B. Abeles and D. S. Beers. Metallurgical Society of AIME, Transactions, v. 221, Feb. 1961, p. 25-27.

The thermal diffusivity (thermal conductivity divided by specific heat) of Armco iron is measured at 30-1025° C. Differences from values computed from published thermal conductivity and specific heat data are ascribed to a rapid variation in the electronic thermal conductivity near the Curie point and a decrease in the lattice thermal conductivity at alpha to gamma phase transition. 9 ref. (P11m, P11h, 2-61; Fe-a)

152-P. The Effect of Plastic Deformation on the Electrical Resistivity of Composite Silver Alumina Alloys. H. R. Peiffer. Metallurgical Society of AIME, Transactions, v. 221, Feb. 1961, p. 60-63.

The increase in electrical resistivity is measured as a function of elongation at 78° K. for a 2% finely divided alumina in Ag material. The amount of increase in electrical resistivity is influenced by the amount of dispersed alumina present. 9 ref. (P15g, 3-68; Ag-b, Al)

153-P. Uranium Solubility in Bismuth-Base Liquid Solutions. A. F. Weinberg, R. J. Van Thyne and R. E. Steiner. Metallurgical Society of AIME, Transactions, v. 221, Feb. 1961, p. 83-90.

Uranium solubility in molten Bi is determined at 350-600° C., varying from 0.09 wt.% to near 2 wt.%, respectively. Zr and Mg, simulated fission products and Na are found to increase or decrease uranium solubility at 370-420° C. depending upon the addition or temperature. Data are obtained by chemical analysis of samples obtained by filtration from saturated melts and by measurement of the variation of electrical resistance with temperature. 8 ref. (P12e, 2-60, 2-61; Bi, U, 14-60)

154-P. Reaction of Pure Tantalum With Air, Nitrogen and Oxygen. W. M. Albrecht, W. D. Klopp, B. G. Koehl and R. I. Jaffee. Metallurgical Society of AIME, Transactions, v. 221, Feb. 1961, p. 110-117.

Kinetic studies are made of the reaction of Ta with O, N and air at 400-1500° C. The Ta-O reaction is linear from

500-1250° C. The Ta-N reaction follows a cubic rate law at 400-700° C. and a parabolic rate law at 800-1475° C. The reaction behavior in air is initially parabolic followed by a transition to linear behavior. 31 ref. (P13b, R1h; Ta, N, O)

155-P. Thermodynamic Properties for the Zn-Cd System From Electromotive Force Measurement. D. J. Wynnemer and G. W. Preckshot. Metallurgical Society of AIME, Transactions, v. 221, Feb. 1961, p. 186-191.

Electromotive force measurements are made on the Zn-Cd system at 700-900° C. Activity coefficients, partial free energies, enthalpies, entropies, integral heat of mixing and vapor-liquid equilibrium composition are determined over the composition range. 19 ref. (P12, P15g, M24b; Cd-b, Zn-b)

156-P. Kinetic and Equilibrium Studies of Redox Reaction in Liquid Bismuth. D. G. Schweitzer and D. H. Gurinsky. Metallurgical Society of AIME, Transactions, v. 221, Feb. 1961, p. 192-198.

The empirical equilibrium constants and the heat of reaction for the reduction are determined at 300-500° C. The mechanisms of the oxidation of U and Mg from dilute Bi solutions are investigated. The kinetics of some of the reactions are affected by air adsorbed on the uranium oxides. 3 ref. (P13, R1h; Bi, Mg, U)

157-P. Solubility of Nitrogen in Liquid Manganese. Nev A. Gokcen. Metallurgical Society of AIME, Transactions, v. 221, Feb. 1961, p. 200-201.

Nitrogen solubility in electrolytic Mn at 1273-1500° C. is determined using quenching, dissolution and solution distillation methods. Activity coefficients and standard free energies are calculated with the reaction being considered exothermic. 4 ref. (P12e, P13; Mn, N)

158-P. Galvanic Behavior in Fused Electrolytes. Pt. 3. Potentials of Calcium, Magnesium and Nickel in LiCl-KCl-K_2CrO_4 and NaCl-KCl-K_2CrO_4. Sidney M. Selis and Laurence P. McGinnis. Electrochemical Society, Journal, v. 108, Feb. 1961, p. 191-195.

Difference of electrode potentials in electrolytes containing Li and Na is explained by formation of a semiliquid electrode surface film which inhibits polarization. (P15m; Ca, Mg, Ni)

159-P. (Translation.) Anistropy of Electrical Properties of Single Crystals of Cadmium Antimonide. I. K. Andronik and M. V. Kot. Soviet Physics, Solid State, v. 2, Dec. 1960, p. 1022-1026. (Translation of Fizika Tverdogo Tela, v. 2, June 1960, p. 1033-1360.)

Conductivity, Hall effect, resistivity and thermal emf. as influenced by temperature and magnetic field. 9 ref. (P15, 2-61; Cd, 14-61, 14-68)

160-P. (Translation.) The Optical and Photoelectric Properties of Zinc Selenide and Telluride. G. A. Zholkevich. Soviet Physics, Solid State, v. 2, Dec. 1960, p. 1009-1011. (Translation of Fizika Tverdogo Tela, v. 2, June 1960, p. 1033-1360.)

Absorption spectra, photoconductivity and luminescence are measured on wafers obtained by direct reduction of the constituent elements. 4 ref. (P17a, P15k; Zn, 14-68)

161-P. (Translation.) Electrical Conductivity and Photoelectric Properties of Cadmium and Zinc Telluride Layers. P. P. Konorov and I. B. Shevchenko. Soviet Physics, Solid State, v. 2, Dec. 1960, p. 1027-1032. (Translation of Fizika Tverdogo Tela, v. 2, June 1960, p. 1033-1360.)

Electrical conductivity as influenced by temperature and photoconductivity as influenced by intensity of incident light. 9 ref. (P15g, 2-61; Cd, Zn, 14-68)

162-P. (Translation.) Anisotropy of Certain Electrical Properties of Single Crystals of Zinc Antimonide. M. V. Kot and I. V. Kretsu. Soviet Physics, Solid State, v. 2, Dec. 1960, p. 1134-1139. (Translation of Fizika Tverdogo Tela, v. 2, June 1960, p. 1033-1360.)

Effect of temperature on electrical conductivity, Hall effect and thermal emf. is measured on test specimens prepared by Bridgman's method and zone melting. 3 ref. (P15, 2-61; Zn, 14-61, 14-68)

163-P. (English.) Annealing Effect of Commercial Silicon Steel Sheets. Komei Haga and Hirokuni Mizuno. Scientific Papers of the Institute of Physical and Chemical Research, v. 54, Sept. 1960, p. 285-294.

Testing Si steel transformer sheet specimens to determine the effect of various annealing conditions on the magnetic properties of the steel sheet. Effects of annealing time, temperature and hydrogen or oxidizing atmosphere on the magnetic permeability of the specimens. 13 ref. (P16, 2-64; SGA-n, ST)

164-P. (Japanese.) Changes in Specific Surface Area of Iron Salts and Iron Oxides Powders on Heating. Akira Moriyama, Jyoichiro Moruyama and Isao Kushima. Japan Institute of Metals, Journal, v. 24, Nov. 1960, p. 699-703.

Measurement of the contraction of specific surface area of Fe oxides produced by thermal decomposition of Fe salts, by heating at constant temperatures (300-900° C.) and in densification through sintering. Equation is derived for rate kinetics and activation energy. 19 ref. (P10c, P13; Fe-b, 6-68, 14-68)

165-P. Studies of Shock Propagation and Vibration and Their Measurements. I. Vigness and E. W. Kammer. Report of NRL (Naval Research Laboratory) Progress, Jan. 1961, p. 23-24.

Effect of mechanical strain upon the resistance of an Au-Cu alloy in both the ordered and disordered state is measured at 78 and 300° K. to study the influence of impurities and lattice imperfections on thermoelectric potentials. The study is part of a program for determining suitability of the properties of materials for bonded wire strain gage applications in instrumentation of shock and vibration measurements. (P15g, Q6p, X28j, 3-68, 3-69; Au-b, Cu-b, 4-61, 17-57)

166-P. (Translation.) The Dispersion and Reestablishment of Contacts Between Microblocks During Plastic Deformation. R. I. Garber, I. A. Gindin and L. M. Polyakov. Soviet Physics, Solid State, v. 2, Dec. 1960, p. 984-990. (Translation of Fizika Tverdogo Tela, v. 2, June 1960, p. 1033-1360.)

Porosities caused by structural disorientation in steel foil and tubing at -196° C. disappear upon returning to room temperature. 15 ref. (P10m, 3-68; ST, 4-56, 4-60)

167-P. Properties and Applications of Some Specialty Wires. Donald E. Thomas. Wire and Wire Products, v. 36, Jan. 1961, p. 73-74, 115-116.

Data are given for electrical conductivity, tensile strength, elongation, density and solderability of bare and metal coated wire composed of stainless steel, Zn, Pb, Ag and Cu, Sn, Ni, Fe and their alloys. Applications in electrical conductors, cables, wire cloth and various consumer goods. (P-general, Q-general, K8, 17-52; 4-61, 17-57)

168-P. Review of Developments in Iron-Aluminum-Base Alloys. J. W. Holladay. Defense Metals Information Center, Battelle Memorial Institute, DMIC Memo 82, Jan. 30, 1961, 57 p.

Physical and mechanical properties of ferritic and austenitic Fe-Al alloys are compared with those of 302, 321, 403 and 430 stainless steels. Data are also given for corrosion and oxidation resistance, workability and elevated temperature properties. (P-general, Q-general, R-general; Fe-b, Al, SS)

169-P. (English.) The Mathiessen Rule in Disordered Binary Alloys. A. Corciovei and G. Musa. Acta Physica Polonica, v. 19, June 1960, p. 647-662.

Theoretical calculation of the vibrational, disorder and mixed components of the electrical resistivity and their deviation from the Mathiessen rule. (P15g)

170-P. (French.) Titanium and Its Alloys. Pt. 1. Principal Properties, Weldability. R. Develay. Soudage et Techniques Connexes, v. 14, Nov-Dec. 1960, p. 409-420.

Compilation of data for physical properties, including density, fusion point, electric resistance, dilation, thermal conductivity, resistance to chemical agents and oxidation and allotropic transformation (at 885° C.), separating an alpha and a beta phase. Influence of O, N and C (present as impurities), of chemical reactivity and of heat treatment on the weldability of Ti and of its alloys, T-A5E, T-A8-Nb2Ta, T-A6V, T-A4M, T-A4D3V, T-D6A and T-V16A. 4 ref. (P-general, K9s, 2-60, 2-64; Ti-b)

171-P. Thermal Fluctuation Effects in Thin Magnetic Films. E. P. Wohlfarth.

Journal of Electronics and Control, v. 10, Jan. 1961, p. 33-37.

Interpretation of thermal fluctuation in small crystallite particles of thin Ni films evaporated on a glass substrate at 200° C. Time dependency of Ni film's coercive force is analyzed according to the anisotropy field, mean effective crystallite size and thermal fluctuation. 10 ref. (P16a, 2-61, 3-67; Ni, 14-62)

172-P. (French.) Action of Sulphur on Copper at Elevated Temperatures. Jacques Oudar. Metaux-Corrosion-Industries, v. 35, Dec. 1960, p. 455-473.

Thermochemical reactions and transformations in Cu exposed to H_2S at 600-1000° C. Correlation of interaction between metal surface defects and nucleation and polygonization characteristics. Data are given for sulphur solubility and absorbtion coefficients. 38 ref. (P12e, P13d, N2, N5, 9-71; Cu, S)

173-P. (Japanese.) Magnetostriction in Alnico 5 Magnets. Tatsuo Fujiwara and Tetsuo Kato. Japan Institute of Metals, Journal, v. 24, Dec. 1960, p. 773-777.

Strain gage measurements and X-ray diffraction patterns for magnet alloy specimens aged at 600° C. and annealed at 900-1300° C. in magnetic fields for various times. Magnetostriction and permeability are determined as a function of magnetization force and direction and heat treatment time and temperature. 34 ref. (P16b, P16q, 2-64; Fe-b, Ni)

174-P. Metals for a New Age. South African Mining and Engineering Journal, v. 71, Dec. 16, 1960, p. 1551-1553.

Discussion of Cu-base alloys, soldering and brazing metals and Ti with regard to their melting points, density, strength, high temperature properties, corrosion resistance and oxidation resistance. (P12n, P10a, Q27, R-general; Cu-b, SGA-f, Ti)

175-P. (Russian.) Solubility of Magnesium in Iron. F. N. Tavadze, E. S. Kartoziya and A. Ya. Shinyaev. Metallovedenie i Termicheskaya Obrabotka Metallov, Jan. 1961, p. 33-35.

Radioactive tracer study of diffusion layers produced in electrolytic Fe and pure Mg under pressure at 1200° C. Self diffusion coefficients of Fe are determined as indicators of Mg solubility as a function of the number of dislocations and vacancies formed during the Mg dissolution process. (P12e, N1a; Fe-a, Mg)

176-P. Magnetic Properties of Chromium Between 0 and 350° C. E. W. Collings, F. T. Hedgcock and A. Siddiqi. Philosophical Magazine, v. 6, Jan. 1961, p. 155-158.

Magnetic susceptibility measurements on high-purity Cr indicate that an antiferromagnetic transition takes place at 39 ± 0.5° C. (P16, 2-61; Cr)

177-P. (Russian.) Electromotive Force Study on Thermodynamic Properties of Binary Systems. V. A. Geiderikh, A. A. Vecher and Ya. I. Gerasimov. Zhurnal Fizicheskoi Khimii, v. 34, Dec. 1960, p. 2789-2794.

Dependence of thermodynamic functions on composition of Fe-Sb alloy at 400-700° C. and 830° K. Values for enthalpy of $FeSb_2$ formation and constitution diagram. Comparison with results obtained calorimetrically by Korber and Oelsen. 14 ref. (P12, 2-60; Fe-b, Sb)

178-P. Magnetic Analysis of the Precipitation of Iron From Beta Brass. A. E. Berkowitz and P. J. Flanders. Acta Metallurgica, v. 8, Dec. 1960, p. 823-832.

Single crystals of beta brass containing 0.07 wt.% Fe are annealed at 300 and 400° C. to precipitate the Fe. Magnetization curves, hysteresis loops and torque curves are measured and analyzed in terms of the concepts of fine particle ferromagnetism to derive size and shape distributions of the Fe precipitate particles and the orientation of their crystallographic and shape symmetry axes. 31 ref. (P16, M26c, N7, 3-72; Cu-n, Fe, 9-61, 14-61)

179-P. Thermodynamics of the Solid Solutions of Mercury in Silver and Gold. H. W. Rayson and N. A. Alexander. Acta Metallurgica, v. 8, Dec. 1960, p. 833-840.

Thermodynamic properties of the Ag-Hg and Au-Hg f-c-c. solid solutions are determined using an isopiestic technique, the equilibrium composition of the alloys being obtained by X-ray analysis. Reciprocal temperature isobans, entropies, heats of solution and solid solubilities are determined at 100-500° C. 19 ref. (P12, N12p; Ag-b, Au-b, Mg)

180-P. Dilute Solutions in Alloys. C. B. Alcock and F. D. Richardson. Acta Metallurgica, v. 8, Dec. 1960, p. 882-887.

An equation is derived by a quasi-chemical approach for the activity coefficient of a dilute solute in a mixture of two metals. This is simply related to the activity coefficients of the solute in each metal separately and the separate activity coefficient of the metals in the mixture. Application of the equation to data on sulphur and oxygen in various liquid Fe, Ni and Co alloys leads to the conclusion that the pairwise interaction energies of a solute atom with each of the surrounding metal atoms may vary considerably with alloy composition. 8 ref. (P12e, P13, 2-60; Fe-b, Co-b, Ni-b, O, S)

181-P. Activities of Manganese in Solid Platinum. H. P. Abraham, M. W. Davies, J. L. Barton and F. D. Richardson. Acta Metallurgica, v. 8, Dec. 1960, p. 888-890.

Activities of Mn in solid alloys of Mn and Pt are measured at 1500-1650° C. The activity coefficients range from 1.3×10^{-5} at extreme dilution to 6.0×10^{-4} and 1.4×10^{-3} at 25 at.% Mn. Heat of formation and heat capacity data are used to calculate the heat of solution. 5 ref. (P13a, P12; Pt-b, Mn)

182-P. (German.) Influence of Ordering Processes and Working on Electrical Properties of a Nickel Silver Alloy of the Composition Cu_2NiZn. G. Bartsch and B. Tehnzen. Metall, v. 15, Feb. 1961, p. 127-136.

Measurement of thermovoltage, electrical resistance and hardness of Cu_2Ni Zn specimens after varying heat treatments (homogenizing at 750° C., quenching from 300-600° C., annealing at 100-300° C.) and working by hammering. Results are discussed in terms of dislocation theory. Kinetics of ordering processes. (P15, 2-64, 3-68, N10; Cu-b, Ni, Zn)

183-P. (French.) Simultaneous Solubility of Hydrogen and Oxygen in Copper and Bronze Melts in the Presence of Water Vapor. Wilhelm Hofmann and Hans-Jurgen Schneider. Memoires Scientifiques de la Revue de Metallurgie, v. 57, Nov. 1960, p. 876-878.

Equilibrium pressure of hydrogen and oxygen content of Cu and bronze (12% Sn) melts under the influence of water vapors. Calculation of dissolved H. 6 ref. (P12e; Cu-b, O, H)

184-P. (Russian.) Investigation of Thermodynamic Properties of Liquid In and Bi Alloys. N. V. Alekseev, Ya. I. Gerasimov and A. M. Evseev. Doklady Akademii Nauk, SSSR, v. 134, Mar. 1960, p. 618-620.

Determination of activities, entropies and heats of solution for In-Bi alloys by electrochemical means using a KCl, LiCl and $ZnCl_2$ electrolyte at 240-300° C. Electrodes of nearly pure In and varied composition In-Bi. (P12; In-b, Bi-b)

185-P. (Russian.) Measurement of Heat Conductive Anisotropy of Zn and Cd in the Superconducting State. N. V. Zavaritskii. Zhurnal Eksperimentalnoi i Teoreticheskoi Fiziki, v. 39, May 1960, p. 1193-1197.

Determination of thermal conductivity of Zn and Cd at 0.1-1.0° K. Relation of thermal conductivity and critical magnetic intensity to temperature. Critical temperatures calculated from magnetic intensity plots. (P11h, P16, 2-63; Cd, Zn)

186-P. (Translation-Brutcher no. 5039.) Electrical Properties of Lanthanum Boride. Yu. B. Paderno. Fizika Metallov i Metallovedenie, v. 10, Apr. 1960, p. 633-634.

Usefulness of lanthanum hexaboride for electronic apparatus. Relation between electrical resistance and porosity (2-27%) of lanthanum boride. (P15; La, B, 14-68)

187-P. (German.) Change of Magnetic Atomic Momentum of Ferromagnetic Metals in Hydrostatic Compression. Je. I. Kondorski and W. L. Sedow. Physikalische Abhandlungen aus der Sowjetunion, v. 3, Apr. 1960, p. 269-277.

Measurement of change of magnetic momentum and electrical resistance at 4.2 and 20.4° K. for Fe, Ni, Fe-Ni alloy (34.7-90.2% Ni) and Ni-Cu alloy (10.2-48.4% Cu) specimens under hydrostatic pressure in magnetic fields of up to 8600 Oe. Interpretation of results in terms of a theory of "latent antiferromagnetism". (P16, P15g; Cu-b, Fe-b, Ni-b)

188-P. Metallurgy of High-Temperature Heat-Transfer Systems (Temperature Dependence of the Surface Tensions of Liquid Metals). S. W. Strauss. Report of NRL (Naval Research Laboratory) Progress, Feb. 1961, p. 34-35. (Available as PB 171315 from U. S. Office of Technical Services, Washington 25, D. C.)

Empirical surface tension-temperature relations are obtained for liquid metals by equation correlating melting point and energy of vaporization per unit volume with critical temperature at which surface tension vanishes and with melting temperatures. Calculated and experimental data are compared for Ag, Al, Au, Bi, Be, Ce, Cu, Fe, In, K, Na, Pb, Sn and Hg. Relations are drawn between surface tension of metals and heat transfer and container. Corrosion characteristics when used as liquid coolants. (P13h, 2-61; 14-60)

189-P. (French.) Quadrupole Effects in the Nuclear Magnetic Resonance of Dilute Alloys. A Blandin and J. Friedel. Journal de Physique et le Radium, v. 21, Oct. 1960, p. 689-695.

Dissolved impurities in Cu and Al base alloys, spatially removed from a nucleus, create electronic density oscillations which result in strong intensity change in nuclear magnetic resonance. A mathematical formula for calculating the magnitude of these oscillations is given which is dependent on the constant affected by Bloch wave formations at the Fermi level. 18 ref. (P16f; Al-b, Cu-b)

190-P. (German.) Anisotropy of Surface Tension on the Boundary Between the Supraconductive and Normal Conductive Phase of Tin. Je. W. Scharwin and W. F. Gantmacher. Physikalische Abhandlungen aus der Sowjetunion, v. 3, Apr. 1960, p. 292-310.

Investigation of surface tension on specimens of varying crystal orientation using ferromagnetic powders and measurement of momentum of forces which act in a magnetic field on a spheric specimen, at temperatures from 2.08-3.69° K. Temperature dependence of surface tension and crystal geometry. (P13h, P15g, P16, 2-61, 3-72; Sn, 6-78)

191-P. (German.) Investigation of Abnormal Temperature Dependence of Initial Permeability by Magnetic After-Effect in Iron and Iron-Silicon Alloys at Temperatures From 300-700° C. H. Fahlenbach and G. Sommerkorn. Solid State Physics in Electronics and Telecommunications, v. 3. Magnetic and Optical Properties. Pt. 1, 1960, p. 201-207.

Measurement of permeability changes in 5-300 mOe magnetized sintered Fe, Fe alloy containing 3% Si, steel with 1% Al and Fe alloy with 0.2% Mn at temperatures from 300-700° C. Interpretation of abnormalities in terms of diffusion of voids. (P16q, 2-61; Fe-b, Al, Mn, Si)

192-P. (German.) Characteristic Magnetic Properties of Alloys With Finely-Dispersed Ferromagnetic Precipitation. E. Kneller. Solid State Physics in Electronics and Telecommunications, v. 3. Magnetic and Optical Properties. Pt. 1, 1960, p. 210-222.

Review of magnetic properties of alloys with superparamagnetic precipitations (Fe and Co amalgams, Cu-Co alloys with 2% Co, Ni-Mn alloys with more than 25% Mn) in terms of: magnetizing curve; temperature-dependency of spontaneous magnetization; Curie temperature as influenced by particle size and thermally stable remanence. (P16; Co-b, Cu-b, Fe-b, Ni-b, Mn)

193-P. Fundamental Materials Considerations in Liquid Metal Heat Exchanger. B. F. Brown and S. W. Strauss. Society of Automotive Engineers, Inc., 485 Lexington Ave., New York 17, N. Y. Preprint 280D, 1961, 10 p.

Relationships of temperature, surface tension, specific heat, atomic weight, stability, solubility, thermal conduction, viscosity and melting point for numerous metals useful in liquid metal heat exchangers. (P-general, W13b)

194-P. The Behavior of Titanium in a High Vacuum. J. Morrison. Paper from "Vacuum Technology Transactions". Pergamon Press, New York, 1959, p. 291-296.

Data are given for gettering properties at 200° C., hydrogen evolution rate at 1000° C., vapor pressure and spectral emissivity. (P13, P12c, P17d, 1-73; Ti)

195-P. Thermal Expansion of Aluminum at Low Temperatures. Eva Huzan, C. P. Abbiss and G. O. Zones. Philosophical Magazine, v. 6, Feb. 1961, p. 277-285.

Thermal expansion is measured by a sensitive optical method at 15-100° K. At lowest temperatures the Gruneisen parameter shows a significant use. 19 ref. (P11g, 2-63; Al)

196-P. (Japanese.) Intrinsic Magnetization and Magnetic Structures of Iron Group Alloys With Chromium and Vanadium. Yoshi Kono and Soshin Chikazumi. Kobayashi Institute of Physical Research, Bulletin, July-Dec. 1959, p. 12-21.

Saturation magnetization is measured for Fe-Cr-Co, Co-Ni-Cr, Fe-Co-V and Co-Ni-V alloys. Addition of Cr and V causes a decrease in intrinsic magnetization in any ferromagnetic alloy. 8 ref. (P16; Co-b, Fe-b, Cr, Ni, V)

197-P. (Translation.) Determination of the Activation Energy of the Work-Function Stabilization Process of the Gold-Barium System. E. D. Pavlovskaya, I. L. Sokol'skaya and Yu. G. Shishkin. Soviet Physics--Solid State, v. 2, Feb. 1961, p. 1671-1672. (Translation of Fizika Tverdogo Tela, v. 2 Aug. 1960, p. 1681-2006).

Work function measurements at 20-1000° C. on layers of Au and Ba deposited on tungsten strips. Effects of formation of an intermetallic compound between the two elements. (P15k; W, Au, Ba, 8)

198-P. (Translation.) Thermoelectric Properties of the Intermetallic Compound $MnAl_3$. N. V. Kolomets and E. A. Popova. Soviet Physics--Solid State, v. 2, Feb. 1961, p. 1758-1761. (Translation of Fizika Tverdogo Tela, v. 2, Aug. 1960, p. 1681-2006).

Investigation of $MnAl_3$ to ascertain thermoelectric properties and electrical conductivity as influenced by composition and temperature. (P15j; Al, Mn, 14-68)

199-P. Thermal Methods. J. H. Woodhead. Paper from "The Physical Examination of Metals". Edward Arnold, Ltd., London, England, 1960, p. 169-224.

Thermodynamic, thermal and thermoelectric properties of metals and alloys and relation to structure and composition changes. Principles and techniques for measurement by thermal analysis, dilatometry and calorimetry. 120 ref. (P11, P12, M23b, 1-54, 10-54)

200-P. Magnetic Analysis. K. Haselitz. Paper from "The Physical Examination of Metals". Edward Arnold, Ltd., London, England, 1960, p. 225-251.

Principles of ferromagnetism, demagnetizing fields and magnetization curves in metals and alloys. Measurement of secondary magnetic properties and application to study of structural transformations, phase constitution, inclusion content, crystal orientation and physical properties. Application of thermomagnetic and magnetic stress-analysis. 37 ref. (P16, P-general, M23a, M-general, 1-54)

201-P. (Translation-ConBur.) Change in the Electrical Resistance of Metals During Electrolytic Saturation With Hydrogen. V. V. Kuznetsov and V. A. Frolov. Journal of Applied Chemistry of the USSR, v. 33, Mar. 1960, p. 633-637.

Specific electrical resistance of steel wires is measured before and after cathodic saturation with hydrogen. The change in resistance is then plotted against saturation time, current density and concentration of additives. 15 ref. (P15g, Q26s; ST, 4-60)

202-P. (German.) Usefulness of "Centanin" Wires for High Precision Resistances. Walter Hetzel and Friedmund Melchert. Zeitschrift fur Instrumentenkunde, v. 68, Nov. 1960, p. 264-270.

Investigation of resistance-temperature curves at 20-50° C. of annealed Centanin (67% Cu, 27% Mn, 5% Ni) wire of varying diameter as influenced by impurities, mechanical deformation by winding, aging at 140-500° C. and surface treatment (etching). Constance of resistance with time. (P15g, 2-61; Cu-b, Mn, Ni, 4-61)

203-P. (German.) Influence of Heat Treatments on Resistance and Magnetizibility of the CuMnNi Alloy "Centanin". Alfred Schulue and Heinz Eicke. Zeitschrift fur Instrumentenkunde, v. 68, Nov. 1960, p. 261-264.

Measurement of electrical resistance and of magnetic susceptibility at temperatures from 10-65° C. of cold worked "Centanin" wires (27% Mn, 5% Ni, rest Cu) after vacuum annealing at 75-450° C. Interpretation of results in terms of recovery and recrystallization. (P15g, P16n, P16p, 2-61, 2-64; Cu-b, Mn, Ni, 4-61)

204-P. (German.) Direct Measurement of the Uniaxial Magnetic Anisotropy of Evaporated Thin Layers of Iron, Nickel, Permalloy and Cobalt. Zdenek Malek and Walter Schuppel. Annalen der Physik, v. 6, May-June 1960, p. 252-261.

Measurement of the parameters of uniaxial anisotropy and their change with time at room temperature by torque measurements on thin layers of Fe, Ni, Co and Permalloy, which are evaporated on a vertical or inclined heated or non-heated support. Interpretation of anisotropy in terms of a short-range order effect caused by faults. (P16; Co, Fe, Ni-b, 14-62)

205-P. (German.) Calorimetry and Thermodynamics of Copper-Bismuth Alloys. Willy Oelsen, Eberhard Schurmann and Dietrich Buchholz. Archiv fur das Eisenhuttenwesen, v. 32, Jan. 1961, p. 39-46.

Calorimetric measurement of heat content-temperature curves for Cu-Bi alloys over the entire concentration range to evaluate thermodynamics (partial and integral enthalpies and entropies; thermodynamic activities) and phase diagram of the binary Cu-Bi system by thermodynamic analysis. (P12, M24b; Bi-b, Cu-b)

206-P. (German.) Optical Constants of Massive Metals. M. Otter. Zeitschrift fur Physik, v. 161, Feb. 1961, p. 163-178.

Measurement of optical constants of hemispheric single crystal Cu, Ag and Au specimens by the Drude method, using a vacuum apparatus which allows production of single crystal specimens as well as optical examination at any temperature. Interpretation of results in terms of the classical theory of metal electrons. (P17a; Ag, Au, Cu, 14-61)

207-P. An Estimate of the Effect of Radiation on the Thermal Conductivity of Beryllium. G. J. Dienes and A. C. Damask. Journal of Nuclear Materials, v. 3, Jan. 1961, p. 16-20.

The thermal conductivity and electrical resistivity of Be at low temperatures is analyzed in terms of the Wiedemann-Franz law and correlated with existing data on the effect of reactor irradiation on electrical resistivity. Thermal conductivity is predicted for 10-100° K. as a function of radiation dosage, temperature and annealing effects. 6 ref. (P11h, P15g, 2-67, Be)

208-P. Thermal Expansion of Alpha-Uranium Single Crystals. Lowell T. Lloyd. Journal of Nuclear Materials, v. 3, Jan. 1961, p. 67-71.

Dilatometry is used to measure the thermal expansions of alpha-uranium single crystals between 25 and 650° C. Equations for length in the three principal crystallographic directions and volume as functions of temperature are derived and compared with values calculated from lattice parameter data. 8 ref. (P11g, M23b, 2-61; U-a, 14-61)

209-P. Irradiation Growth of Zirconium-Plutonium Alloys. J. A. Horak and H. N. Rhude. Journal of Nuclear Materials, v. 3, Jan. 1961, p. 111-112.

Cold worked specimens of 5-7% Pu-Zr specimen rods are exposed to reactor radiation in NaK filled capsules at 500° C. to total burnup. Elongation with accompanying reduction in cross sectional area and distortion is observed as a function of irradiation dose, time and temperature. Anisotropic growth is attributed to preferred orientation introduced by cold working. (P10d, 2-67, 3-68, 3-72; Zr-b, Pu)

210-P. Properties of Refractory Materials: Collected Data and References. W. G. Bradshaw and C. O. Matthews. Lockheed Aircraft Corp. U. S. Office of Technical Services, PB 171101, June 1958, 110 p. $2.50.

Comprehensive survey of the properties of refractory materials with melting points above 2500° F. to assist in the selection of materials which show promise for use in high-temperature missile and nuclear applications. The physical, mechanical and chemical characteristics of these materials at elevated temperatures are presented in tabular form. Data on the melting points, ductility and elevated-temperature stability of the refractory metals, carbides, nitrides, oxides, silicides, sulphides, beryllides, aluminides, other intermetallics, phosphates and uranates. (P-general, Q-general; EG-d37)

211-P. (German.) Solubility of Electrolytically Deposited Alpha and Beta Cobalt. N. Pangarov, Zv. Mutaftschiev and St. Rashkov. Comptes Rendus de l'Academie Bulgare des Sciences, v. 13, Nov-Dec. 1960, p. 705-708.

A Co sample is immersed in IN-hydrochloric acid, IN-sulphuric acid or 0.005

N-nitric acid while the solution is stirred and the temperature kept at 25° C. Measurements are made of solubility and polarization curves. 4 ref. (P12e; Co-a)

212-P. Ablation, Heat Sink and Radiation. John O. Collins and Sidney Speil. Materials in Design Engineering, v. 53, Mar. 1961, p. 114-118, 149-150.

Principles of temperature control by ablation, heat sink and radiation systems. Thermal properties of materials with potential use in systems including Be, Mg, Al, Ti, Cr, Cu, Mo, ceramics, plastics and foams. (P11; Be, Mg, Al, Ti, Cr, Cu, Mo, SGA-h, NM-d, NM-b, 17-57)

213-P. (Czech.) Irreversible Change in Electrical Resistance of Thin Tellurium Layers During Artificial Aging. Karel Cermak. Ceskoslovensky Casopis Pro Fysiku, June 1960, p. 517-520.

When a vacuum deposited thin film of Te is heated to temperatures above 190° C., an irreversible change in the electrical resistance of the film is observed which is attributed to the destruction of the film at high temperatures. 14 ref. (P16, 2-62, 2-65; Te, 14-62)

214-P. (Ukranian.) Influence of Gamma Irradiation on Some Magnetic Properties of Iron and Its Alloys. I. Ya. Dekhtyar and A. M. Shalaev. Ukrainshii Fizichnii Zhurnal, v. 5, May 1960, p. 677-680.

Gamma irradiation of hardened and heat treated Fe-Ni, Fe-Cr alloys and electrolytic Fe. Origination of Frankel defects and dislocation loops and changes in coercive force, magnetization and galvanomagnetic effect as a function of irradiation. 9 ref. (P16, M26, 2-67; Fe-b)

215-P. (Japanese.) Studies of Cermets. Pt. 8. Thermodynamics of Surface Tension. Kaizo Monna and Hajime Suto. Japan Institute of Metals, Journal, v. 25, Jan. 1961, p. 65-68.

A formula is proposed for calculating thermodynamically the surface tension of binary liquid systems which form imperfect solution. Application to CuO, CuS, CuSe, CuTe, FeS, CoS and NiS compounds. 9 ref. (P12e, M24b; 14-60)

216-P. (Translation-ConBur.) Heat of Formation of UBe_{12}. M. I. Ivanov and V. A. Tumbakov. Soviet Journal of Atomic Energy, v. 7, Dec. 1960, p. 559-561.

A mixture of Be powder and finely dispersed uranium prepared by the decomposition of its hydride is heated and a substance consisting of UBe_{13} and a small quantity of Be is obtained. The heat of formation of UBe_{13} is determined from the difference between the heat of solution of UBe_{13} and of the corresponding mixture of its components. 10 ref. (P12; Be-b, U)

217-P. (Czech.) Thermal Expansion in Chilled Cast Iron and Its Effect on Stresses Present in Rolling Mill Rolls. Robert Kamensky and Ludmila Hyspecka. Hutnicke Listy, v. 16, Jan. 1961, p. 38-41.

Dilatometric analysis at 100-600° C. of samples are cut from a roll in tangential direction. At low temperatures the expansion of white iron is inferior to that of gray iron. With rising temperature, the white iron expansion approaches and finally reaches that of gray iron. Thermal tensile stresses leading to crack formation upon chilling operate as functions of the different thermal expansion coefficients. 13 ref. (P11g, Q25p, W23k, 2-61, 9-72; CI, 17-57)

218-P. (Czech.) Surface Tension on Austenitic Grain Boundaries. Karel Mazanec and Emilie Kamenska. Hutnicke Listy, v. 16, Jan. 1961, p. 41-49.

Surface tension measurement by determination of the angles formed between the austenitic-ferritic grain boundaries, the angles of grooves appearing at 1050-1100° C., under a hot stage microscope, and the contact angle formed between a lead drop brought to an austenitic plane surface at 900° C. 28 ref. (P12e, M27f, N8, 2-62; CN)

219-P. Enthalpy and Specific Heat of Nine Corrosion-Resistant Alloys at High Temperatures. Thomas B. Douglas and Andrew C. Victor. Journal of Research, National Bureau of Standards, Engineering and Instrumentation, v. 65C, Jan-Mar. 1961, p. 65-69.

Measurement of specific heat at 0-900° C. of two alloys, 90Ni-10Cr and 316 stainless steel, with accuracies within 0.3% being calculated from enthalpies determined with a drop method and precision Bunsen ice calorimeter. Results are compared with high temperature specific heats of seven other alloys, 80Ni-20Cr, 76Ni-15Cr (three different

samples), 347 and 446 stainless steel and Monel (67% Ni, 30% Cu.) 10 ref. (P12r; SGA-g, Ni-b, SS)

220-P. (Translation-ConBur.) Influence of Cathodic Polarization of Tantalum on Its Electrical Conductivity. Kh. L. Tseitlin, E. K. Revazov and V. A. Strunkin. Journal of Applied Chemistry of the USSR, v. 33, Apr. 1960, p. 851-854.

The amount of hydrogen absorbed by Ta during cathodic polarization is deduced from electrical resistivity measurements and expressed as a function of current density, time and temperature of polarization. 8 ref. (P15g; Ta)

221-P. The Emittance of Titanium and Titanium Alloys. W. D. Wood, H. W. Deem and C. F. Lucks. Defense Metals Information Center, Battelle Memorial Institute, DMIC Memo. 91, Mar. 17, 1961, 26 p. (Available as PB 161241 from U. S. Office of Technical Services, Washington 25, D. C.)

Data given for normal total emittance and reflectance and normal spectral emittance and reflectance of Ti, 5Al-2.5 Sn Ti alloy, 8Mn Ti alloy, 6Al 4V Ti alloy and V Ti alloys as a function of temperature and wave length. (P17a; Ti-b)

222-P. (Russian.) Thermal Conductivity of High-Purity Thallium and Tin. N. V. Zavaritskii. Zhurnal Eksperimentalnoi i Teopeticheskoi Fiziki, v. 39, June-Dec. 1960, p. 1571-1577.

The thermal conductivity of Tl and Sn single crystals of different purity levels in normal (Kn) and superconducting (Ks) states. Electron scattering on lattice imperfections and thermal oscillations are related to Ks-Kn variations. 17 ref. (P11h; Sn, Tl)

223-P. (Russian.) Ferromagnetic Resonance in Silicon Iron Crystals and Its Relation to the Domain Structure. Ya. S. Shur and O. I. Shiryaeva. Zhurnal Eksperimentainoi i Teopeticheskoi Fiziki, v. 39, June-Dec. 1960, p. 1596-1601.

Measurements of resonance absorption curves in polycrystalline disks with varying directions of constant magnetic field and powder diffraction pattern examination of domain structure. An additional magnetic peak in the weaker fields in the presence of many-domain structures is found along with the resonance peak found in saturating fields. 7 ref. (P16f; Fe-b, Si, 14-61)

224-P. The Electrical Resistivity of Plutonium, Neptunium and Some Plutonium Alloys. Cryogenics, v. 1, Sept. 1960, p. 52-53.

Determination of the electrical resistivity of rod specimens of Pu, Np and three gamma phase stabilized Pu-Al alloys at 1.5-300° K. with neutron diffraction examination of the Pu rod to determine its antiferromagnetic properties. (P15g, P16p, M22j, 2-61; Np, Pu-b, Al)

225-P. Anomalies in the Magnetic Susceptibility and Electrical Resistivity of Vanadium. Michael Alan Taylor and Jean-Paul Burger. Physical Review Letters, v. 6, Feb. 15, 1961, p. 185-187.

A previous undetected anomaly in the temperature dependence of the magnetic susceptibility of vanadium and its association with the resistivity anomaly are reported for a specimen of 99% purity at 20-293° K. 8 ref. (P15g, P16n, P16p, 2-61; V-a)

226-P. The Melting Points of Tantalum Carbide and Tungsten. Charles F. Zalabak. NASA Technical Note D-761, Mar. 1961, 21 p. (Available from National Aeronautics and Space Administration, Washington, D. C.) $.75.

Resistance heating and electron-bombardment heating of TaC and W to determine their melting points. Carbon impurities are found to lower the melting point of tungsten. X-ray diffraction of TaC after heating indicates a single phase present and the lattice parameters are given. 14 ref. (P12n; Ta, W, 14-68)

227-P. (Translation-Brutcher no. 4652.) Characteristics of Thermal Softening of Alloyed Austenite. M. E. Blanter, V. F. Gorshkova and M. G. Lozinskii. Metallovedenie i Termicheskaya Obrabotka Metallov, July 1959, p. 2-10.

Effects of Cr, W, Mo, Co and Ni in amounts usually found in constructional steels, upon the thermal softening (constants) of alloyed austenite. Effect of alloying elements on critical temperature of physical softening. (P11, 2-60; SS-e)

228-P. (Translation-Brutcher no. 4839.) Effect of Titanium, Aluminum and Oxygen on the Solubility of Nitrogen in Liquid Iron. S. Maekawa. Tetsu-to-Hagane (Iron and Steel Institute of Japan, Journal), v. 36, Mar. 1960, p. 241-243.

Experimental study of the solubility of nitrogen in the liquid Fe-Ti, Fe-Al and Fe-O systems and of interaction with third elements. Effect of Ti, Al and O on solubility of nitrogen in liquid Fe. (P12e; Fe, N)

229-P. (Translation-ConBur.) Thermal Expansion of Alpha Plutonium. N. T. Chebotarev and A. V. Bezmosikova. Soviet Journal of Atomic Energy, v. 7, Dec. 1960, p. 585-589.

Determination of the coefficient of thermal expansion of alpha-phase Pu wire at -196 to 100° C. Data are given for the lattice parameters of the sample at room temperature. 3 ref. (P11g, M26, 2-61; Pu-a, 4-61)

230-P. X-Ray Mass Absorption Coefficients for Mo, Nb, Zr and Ti. W. R. Sweeney, R. T. Seal and L. S. Birks. Report of NRL (Naval Research Laboratory) Progress, Mar. 1961, p. 17-18. (Available as PB 171316 from U. S. Office of Technical Services, Washington 25, D. C.) $1.25.

Fluorescent X-ray spectroscopy measurements of the X-ray mass absorption coefficients for Mo, Cb, Zr and Ti using monochromatic incident radiation wave lengths between 0.5A and 1.5A. Comparison with published data. (P17c; Mo, Cb, Zr, Ti)

231-P. (English-French.) General Data on Cobalt. Paper from "Cobalt". Societe Generale Metallurgique de Hoboken, Belgium. 1961, p. 33-37.

Electrical, magnetic, optical and mechanical properties, phase transformations and solubility of oxygen in Co. (P-general, Q-general, M24; Co)

232-P. (English.) Anisotropy of Resistivity in Iron and Dilute Silicon Iron. Fiji Tatsumoto, Kaizo Kuwahara and Hitoyasu Kimura. Hiroshima University, Journal of Science, Series A, v. 24, Oct. 1960, p. 359-365.

Measurements at room temperature to the Curie point to determine effect of temperature and magnetic field strength on magnetic domain structure, anisotropy resistivity coefficient, saturation magnetoresistance effect and Hall coefficient for Fe and 1.08% Si. (P15g, P16, 2-61; Fe-b, Si)

233-P. (English.) Temperature Dependence of the Magnetostriction Constants of Dilute Aluminum Iron. Fiji Tatsumoto, Kaiyo Kuwahara, Hitoysau Kimura and Tetsuhiko Okamoto. Hiroshima University, Journal of Science, Series A, v. 24, Oct. 1960, p. 367-369.

Measurement of magnetostriction constants of 0.66 and 1.32% Al-Fe alloy single crystal strips at temperatures below the Curie point, 50-1000° K. Comparison of temperature dependent curves with those of pure Fe. (P16b, 2-61; Fe-b, Al, 14-61)

234-P. A Simple Method of Determining the Specific Heats of Blast Furnace Raw Materials. U. P. Mahapatra, P. R. Dhar and I. N. Gupta. Research & Industry (India), v. 6, Jan. 1961, p. 6-7.

Data for the specific heats of Fe ores and limestone are used in calculating the heat balance of a blast furnace and a low-shaft furnace. 3 ref. (P12r; Fe, RM-n)

235-P. (Translation-ConBur.) Experimental Determination of the True Specific Heats of Uranium, Thorium and Other Metals. E. A. Mit'kina. Soviet Journal of Atomic Energy, v. 7, Feb. 1961, p. 669-670.

True specific heats of U, Th, beryllium sodium and a Bi-Pb alloy are determined by a relative heating and cooling method and an absolute method involving the use of an electron-radiation calorimeter in an inert-gas atmosphere and in a vacuum. 3 ref. (P12r; Bi-b, Pb-b, Th, U)

236-P. Relative Thermodynamic Properties of Solid Iron-Aluminum Alloys. S. V. Radcliffe, B. L. Averbach and M. Cohen. Acta Metallurgica, v. 9, Mar. 1961, p. 169-176.

The relative thermodynamic properties of solid 5-73% Al-Fe alloys obtained at 875-1000° C. as a function of composition and temperature by patented metric emf. measurements using a molten chloride electrolyte. Data are given for the negative heats of mixing and entropy of mixing at the equiatomic composition. The negative entropy changes are discussed in terms of magnetic, vibrational and electronic effects. 19 ref. (P12, M25, 2-60, 2-64; Fe-b, Al)

237-P. Thermodynamic Properties of Uranium Bismuth Alloys. A. Cosgarea, Jr., E. E. Hucke and D. V. Ragone. Acta Metallurgica, v. 9, Mar. 1961, p. 225-236.

Thermodynamic properties of U-Bi alloys determined at 725-875° C. by measuring the vapor pressure of Bi in equilibrium with the condensed phase using an optical absorption technique. Data are given for Bi activity and for enthalpy, entropy free energies, equilibrium constant and solubility limit with construction of a phase diagram for the system. 8 ref. (P12, M24b; Bi-b, U-b)

238-P. Precision Density Measurements on Deformed Copper and Aluminum Single Crystals. M. J. Hordon and B. L. Averbach. Acta Metallurgica, v. 9, Mar. 1961, p. 247-249.

Hydrostatic measurements of the fractional decrease of density are used to estimate the number of dislocations in annealed and plastically strained single crystals of high-purity Cu and Al. An almost linear increase in dislocation density with shear strain is observed and compared with values obtained from X-ray measurements. 4 ref. (P10a, M22g, M26b, 3-68; Al-a, Cu-b, 14-61)

239-P. (Russian.) Anisotropy of the Hall Effect in Sn. V. N. Kachinskii. Doklady Akademii Nauk SSSR, v. 135, Apr. 1960, p. 818-821.

Investigation of magnetic and electrical anisotropy of Sn monocrystals at 4.2° K. in a magnetic field. Dependence of electrical intensity vector on magnetic intensity and orientation and crystallographic orientation. 8 ref. (P15p; Sn)

240-P. Solubility of Antimony in Mercury. A. E. Zebreva and M. T. Kozlovsky. Czechoslovak Chemical Communications, Collection, v. 25, Dec. 1960, p. 3188-3194.

Polaragraphic and potentiometric measurement of Sb solubility in Sb and Cu-Sb amalgams, using the method of Hartmann and Scholzel. Effect of anodic oxidation and Cu-Sb intermetallic compound formation on solubility curve. (P12e; Hg, Sb)

241-P. Dielectric Characteristics of Tantalum Anodic Films as Related to Film Structure. Donald Mohler and Robert G. Hirst. Electrochemical Society, Journal, v. 108, Apr. 1961, p. 347-351.

Very thin films on the metal surface influence the structure and leakage current of anodic films formed thereon. Sufficiently long cleaning with HF removes these films leaving clean metallic Ta and when this is anodized, excellent oxide films are formed. 4 ref. (P15n; Ta, 14-62)

242-P. (Ukrainian.) Application of the Theory of Regular Solutions to an Analysis of Alpha-Gamma Equilibrium and Fusibility Curves of Iron-Aluminum, Iron-Vanadium and Iron-Molybdenum Systems. A. G. Lesnik and V. P. Skvorchuk. Tsvetnaya Metallurgiya, Oct. 1960, p. 1408-1412.

Thermodynamic analysis of the systems at low concentrations of various alloying elements and in the regions of the melting points. Data are given for interatomic interaction parameters. (P12, M24b, N-general; Fe-b, Al, Mo, V)

243-P. (Russian.) Physico-Chemical Study of Joint Zinc and Manganese Solubility in Solid Magnesium as a Function of Temperature. F. T. Bumazhnov. Tsvetnaya Metallurgiya, June 1960, p. 138-143.

Method for joint melting of Zn and Mn in solid Mg. Influence of Zn-Mn ratio and hardening temperature on solubility, strength and corrosion resistance of ternary Mn-Zn-Mg alloy. 6 ref. (P12e, R-general, Q27; Mg-b, Mn, Zn)

244-P. (German.) Thermal Dimensional Changes of Copper Plated Fe-Ni Leads Used in Evacuated Tubes and Bulbs. E. G. Fuchs. Acta Technica Academiae Scientiarum Hungaricae, v. 32, Jan-Feb. 1961, p. 53-63.

Computation of the radial dimensional changes from the longitudinal expansion of the Fe-Ni alloy and Cu. By correct choice of the ratio wire-diameter/thickness-of-plating, a lead not differing in its expansion from the surrounding glass is obtained. 3 ref. (P10d; Fe-b, Ni-b, Cu, 8-62)

245-P. (English.) Solution Rate Studies of Solid Metals in Liquid Metals. Pt. 2. Cu in Bi and Ag in Bi. Tadao Sano, Masanobu Miyake and Takao Konishi. Osaka University, Technology Reports, v. 10, Oct. 1960, p. 815-824.

The solution rate of dissolution of solid Cu and Ag in liquid bismuth under static and isothermal condition at 300-500° C. is measured by electrical resistivity and chemical analysis methods.

The solution rates and the activation energy for the reaction are discussed in terms of a diffusion mechanism. 5 ref. (P12e, P13a, N1; Cu, Ag, Bi)

246-P. (English.) Effects of Special Heat Treatment on Permalloys. Sadami Tomita. Physical Society of Japan, Journal, v. 16, Mar. 1961, p. 393-396.

Magnetic properties and electrical resistance of Mumetal and 50-Permalloy are measured after low temperature heat treatments at 200-600° C. A theory based on inhomogeneous internal structure is developed to explain the phenomena. 9 ref. (P15g, P16, 2-64; Ni-b)

247-P. (Russian.) Investigation of Resistivity in Ni-Pd Alloys in the Temperature Range 0-700° C. S. Yazliev. Zhurnal Neorganicheskoi Khimii, v. 5, Nov. 1960, p. 2440-2445.

The thermal coefficient of resistance for all compositions in the system are shown to reach a maximum at the Curie point and, independent of temperature, a minimum at 75 at.% Pd. At high temperatures the difference between alloy and pure component resistivities is a temperature independent constant. 4 ref. (P15g, 2-61; Ni-b, Pd-b)

248-P. (Translation.) Irreversible Thermal Changes of Shape in Cadmium-Lead and Cadmium-Zinc Alloys. N. N. Davidenkov, V. A. Likachev and G. A. Malygin. Soviet Physics, Solid State, v. 2, Apr. 1961, p. 2183-2187. (Translation of Fizika Tverdogo Tela, v. 2, Oct. 1960, p. 2349-2668.)

Investigation of the effect of the anistropy of thermal expansion on dimensional change of Cd-Pb and Cd-Zn alloys. Results of thermal cycling at 270-400° C. indicate that irreversible expansion is possible and that the dependence of coefficient of growth on composition is nonlinear. 3 ref. (P10d, P11g, 3-72; Cd-b, Pb, Zn)

249-P. Zirconium-Copper Alloy...High Strength and Conductivity. A. E. Moredock and D. K. Fox. Metal Progress, v. 79, Apr. 1961, p. 75.

Copper with 0.15% Zr added combines good electrical conductivity (96% I. A. C. S. after aging) with moderate strengths and hardnesses up to 660° F. Uses include all types of electrical apparatus which need electrical and mechanical properties throughout a range of operating temperatures. (P15g, Q-general, T1, 17-57; Cu-b, Zr)

250-P. (Translation-ConBur.) Growth of Uranium Rods in an Aggressive Gaseous Medium. I. V. Batenin, A. N. Rudenko and B. V. Sharov. Soviet Journal of Atomic Energy, v. 7, Mar. 1961, p. 811-814.

Investigation to determine the growth of heated U specimens exposed to air, N and CO_2 and its dependence on temperature, pressure of medium, specimen rod diameter and degree of initial U surface oxidation. (P10d; U)

251-P. (German.) Influence of Orientation on Resistance Changes in Zinc Crystals Caused by Alpha Irradiation. M. Haager. Physikalische Verhandlungen, v. 11, Oct-Nov. 1960, p. 203-204.

Alpha irradiation and resistance measurements by a Wheatstone bridge of Zn crystals of varying orientation at the temperature of liquid air. (P15g, 3-72; Zn, 14-61)

252-P. (German.) Optical Constants of Solid Metals as Influenced by Temperature. M. Otter. Zeitschrift fur Physik, v. 161, Feb. 1961, p. 539-549.

Measurement of optical constants of hemispheric single crystal specimens of Cu, Ag and Au by the "Drude method" in the visible spectrum range from room temperature up to melting temperature and of molten Cu and Au at melting temperature. (P17a, 2-61; Ag, Au, Cu)

253-P. (German.) Conductivity and Hall Constant. Pt. 13. Alpha Copper-Aluminum Alloys. Werner Koster and Hans-Peter Rave. Zeitschrift fur Metallkunde, v. 52, Mar. 1961, p. 158-161.

Measurement of electrical resistance and Hall constant of recrystallized cold rolled (70% deformed) 0.1 mm. thick sheet (4-9% Al in Cu) after annealing at 600-1000° C., quenching from various temperatures (20-1000° C.) with and without subsequent aging at 20 and 150° C. Influence of voids on measured properties. (P15g, P15p, 2-64, 3-68, 3-71; Cu-b, Al)

254-P. (German.) Conductivity and Hall Constant. Pt. 14. Alpha Copper-Manganese and Alpha Silver-Manganese Alloys. Werner Koster and Hans-Peter Rave.

Zeitschrift fur Metallkunde, v. 52, Mar. 1961, p. 161-167.

Measurement of electrical resistance and Hall constant of cold rolled 0.1 mm. thick sheet of Cu-Mn (5-40 at.% Mn) and Ag-Mn (5-35 at.% Mn) alloy after annealing (500-800° C.) and quenching with and without subsequent aging at 113-142.5° C. (P15g, P15p, 2-64; Cu-b, Ag-b, Mn)

255-P. (German.) Magnetic Susceptibility and Electrical Resistance of Homogeneous and Heterogeneous Iron-Copper Alloys. Cornelius Berghout. Zeitschrift fur Metallkunde, v. 52, Mar. 1961, p. 179-186.

Susceptibility and resistance measurements at 20-350° K. on 1000° C. homogenized, hammered and rolled Cu strip of 0.1 mm. thickness containing 0.11-3.0% Fe and on a cylindrical specimen containing 0.66% Fe during aging at 430° C. and after varying degrees of cold rolling. Influence of alloy element concentration, phase homogeneity, precipitation, temperature and plastic deformation on resistivity and anisotropy of susceptibility. (P15g, P16n, P16p, 2-60, 2-61, 2-64, 3-68; Cu-b, Fe)

256-P. (Russian.) Study of Types of Deviations of Raoult's Law. D. M. Laptev. Izvestiya Vuz Chernaya Metallurgiya, Oct. 1960, p. 5-13.

Computation of deviations in Raoult's law based on values of the activation coefficient. Vapor pressure and activation coefficient in relation to composition are studied in Fe-Cu, Ag-Au and Cr-Ni melts at 952 and 1550° C. 4 ref. (P12b, P12c)

257-P. Solubility of Nitrogen in Liquid-Iron Manganese Alloys. R. A. Dodd and N. A. Gokcen. Metallurgical Society of AIME, Transactions, v. 221, Apr. 1961, p. 233-236.

Solubility of nitrogen in liquid Fe-Mn systems at 1550° C. and 1 atm. pressure is determined by an equilibration and sampling method. The solubility increases from 0.040% for pure Fe to 1.41% for pure Mn. 9 ref. (P12e; Fe-b, Mn-b, N)

258-P. The Free Energy of Formation of CdSb. Richard J. Borg. Metallurgical Society of AIME, Transactions, v. 221, Apr. 1961, p. 242-243.

The vapor pressure of Cd in equilibrium with CdSb in the presence of excess Sb is measured using the Knudsen effusion method at 276-379° C. An equation is derived for the free energy of formation and the enthalpy and entropy are obtained from the temperature coefficient of the free energy. 9 ref. (P12a, P12c; Sb-b, Cd, 14-67)

259-P. A Study of the Spectral Emissivities and Melting Temperature of Osmium and Ruthenium. R. W. Douglass and E. F. Adkins. Metallurgical Society of AIME, Transactions, v. 221, Apr. 1961, p. 248-249.

An equation is derived for the variation of the spectral emissivity of Os and Ru with temperature by calculation applying Wein's law to the true temperatures and surface temperature for sintered bar specimens resistance heated to 2600° C. The melting temperature of Os and Ru are determined as 3010 ± 10° and 2250 ± 10° C., respectively. 3 ref. (P12n, P17d, P17e, 2-61; Os, Ru)

260-P. The Effect of Arsenic and Tellurium on the Surface Tension of Lead. Douglas J. Harvey. Metallurgical Society of AIME, Transactions, v. 221, Apr. 1961, p. 266-270.

The surface tension of 0-6.7% Te-Pb and 0-10.3% As-Pb alloys is examined by the maximum bubble pressure method at 350-750° C. The surface tension of pure Pb is determined as a function of Te and As contents and temperature, using Gibbs adsorption equation. Data are given for surface activity and concentration of Te and As. 19 ref. (P12b, 2-60, 2-61; Pb-b, As, Te)

261-P. Thermodynamic Properties of Cr_3C_2 at High Temperatures. S. Fujishiro and N. A. Gokcen. Metallurgical Society of AIME, Transactions, v. 221, Apr. 1961, p. 275-279.

The dissociation pressure of Cr_3C_2 is measured at 1908-2237° K. using graphite Knudsen effusion cells. Data are given for vapor pressures, equilibrium pressure, free energy, enthalpy, heat of formation and the kinetics of the vaporization reaction. 18 ref. (P12; Cr, C, 14-68)

262-P. The Solution Rate of Copper, Nickel and Their Alloys in Lead. David A. Stevenson and John Wulff. Metallurgical Society of AIME, Transactions, v. 221, Apr. 1961, p. 279-285.

The rates of solution of Cu, Ni and three Cu-Ni alloys in liquid Pb are studied at 527 and 727° C. under dynamic conditions to determine the effect of relative velocity at a solid-liquid interface on the dissolution kinetics of pure solid materials in liquid metals. 12 ref. (P12e; Pb, Cu-b, Ni-b)

263-P. A Thermodynamic Study of Dilute Solutions of Sulphur in Liquid Tin and Lead. L. L. Cheng and C. B. Alcock. Metallurgical Society of AIME, Transactions, v. 221, Apr. 1961, p. 295-300.

Use of radiochemical methods for the study of the gas-liquid equilibria at low temperature and for the determination of the sulphur contents of metal beads which have been equilibrated with H_2S/H_2 mixtures of known sulphur potential to obtain the liquid solubility and the free energy of solution of sulphur in liquid Sn and Pb at 500-680° C. 33 ref. (P12a, P12e; Sn, Pb, S)

264-P. Free Energies of Formation of Gaseous Metal Oxides. Molly Gleiser. Metallurgical Society of AIME, Transactions, v. 221, Apr. 1960, p. 300-304.

The standard free energies of formation of Al, Be, Mo, Si, Ta, V, W and Zr gaseous metal oxides together with those of their condensed oxides are plotted against temperature with tabulation of the heats of formation of the gaseous oxides. 9 ref. (P12a, Al-b, Be-b, Mo-b, Si-b, Ta-b, V-b, W-b, Zr-b, 14-68)

265-P. Calculation of Activities in Binary Systems Having Miscibility Gaps. H. A. Wriedt. Metallurgical Society of AIME, Transactions, v. 221, Apr. 1961, p. 377-383.

Utilization of the continuous free energy function for computing the thermodynamic activities in the beta-sigma solution of binary systems as a function of compositive with interrelation of gap location and symmetry to Henry's law. Application to calculation of values for the Al-Zn and CaO-SiO_2 systems. 8 ref. (P12b, M24b, 2-60; Al-b, Zn-b, 14-68)

266-P. Thermal Expansion of Beta Titanium. D. N. Williams. Metallurgical Society of AIME, Transactions, v. 221, Apr. 1961, p. 411-412.

Dilatometric measurement at 68-2800° F. on A-55 unalloyed Ti and Ti-8V, Ti-20V and Ti-6Al-4V alloys to determine the thermal expansion coefficient. (P11g, 2-60; Ti-b, Al, V)

267-P. (Russian.) Effect of Carbon on Surface Tension of Molten Co and Ni and Their Interphase Tension on the Alumina Boundary. V. N. Eremko and B. I. Nizhenko. Ukrainskii Khimicheskii Zhurnal, v. 26, Apr. 1960, p. 423-428.

Determination of surface tensions for various carbon alloys of Ni and Co. Effect of carbon on interphase tension between liquid metal-solid alumina at 1550-1600° C. test temperatures and vacuum conditions. Data are applied to surface tension and carbon adsorption isotherm plots. 12 ref. (P12h, P13d, 2-60; Ni-b, Co-b, C, Al)

268-P. (Russian.) Effect of H_2O_2 on the Potential of an Oxygen Electrode on an Oxidized Steel Surface in Alkali Solution. A. S. Afanasev and B. I. Sotnikova. Ukrainskii Khimicheskii Zhurnal, v. 26, Apr. 1960, p. 466-470.

Investigation of cell characteristic changes in an electrolytic cell composed of oxidized steel electrodes and .1N KOH electrolyte. Determination of H_2O_2 stability in KOH. Relation of cell voltages and H_2O_2 decomposition to time, pH and KOH concentration. 17 ref. (P15; ST)

269-P. (Russian.) Wettability of Molten Ti and Sn Alloys and Their Interphase Tension on the Boundary With Alumina. V. N. Eremenko and V. I. Nizhenko. Ukrainskii Khimicheskii Zhurnal, v. 26, May 1960, p. 605-607.

Investigation of the effect of Ti additions on surface tension of Sn in contact with solid Al_2O_3. Determination of interphase tension between Sn and alumina. Effect of Ti and oxygen impurity on the adsorption of Ti on the alumina surface. 10 ref. (P12h, P13d, 2-60, 3-69; Sn-b, Ti, Al)

270-P. (Russian.) Role of H_2O_2 During Polarization of a Steel Electrode in Alkali Solution With Small Current Density. A. S. Afanasev, A. N. Burmistrova and E. N. Chankova. Ukrainskii Khimicheskii Zhurnal, v. 26, May 1960, p. 579-584.

Investigation of H_2O_2 addition effects on characteristics of an electrolytic cell containing oxidized and reacidified steel electrodes and 1.86 N NaOH electrolyte. Anodic polarization, limiting diffusion

current and potential are related to electrode preparation, H_2O_2 concentration and current. 13 ref. (P15; ST)

271-P. (Russian.) Thermodynamic Properties of the Cadmium-Tin System. N. V. Alekseev and A. M. Evseev. Zhurnal Fizicheskoi Khimii, v. 34, Nov. 1960, p. 2460-2462.

Liquid Cd-Sn system is studied within 567-600° K. by the effusion method. Values for activity of both components as well as partial and integral heats of mixture and entropy are computed. Insignificant deviations of system (with small Cd concentrations) are observed in comparison with those predicted by regular solution theory. 6 ref. (P12; Cd-b, Sn-b)

272-P. Analysis of Effective Thermal Conductivities of Honeycomb-Core and Corrugated Core Sandwich Panels. Robert T. Swann and Claud M. Pittman. NASA Technical Note D-714, Apr. 1961, 62 p. (Available from National Aeronautics and Space Administration, Washington, D. C.) $1.75.

Equations are derived for the transfer of heat in sandwich panels. An exact method is developed for considering internal reflections of radiant heat and for reducing the given problem to an equivalent problem which may be solved by black-body methods. Equations are derived which give the effective thermal conductivities as functions of geometric parameters and material properties. 7 ref. (P11h; 4-57)

273-P. (German.) Measurement of Electromotive Forces Between Slag and Steel Bath and Its Application in Openhearth Furnace Process Control. Karl-Ludwig Kiesel. Neue Hutte, v. 6, Mar. 1961, p. 157-166.

Measurement of emf. between slag and metal in the openhearth furnace by graphite electrodes under normal operation conditions. Thermodynamic interpretation of measured emf. as influenced by basicity and FeO content of slag; usefulness in control of dephosphorization and desulphurization. (P15g, D2, D11n, 2-60; ST)

274-P. Measurement of the Thermal Properties of Metals at Elevated Temperatures. R. L. Rudkin. U. S. Naval Radiological Defense Laboratory. U. S. Office of Technical Services, PB 171185, May 1960, 24 p. $.75.

Thermal properties of tungsten, used in the construction of rocket nozzles and combustion chambers and at the surfaces of missile nose cones and re-entry vehicles, are measured from 1500-2900° K. using a resistance heated 10 mil wire suspended in a vacuum of 10-5 mm. Hg. The total hemispherical emittance is determined by measuring the electrical power dissipated at the center of the wire. (P11, 2-61, T24e; W)

275-P. Thermo-Electric Phenomena in Relation to Structural Changes in Metals and Alloys. G. P. Chatterjee. Indian Institute of Metals, Transactions, v. 13, Dec. 1960, p. 315-322.

Potentiometric measurements of thermal electromotive force of strip and wire specimens of Al, Cu, Ni, Nichrome, brass, steel and Duralumin after annealing, tempering and aging treatments and cold working. Relation of deformation, work hardening and heat treatment induced microstructural changes to thermo-electric properties. 9 ref. (P15j, M26, M27, 2-64, 3-68; Al-b, Cu-b, Ni-b, ST)

276-P. Interface Energy Studies in Some Nonferrous Alloys Containing a Liquid Phase. V. Ramachandran and A. A. Krishnand. Indian Institute of Metals, Transactions, v. 13, Dec. 1960, p. 323-331.

Relation of interphase and intergranular energies of alloys containing an insoluble liquid or brittle phase on microstructure and working properties such as hot shortness and cold brittleness. Effect of alloying elements on interfacial energy and dihedral angle of several Cu, Al and Zn-based binary and ternary alloys. 9 ref. (P13h, Q26s, 2-60; Al-b, Cu-b, Zn-b)

277-P. (French.) Hall Effect of Nickel at Low Temperatures. R. Huguenin and D. Rivier. Helvetica Physica Acta, v. 33, Dec. 31, 1960, p. 973-977.

Ni of 99.999% purity is exposed to a magnetic field at 4-293° K. while immersed in liquid He, nitrogen or distilled water with intermediate temperatures obtained by a heating device. The Hall coefficient is determined as a function of temperature and field strength. 7 ref. (P15p, 2-61; Ni)

278-P. (German.) Residual Resistance of Gallium and Its Alloys. T. Frederking

and R. Reimann. Helvetica Physica Acta, v. 33, Dec. 31, 1960, p. 998-1002.

The electrical resistance of wires cast from pure Ga and Ga containing up to 2.6% Al, 0.01% Zn, 0.02% Pb, 0.01% Cu, 0.33% In or 0.006% Sn is determined at 1.3-4.2° K. to study the effects of composition, temperature and wire diameter. 5 ref. (P15g, 2-60, 2-63, 3-73; Ga-b, 4-61)

279-P. (French.) Magnetic Susceptibility of Selenium and Tellurium Between 80 and 1300° K. M. Risi and S. Yuan. Helvetica Physica Acta, v. 33, Dec. 31, 1960, p. 1002-1005.

Temperature dependence of susceptibility change of pure Se and Te in the liquid state and effect of previous heat treatments on solid state susceptibility. Relation of susceptibility change to the increase of free-spinning electrons. 5 ref. (P16n, P16p, 2-61, 2-64; Se, Te)

280-P. (English.) Magnetoresistance of Dilute Alloys of Manganese in Copper, Manganese in Zinc and Chromium in Zinc at Liquid Helium Temperatures. Yoshio Muto. Tohoku University, Science Reports of the Research Institutes, v. 13, Feb. 1961, p. 1-7.

Potentiometric measurement of resistances in 5.4% Mn-Cu, 0.12% Mn-Zn and 0.10% Cr-Zn alloys as a function of magnetic field strength and temperature. Hysteresis is noted with decrease of magnetoresistance at increasing field strength. 11 ref. (P16, P15g, 2-63; Cu-b, Zn-b, Mn, Cr)

281-P. Zinc Castings. Schrade F. Radtke. Foundry, v. 89, May 1961, p. 144-147.

Chemical requirements and physical and mechanical properties of Zn alloys for die casting. Coatings to increase corrosion resistance. 4 ref. (P-general, Q-general; Zn, 5-61)

282-P. The Soft X-Ray Emission Spectra of Sodium, Beryllium, Boron, Silicon and Lithium. R. S. Crisp and S. E. Williams. Philosophical Magazine, v. 6, Mar. 1961, p. 365-369.

Emission band forms of the K and L 23 spectra of elements obtained with a photon-counting spectrometer are compared with previously published spectra. 9 ref. (P17e; B, Be, Li, Na, Si)

283-P. The Hall Coefficient of Liquid Mercury. N. Cusack and P. Kendall. Philosophical Magazine, v. 6, Mar. 1961, p. 419-427.

Development of a technique for measuring the Hall coefficient of liquid metals using the d-c. method with a glass Hall cell. Hall coefficient and other electrical properties of liquid Hg are compared with those of solid Hg as a function of temperature and size and shape effects. 25 ref. (P15p, 2-61, 3-73; Hg, 14-60)

284-P. Correlation Between Magnetic Susceptibility and Hydrogen Solubility in Alloys of Early Transition Elements. D. W. Jones, N. Pessall and A. D. McQuillan. Philosophical Magazine, v. 6, Mar. 1961, p. 455-459.

Hydrogen absorption capacities of b-c-c. binary alloys of systems having electron to atom ratios of 4, 5 and 6 for Ti, Cb and Mo, respectively, are calculated as a function of the heat of solution for hydrogen. The magnetic susceptibility of the alloys reaches a minimum at the point at which hydrogen solubility disappears, which is attributed to a change in electronic structure as a function of composition. 3 ref. (P16n, P16p, P12e; Cb-b, Ti-b, Mo-b, H)

285-P. The Resonance Integral of Thorium Metal Rods. Eric Hellstrand and Jakob Weitman. Nuclear Science and Engineering, v. 9, Apr. 1961, p. 507-518.

Neutron activation study of cross sections using Au as a standard for the calibration. (P18j, S11q; Th)

286-P. Low-Temperature Research on Transuranic Metals. K. Mendelssohn. Paper from "Advances in Cryogenic Engineering". v. 6. Plenum Press, Inc., New York, 1961, p. 622-626.

Description of techniques and equipment used in measuring the electrical resistance of pure Np and Pu and their alloys at 300-100° K. 4 ref. (P15g, 2-63; Np, Pu)

287-P. Report on Behavior of Magnetic Materials Under Extreme Environmental Conditions. Communications and Electronics, Mar. 1961, p. 58-60.

Study of the performance of principal components used in magnetic amplifiers (cores, wires, rectifiers, insulation and

potting) under 20-700° C. temperature cycling, nuclear radiation, mechanical stress (20,000 psi.) and oxidizing atmospheres. Materials studied include Mo-Permalloy, Supermalloy, Supermendur, ferrites and Si steel. 12 ref. (P16, Q-general, R1h, X11g, 2-62, 2-67, 3-66; SGA-n, Fe-b, Ni-b, 17-52, 17-57)

288-P. Measurement of Electrical Resistivity of Bulk Metals. J. E. Zimmerman. Review of Scientific Instruments, v. 32, Apr. 1961, p. 402-405.

Alternating current induction measurements are made at 1-4.2° K. using coils of Cu and Cb wire to determine resistivity of cylinders of Cu and CuMn alloy. Derivation of theoretical expressions for a sphere and infinite circular cylinder using Maxwell's equations. (P15g; Cu-b, Mn)

289-P. The Wetting of Solid Metals by Liquid Metals. D. O. Jordan and J. E. Lane. Paper from "Australian Atomic Energy Symposium". Melbourne University Press, Melbourne, Australia, 1958, p. 197-200.

Investigation of the spreading of liquid metal on solid metal surfaces. Results indicate that spreading is aided by the formation of intermetallic compounds and solid solutions and the addition of fluxes and other surface active agents. Spreading is reduced by oxide and sulphide formation. 34 ref. (P13h)

290-P. Some Effects of Irradiation on Uranium and Uranium-Based Alloys. H. M. Finniston. Paper from "Australian Atomic Energy Symposium". Melbourne University Press, Melbourne, Australia, 1958, p. 226-233.

Report on effects of irradiation on uranium and uranium alloys shows that two major phenomena take place: surface wrinkling caused by "grain growth" and swelling due to fission product gases. Both effects are complicated by the anisotropy of the alpha-uranium phase. 7 ref. (P10d, 2-67; U-b)

291-P. The Solution of Lime in Liquid Calcium and Its Effect on the Reducing Properties of the Metal. D. J. M. Beuan and F. D. Richardson. Paper from "Australian Atomic Energy Symposium". Melbourne University Press, Melbourne, Australia, 1958, p. 586-587.

Determination of the melting point of Ca and its solubility in molten lime by heating under vacuum at 1250° C. for various times. Solubility and melting point data are used to calculate reduction potentials for Ca in the oxide reduction of U, UO_2 and Ta. 3 ref. (P12e, P13; Ca, RM-q)

292-P. (German.) Influence of Residual and Alloying Elements on Viscosity of Cast Iron Melts. Anton Koniger. Forschungsberichte des Landes Nordrhein-Westfalen, no. 970, 1961, p. 1-26.

Measurement of viscosity by a rotating viscosimeter for high-carbon Fe alloys of varying S, P and Si content. Test casting to investigate influence of phosphorus on casting properties. Graphical representation of mutual relations between viscosity, casting properties and phosphorus content as influenced by temperature. (P10f; CI, 14-60)

293-P. (Russian.) Surface Tension of Ge. T. P. Kolesnikova. Izvestiya Vuz--Chernaya Metallurgiya, Sept. 1960, p. 15-17.

Surface tension measurement using the stationary drop method in a vacuum with drop support plates of quartz and carbon. Relation of surface tension to test temperature and type of support. 7 ref. (P12e; Ge)

294-P. Measurement of Thermal Expansion at Low Temperature. G. K. White. Cryogenics, v. 1, Mar. 1961, p. 151-158.

Determination of the linear thermal expansion of Cu, Fe, Be and Cr at 4-300° K. using a three-terminal capacitor to measure very small length changes. Design consideration for transformer bridge, reference capacitor, expansion capacitor and associated cryogenic problems. 28 ref. (P11g, 1-52, 2-63; Cu, Cr, Fe, Be)

295-P. Atomic Heats of Tin and Tin-Indium. M. Yagub. Cryogenics, v. 1, Mar. 1961, p. 166-170.

Specific heats of pure Sn and Sn-In alloys (1-2% In) are measured in the normal state between 0.6 and 1.8° K. Temperatures below 1° K. are obtained by adiabatic magnetization of the specimens. A magnetic field of 500 gauss is used to suppress superconductivity. Atomic heat measurements are made in the superconducting state at 2-4.5° K. for Sn and Sn-In alloy. 14 ref. (P12r; Sn-b, In)

296-P. The Superconductive Transition in a Transverse Field at Various Orientations for Thin Tin Films. Cryogenics, v. 1, Mar. 1961, p. 180.

Determination of the shape of transition curves for Sn film by electrical resistance measurement at 3.55-3.836° K. as a function of the orientation of a transverse magnetic field. Specimens are prepared in a vacuum of 5×10^{-6} mm. Hg and deposited on mica to thickness of 2000-3500 Å. (P15g, 2-63; Sn, 14-62)

297-P. (German.) Hall Effect of Quench-Condensed Tin-Copper Alloy Films. Joachim Fortmann and Werner Buckel. Zeitschrift fur Physik, v. 162, Jan. 1961, p. 93-104.

Measurement of electrical resistance, transition temperature of superconductivity and Hall coefficients in Sn-Cu alloys (0-100% Cu) obtained by simultaneous quenching onto a cooled substrate during heating from 4-350° K. and recooling to 4° K. Comparison of results with properties of bulk Sn-Cu alloys. (P15p, P15g, 2-64; Sn-b, Cu-b)

298-P. The Vaporization and Physical Properties of Certain Refractories. Pt. 1. Techniques and Preliminary Studies. A. A. Hasapis, M. B. Panish and C. Rosen. Avco Corporation (Wright Air Development Division). U. S. Office of Technical Services, PB 171413, Oct. 1960, 73 p. $2.

Effusion studies of the vaporization of Rh, Ir and Os by the Knudsen effusion technique. The rate of effusion is determined by condensing the molecular beam on a target. Mass spectrometric studies are made of the vaporization of thoria from tungsten effusion cells and interactions between thoria and tungsten at elevated temperatures are noted. (P12p, P-general; Ir, Os, Rh)

299-P. The Thermal Emissivity of Some Materials Used in Thermionic Valve Manufacture. C. M. Cade. IRE Transactions on Electron Devices, ED-8, Jan. 1961, p. 56-69.

Laws governing thermal radiation are reviewed and emissivity data are given for Fe, Mo, Ni, Ta, W, Au, Ag, Zr, Ti, Al, Pt, Nichrome, Nimonic, Moly-Tungsten, ceramics, nonmetals and coated surfaces. Measurement methods include heating in vacuum using electric current, very fine potential leads, Pt/Pt-Rh thermocouple and comparing with calculated values. (P15k, P11; Fe-b, Mo-b, Ni-b, Ta, W-b, Au, Ag, Pt-b, Zr, Al, Ti, NM-f, 17-57)

300-P. Physical and Mechanical Properties of Sodium-Reduced and Electrorefined Titanium. C. N. Adams and E. D. Hull. U. S. Bureau of Mines, Report of Investigations 5772, 1961, 12 p.

Preparation of test specimens by arc furnace melting, casting, machining, cold rolling and vacuum annealing at 300-700° C. Dilatometric measurements and mechanical tests are used to determine effect of annealing time and temperature and reduction method on Vickers hardness, tensile and yield strength, recrystallized grain size, purity microstructure and coefficient of linear thermal expansion. 10 ref. (P-general, M-general, Q-general, 2-60, 2-64; Ti-a)

301-P. Researches on Hydrogen Overvoltage on Metallic Single Crystals: Silver and Lead. L. P. Bicelli and B. Rivolta. Politecnico Di Milano (Wright Air Development Division). U. S. Office of Technical Services, PB 161801, Apr. 1960, 27 p. $.75.

Measurement of hydrogen overvoltage on Ag and Pb single crystal cathodes oriented following the (100), (110) and (111) planes in sulphuric acid solutions for Ag and perchloric acid and sulphamic acid for Pb. The parameters are coincident for all of the Ag electrodes, while they are different for the Pb electrodes. (P15m; Ag, Pb, 14-61)

302-P. Superconductivity. Vernon L. Newhouse. Tech Engineering News, v. 42, Apr. 1961, p. 20-22, 24, 26, 42.

Observation of electron "tunneling" in superconducting devices such as thin films of Al, Pb, In, Sn and Ta, Ni and Cb oxides as related to temperature effect on electrical resistance of conductors. Application of discovery to computer fabrication and use of cryotrons as computer components. (P15g, 2-61; Al, Pb, In, Ta-b, Ni-b, Cb-b, 14-62)

303-P. Review of Recent Work at NRL on the Irradiation Effect in Magnetic Alloys. E. I. Salkovitz and A. I. Schindler. Report of NRL (Naval Research Laboratory) Progress, Feb. 1960, 16 p.

Effect of irradiation of Si steel, ferrite, Permalloy, Supermalloy, Sinimax,

Mumetal and Deltamax on the hysteresis loops, coercive force and remnance. 12 ref. (P16, 2-67; SGA-n)

304-P. Mechanisms of Surface Removal From Metals in Space. John L. Ham. Aerospace Engineering, v. 20, May 1961, p. 20-21, 49-52.

Examination of metal evaporation, oxide dissociation, diffusion inward, chemical reaction and other mechanisms of surface removal on Mg, Al, Zn, Cd, Pb, Cu, Ag, Cr, Fe, Co, Ni, Ti, Zr, Mo and W under space conditions. 15 ref. (P13, Q9, 1-73)

305-P. (Translation-ConBur.) Pressure of Saturated Vapor of Liquid Antimony and Its Association State. V. V. Illarionov and A. S. Cherepanova. Academy of Sciences of the USSR, Proceedings, Chemistry Section, v. 133, July-Aug. 1960, p. 901-904.

Radiometric method for the determination of the saturated vapor pressure and vapor density of liquid Sb using gamma radioactive isotopes. Calculation of the latent heat of evaporation. 17 ref. (P12c, 1-59; Sb)

306-P. (Translation.) Thermoelectric Properties of the Silicon-Chromium System. E. N. Nikitin. Soviet Physics--Solid State, v. 2, May 1961, p. 2389-2392. (Translation of Fizika Tverdogo Tela, v. 2, Nov. 1960, p. 2671-2988).

Phase compositions are determined for singular points on electrical conductivity or thermoelectric power curves. Effect of temperature and B and Ag content on thermoelectric power, electrical conductivity and thermal conductivity. 14 ref. (P15j)

307-P. Researches on Hydrogen Evolution. Wright Air Development Division. U. S. Office of Technical Services, PB 161880, Apr. 1960, 50 p. $1.25.

Potentiostatic method of applying triangular voltage is used in the investigation of adsorption phenomena, particularly on the noble metals Pt, Rh, Ir, Pd and Au. In the case of hydrogen bubbling, a continuous transition from the stationary to the instationary curve is found for Pt when increasing the voltage speed. (P13d; Au, Ir, Pd, Pt, Rh)

308-P. A Brief Review and Analysis of Thermoelectricity. W. H. Lucke. Report of NRL (Naval Research Laboratory) Progress, Apr. 1961, p. 14-25.

The three basic thermoelectric effects, Seebeck, Thompson and Pelter, are defined and the relations between them demonstrated for different conductors as a function of temperature. The effects are explained on the basis of energy changes of the current carriers and their equilibrium with the lattice. 5 ref. (P15j)

309-P. Electrical Characteristics of Four Ternary Platinum-Rhodium-Base Alloys Containing Chromium, Cobalt, or Ruthenium. Herman H. Lowell, Hubert W. Allen and Joe E. Jenkins. National Aeronautics and Space Administration, NASA TN D-867, May 1961, 17 p.

Resistivities of small cast specimens of 5 Co-15 Rh-80 Pt, 5 Cr-15 Rh-80 Pt and 10 Cr-15 Rh-75 Pt and of a wire sample of 5 Ru-15 Rh-80 Pt are determined from 20-900° C. 8 ref. (P15g, 2-61; Pt-b, Rh-b, Co, Cr, Ru)

310-P. (English.) Theory of Adsorption of Hydrogen Atom on Metal Surface. Pt. 2. Tomiyuki Tōya. Hokkaido University, Research Institute for Catalysis, Journal, v. 8, Dec. 1960, p. 209-263.

Theoretical investigation of r and s-type adsorption phenomena of H on Ni, Cu and Pt surfaces. Formula for determining heat dissolution, equilibrium distance, energy, polarization and adsorption effects on work function and conductivity. 24 ref. (P13d; Cu, Ni, Pt, H)

311-P. The Emittance of Coated Materials Suitable for Elevated-Temperature Use. W. D. Wood, H. W. Deem and C. F. Lucks. Defense Metals Information Center, Battelle Memorial Institute, DMIC Memo. 103, May 4, 1961, 136 p. (Available as PB 171622 from U. S. Office of Technical Services, Washington 25, D. C.)

Emittance data are compiled for boride, carbide, oxide and silicide coatings and paint and enamel coatings on such materials as W, Ta, Inconel, stainless steel, graphite, Mo, Nimonic and Cb alloys. Data are separated according to type of coating and to type of measurement, whether spectral or total. 12 ref. (P17a; Cb-b, Mo, Ni-b, SS, Ta, W, 8)

312-P. The Solubility of Silicon Nitride in Ferrite. R. Rawlings and P. M. Robinson. Iron and Steel Institute, Journal, v. 197, Apr. 1961, p. 306-308.

Nitrogen in solid solution in equilibrium with silicon nitride is determined

by measuring internal friction of steel wires containing 0.5-1.9% Si at 600-900° C. with calculation of heat of solution of silicon nitride and activity coefficient of Si. 15 ref. (P12e, P12b, N8, Q22; Fe-b, Si, 4-61)

313-P. Thermoelectric Properties of Rhodium-Platinum Alloys. A. S. Darling. Instruments and Control Systems, v. 34, May 1961, p. 861-863.

Review of thermoelectric properties of Rh-Pt alloys of various composition and the high-temperature-stability of Rh-Pt thermocouples. Effects of contamination, vaporization of Rh and gradual diffusion of Rh into pure Pt are investigated at 300-1900° C. (P15j, X9q, 2-62, 10-54; Pt-b, Rh-b, 17-57)

314-P. Hyperfine Field and Atomic Moment of Iron in Ferromagnetic Alloys. C. E. Johnson, M. S. Ridout, T. E. Cranshaw and P. E. Madsen. Physical Review Letters, v. 6, May 1, 1961, p. 450-451.

Measurement of Mossbauer absorption spectrum of Fe-Co and Fe-Ni alloys for the 14.4 Kev. radiation of Fe^{57} to establish proportional relationship between hyperfine field and atomic moments. 15 ref. (P17c; Fe-b, Co, Ni)

315-P. (Japanese.) Nickel for Glass Sealing. Satoru Mito. Japan Institute of Metals, Journal, v. 25, Feb. 1961, p. 104-108.

Glass sealing applicability of Ni as influenced by bubble formation characteristics and wettability. Effect of heat treatment time and temperature, degassing and deoxidizing and alloy additions on properties of Ni wire specimens. (P13h; Ni, NM-f42, 4-61)

316-P. (Japanese.) Experimental Data of the Thermodynamics of Surface Tension. Pt. 9. Studies on Cermets. Kaizo Monma and Hajime Suto. Japan Institute of Metals, Journal, v. 25, Feb. 1961, p. 143-147.

Review and correlation of data for surface tension with calculation of free energy curves for metallic melts of Cu-Ni, Ni-Mo, Cu-Cu_2S, Cu-Cu_2O, Cu-Cu_2Se, Cu-Cu_2Te and FeC-FeS systems at 1150-1600° C. 12 ref. (P13h, 10-54; Cu-b, Ni-b, Fe-b)

317-P. (Japanese.) Interaction Parameters of Alloying Elements in Molten Iron. Harue Wada and Tunezo Saito. Japan Institute of Metals, Journal, v. 25, Feb. 1961, p. 159-163.

Statisco-thermodynamic calculation of interaction parameters and interchange energies in Fe systems using models and Mott's equation. Comparison with data for Fe-Cr, Fe-Ni, Fe-C and Fe-S ternary systems with 40 other elements. 29 ref. (P12, P13, M24c; Fe-b, Ni, Cr, C, S)

318-P. Radiation Can Ruin Your Design. Mary Jane Ostemann, J. F. Kircher, J. W. Clark and T. D. Hanscome. SAE (Society of Automotive Engineers) Journal, v. 69, June 1961, p. 82-84.

Effect of radiation on the yield, tensile, fatigue and impact strengths; Brinell hardness; ductility; elastic constants; creep rate; work hardening; density; diffusion coefficients; microstructure; thermoelectromotive force; thermal conductivity; electrical resistivity; corrosion resistance; dimensional stability and internal friction of metals, glass, elastomers, graphite, organic fuels and lubricants, plastics and semiconductor materials and on electrical and electronic components. (P-general, Q-general, 2-67)

319-P. Ferromagnetic Resonance Absorption of Single-Crystal Thin Films of Nickel. Masao Kuriyama, Hirokage Yamanouchi and Sukeaki Hosoya. Physical Society of Japan, Journal, v. 16, Apr. 1961, p. 701-706.

Single-crystal films having (100) and (111) orientations are epitaxially grown by vacuum deposition onto heated rock salt and zinc blende. Size of crystallites is determined by electron diffraction. Data are given for saturation magnetization, crystalline anisotropy and Lande splitting factor. 8 ref. (P16f; Ni, 14-61)

320-P. Spin Wave Resonance in Pd-Ni Alloy Films. Hiroshi Nose. Physical Society, Journal, v. 16, Apr. 1961, p. 838.

Measurement of concentration dependence of exchange coupling constants and g-factors of Pd-Ni alloy films. 3 ref. (P18m; Ni-b, Pd-b, 14-62)

321-P. Lattice Spacings and Densities of Gold-Nickel Alloys. Gene F. Day. Institute of Metals, Journal, v. 89, Apr. 1961, p. 296.

Effect of vacancy concentration on deviation of measured density from

density calculated from lattice parameters is investigated for quenched Au-Ni specimens, containing 0-100% Ni, by buoyancy measurements and microexamination. (P10a, M26s, 2-64; Au-b, Ni-b)

322-P. Physical Properties of Metals. Clifford A. Hampel. Chapter 35 from "Rare Metals Handbook". Reinhold Publishing Co., New York 22, 1961, p. 687-702.

Tabulated lists of physical properties of metals; weight, number, density, expansion coefficient, thermal neutron cross section, resistivity and conductivity. 13 ref. (P-general)

323-P. Optical Properties of Anodic Oxide Films on Tantalum, Niobium and Tantalum + Niobium Alloys and the Optical Constants of Tantalum. L. Masing, J. E. Orme and L. Young. Electrochemical Society, Journal, v. 108, May 1961, p. 428-438.

Reflectivity measurements are made to obtain refractive indices, a measure of thickness. The values obtain vary with current density, temperature and electrolyte concentration at which the films are formed. Measurements are also made on unanodized Ta and anodized Zr. 15 ref. (P17a, R1h; Cb-b, Ta-b)

324-P. (Japanese.) Electrical Properties of Evaporated InSb Film. Pt. 2. S. Ebisawa and K. Kawasaki. Electrotechnical Laboratory, Bulletin, v. 25, Feb. 1961, p. 134-136.

Variation of electrical resistance of thin films with gas absorption is studied for films evaporated on quartz at room temperature and films heat treated at 400° C., exposed to O, N and H_2O. 3 ref. (P15g; In-b, Sb-b, 14-62)

325-P. Notes on the Assessment of Filler Metals and Fluxes. G. M. A. Blanc, J. Colbus and C. G. Keel. Welding Journal, v. 40, May 1961, p. 210s-222s.

Physical meaning and methods of determining surface tension and wetting power. Surface tension of Cu-Zn, Cu-Ni-Zn and Ag-Cd-Cu-Zn filler metals and boric acid and borate fluxes. Effects of various surface active substances on surface tension and wetting power. Relationship between strength of brazed joints and surface tension, viscosity and wetting power of filler metals and fluxes. 27 ref. (P13h, W29h; Cu, Zn, Ni, Ag, Cd, 17-57, RM-q)

326-P. (German.) Density of Molten Silver and Silver-Tin Alloys. I. Lauermann and G. Metzger. Zeitschrift fur Physikalische Chemie, v. 216, no. 1/4, 1961, p. 37-41.

Measurement of density and specific volume of pure Ag at 1150 and 1050° C. and in the binary system Ag-Sn over the entire concentration range at 1200° C. by a capillary method. 11 ref. (P10a; Ag-b, Sn-b)

327-P. (German.) Thermal Expansion of High-Melting Phase. H. Nowotny and E. Laube. Planseeberichte fur Pulvermetallurgie, v. 9, Apr. 1961, p. 54-59.

Measurement of thermal expansion coefficient by X-ray measurement of lattice parameter as influenced by temperature (20-1000° C.) for sintered and cast specimens of following carbides and silicides of transition metals: HfC, TaC, UC, $TaSi_2$, Ta_5Si_3 and Cb_5Si_3. 19 ref. (P11g, M26; Cb, Hf, Ta, U, 5, 6-72, 14-68)

328-P. (German.) Vacuum Sintered Fine-Particle Tantalum Carbide. D. Moskowitz and M. Humenik, Jr. Planseeberichte fur Pulvermetallurgie, v. 9, Apr. 1961, p. 60-64.

Measurement of density and electrical resistivity as influenced by sintering temperature for specimens of H_2SO_4-leached, cold pressed and vacuum sintered (20-2300° C.) microsize TaC powders, containing 18.9% combined and 1.21% free carbon. 3 ref. (P10a, P15g; Ta, 6-69)

329-P. Design Selector Chart for Copper Alloys. C. L. Bulow. Design News, v. 16, June 5, 1961, p. 64-67.

Data given for composition, electrical conductivity, machinability, strength, corrosion resistance and wear resistance of Cu alloys, leaded and nonleaded brasses, tin brasses, cupronickel alloys, nickel silvers, phosphor, silicon and aluminum-silicon bronzes. (P15g, G17k, Q27a, R-general; Cu-b)

330-P. (English.) The Effects of Imperfections on the Superconducting Critical Temperature of Tantalum. D. P. Seraphim, D. T. Novick and J. I. Budnick. Acta Metallurgica, v. 9, May 1961, p. 446-452.

The critical temperature for superconductivity in pure specimens and in

specimens doped with O, N and H interstitial impurities is investigated after cold working by resistance measurements. The nature and number of deformation induced defects which scatter the electron state are considered as influencing factors, as well as the mean free path effect as influenced by O, H and N concentrations. 23 ref. (P15g, M26s, M25, 3-68, 3-69; Ta)

331-P. (English.) Electrical Resistance of Copper-Gold Alloys at Low Temperatures. M. Hirabayshi and Y. Muto. Acta Metallurgica, v. 9, May 1961, p. 497-503.

Resistance measurements as a function of temperature on polycrystal and single crystal specimens containing 5.0-75.0% Au at 4.2-273° K. in the annealed and quenched states. Effect of order-disorder and impurity content on residual resistance and Debye temperature. 17 ref. (P15g, N10, 2-63, 2-64, 3-69; Au-b, Cu-b)

332-P. (English) The Solubility of Ni, Cr, Fe, Ti and Mo in Liquid Lithium. H. W. Leavenworth and R. E. Cleary. Acta Metallurgica, v. 9, May 1961, p. 519-520.

Solubilities of dilute liquid metal solutions are determined as a function of temperature at 1200-1700° F. using flame photometry, colorimetry and radioactive tracer methods. The magnitude of the solubility increases with the atomic size factor. (P12e, 2-61; Li, Ni, Cr, Fe, Ti, Mo)

333-P. (Translation-ConBur.) Thermodynamic Properties of Liquid Indium-Bismuth Alloys. N. V. Alekseev, Ya. I. Gerasimov and A. M. Evseev. Academy of Sciences of the USSR, Proceedings, Physical Chemistry Section, v. 134, Sept-Oct. 1960, p. 883-885.

Determination of the thermodynamic functions of the In-Bi system from 240-300° C. by emf. measurements with tabular presentation of results. (P12; Bi-b, In-b)

334-P. (Translation-Chemical Society.) Heat of Transition of the Sigma Phase Into Alpha Solid Solution in the Iron-Chromium System. I. I. Kornilov and N. M. Matveeva. Russian Journal of Inorganic Chemistry, v. 5, June 1960, p. 671-672.

Thermal analysis used to determine heat transition of the sigma phase (based on the compound FeCr) into the alpha solid solution of the Fe-Cr system. Preparation and composition of alloys. Heating curves. 7 ref. (P12q, M23r, M24b; Cr-b, Fe-b)

335-P. (Translation-Chemical Society.) Fusion Diagram of the Aluminum-Copper-Lithium System. V. I. Mikheeva, Z. K. Sterlyadkina and O. N. Kryukova. Russian Journal of Inorganic Chemistry, v. 5, Aug. 1960, p. 867-871.

Thermal analysis of the Al-Cu-Li system composed of up to 75 at.% Cu and Li. A melting point diagram is constructed; equilibrium is characterized by two incongruently melting ternary phases. The ternary eutectic representing the simultaneous crystallization of an Al solid solution occurs at the composition of 73 at.% Al, 18.6 at.% Cu and 8.4 at.% Li. 12 ref. (P12n; Al-b, Cu, Li)

336-P. (Translation-ConBur.) Determination of the Solubility of Metals in Lithium. Yu. F. Bychkov, A. N. Rozanov and V. B. Yakovleva. Soviet Journal of Atomic Energy, v. 7, Apr. 1961, p. 987-992.

The solubility of U, Zr, Fe, Li, Ti, Mo, Cb and Be in Li at temperatures of 700-1000° C. is determined to assess the stability of metals in Li and establish the mechanism of corrosion. The presence of isothermal transfer of Al, Be, Zr and Si via Li to steel and Fe is established. 6 ref. (P12e; Li, Be, Cb, Fe, Mo, Ni, U, Ti, Zr)

337-P. (Translation.) Thermoelectric Properties of Solid Solutions of Chromium, Vanadium and Titanium in Nickel. M. V. Vedernikov and N. V. Kolomoets. Soviet Physics--Solid State, v. 2, May 1961, p. 2420-2427. (Translation of Fizika Tverdogo Tela, v. 2, Nov. 1960, p. 2671-2988).

Dependence on temperature and second component concentration of the electrical resistivity and thermoelectric power of Ni-Cr, Ni-V and Ni-Ti solid solutions. 14 ref. (P15g, P15j; Cr, Ni, Ti, V, 14-67)

338-P. (Translation.) Electrical Conductivity of Liquid Selenium in Strong Electric Fields. A. A. Andreev and A. R. Regel. Soviet Physics--Solid State, v. 2, May 1961, p. 2467-2472. (Translation of Fizika Tverdogo Tela, v. 2, Nov. 1960, p. 2671-2988).

Temperature (150-370° C.), field intensity (up to 1.2 x 10^{-5} v per cm.) and impurity concentration (0.1-1.0% iodine), dependence of the electrical conductivity and strong field effect of liquid Se. 16 ref. (P15g, 2-61, 3-69; Se)

339-P. Gas Solubility in Metals. Gerald N. Goldberg. Michigan Technic, v. 79, May 1961, p. 14-16.

Investigations into the solubility of gases such as nitrogen, oxygen and hydrogen in various liquid metals and alloys including Fe, low-carbon steel and austenitic stainless steel using Sieverts apparatus. Factors such as high-temperature interaction between refractories, slag, gas phases or metal phases are taken into account. 4 ref. (P12e, D11h; CN-g, Fe, SS-e, H, N, O)

340-P. (Rumanian.) Variations of Physical Properties of Iron With Heating Time. Ovidiu Bolgiu, Maria Bolgiu and Traian Negrescu. Studii si Cercetari de Metalurgie, v. 5, Apr. 1960, p. 471-491.

Variations in dilation and metallic valence of high-purity Fe and Fe oxides during heating from 20-1000° C. 13 ref. (P-general, 2-64; Fe)

341-P. (Translation-Columbia.) Fine Structure of the Principal K Absorbtion of Transition Metals of the Iron Group, Their Alloys and Compounds. S. A. Nemnonov. Academy of the Sciences of the USSR, Bulletin, Physical Series, v. 24, Apr. 1960, p. 455-461.

Investigation of the electronic structure of transition metals Cr, Mn, Fe, Co, Ni, Cu and Zn shows that changes take place in the principal edge as concentration of the metal increases. Changes are identified by the magnitude and direction of the shifts of the three characteristic points of the K edge. 9 ref. (P17; Co, Cr, Cu, Fe, Mn, Ni, Zn)

342-P. (German.) Magnetic Properties of Sintered Iron. Hermann Dietrich. Zeitschrift fur Metallkunde, v. 52, Apr. 1961, p. 232-235.

Ballistic measurement of magnetization and measurement of coercive force at compensated gravity field for heat treated (825-1200° C. under hydrogen atm.) ring specimens of commercial unalloyed sintered Fe of given density and composition. Comparison of magnetic properties with cast and rolled pure Fe specimens. (P16; Fe, 6-72)

343-P. (German.) Conductivity and Hall Constant. Pt. 15. Alpha-Copper-Beryllium Alloys. Werner Koster and Hans-Peter Rave. Zeitschrift fur Metallkunde, v. 52, Apr. 1961, p. 252-255.

Measurement of resistivity and Hall constant for recrystallized, 65% cold rolled and differently heat treated (20-900° C.) and aged (20-250° C.) Cu-Be alloy (1.75% Be) strip specimens at 20° C. Establishment of annealing isotherms for various annealing and quenching temperatures. Hall constant as influenced by phase transformation. (P15, 2-64; Cu-b, Be, 4-53)

344-P. (German.) Conductivity and Hall Constant. Pt. 16. Au-Ni Alloys. Werner Koster and Hans-Peter Rave. Zeitschrift fur Metallkunde, v. 52, Apr. 1961, p. 255-259.

Measurement of resistivity and Hall constant for recrystallized, 65% rolled and differently heat treated (700-900° C.) and aged (110-150° C.) Au-Ni alloy (30 at.% Ni) specimens at 20° C. Establishment of annealing isotherms for various annealing and quenching temperatures. Hall constant as influenced by Ni content. Mechanism of phase transformation. (P15, 2-64, N-general; Au-b, Ni-b)

345-P. (German.) Electrical Resistance of Metallic Metals. Pt. 8. Electrical Resistance of Molten Al-Zn-Sn Alloys. Albert Roll and Anantha Swamy. Zeitschrift fur Metallkunde, v. 52, Apr. 1961, p. 260-262.

Electrodeless measurement of electrical resistance under Ar atm. at atmospheric pressure using an eddy current method for sections of constant Sn (5, 10 and 15 at.%) content and sections of constant Al (5, 10 and 15 at.%) content in the Zn-rich portion of the ternary Al-Zn-Sn system from 300-700° C. Abnormalities of resistivity as influenced by valency electron concentration. (P15g; Zn-b, Al, Sn)

346-P. (German.) Thermomagnetic Analysis of Cobalt by Electron Irradiation. Shigeto Yamaguchi. Zeitschrift fur Metallkunde, v. 52, Apr. 1961, p. 284-285.

X-ray diffraction measurement of magnetic induction as influenced by temperature (20-300° C.) and crystallographic orientation on Co particles

magnetically attached to a metal surface and heated by electron irradiation. (P16, M22g, 2-61, 3-72; Co)

347-P. Metallurgy of High Temperature Heat Transfer Systems (The Density of Liquid Bismuth and of Dilute Solutions of Copper in Bismuth). L. E. Richards and S. W. Strauss. Report of NRL (Naval Research Laboratory) Progress, May 1961, p. 24-25. (Available as PB 171318 from U. S. Office of Technical Services, Washington 25, D. C.) $1.25.

Density measurements as a function of temperature from 400-800° C. for liquid Bi using a modified Archimedean method and from 790-810° C. for 3.5% Cu-Bi solutions by interpolation on density-temperature plots. Data are given for partial molal volume and molal volume as a function of dilution. 8 ref. (P10a; Bi, Cu, 14-60)

348-P. (Russian.) Gamma Absorption by Liquid Metals. A. I. Belyaev. Isvestiya VUZ-Tsvetnaya Metallurgiya, Feb. 1961, p. 39-42.

The gamma ray absorption occurring in liquid Al-Cu, Al-Zn, Al-Sn and Al-Mg systems is measured by determining the number of impulses in gamma rays that were passed through the melt. Change of absorption with the atomic number of metals and the number of electrons in their atoms. (P17c; Al-b, Cu-b, Mg-b, Sn-b, Zn-b)

349-P. (Russian.) Removal of Silver From a Lead Melt. V. M. Andreev and F. M. Loskutov. Isvestiya VUZ-Tsvetnaya Metallurgiya, Feb. 1961, p. 58-64.

Determination of the simultaneous solubility of Ag and Zn from 320-500° C. Values found should be important for the purification of Pb by Zn additions. 8 ref. (P12e; Zn, Ag)

350-P. Total Cross Section of Lead for Slow Neutrons. M. F. Collins and G. Dalling. Philosophical Magazine, v. 6, Apr, 1961, p. 485-489.

A beam of filtered neutrons with a mean wavelength of 8.4 A is used to measure the total cross section of Pb as a function of temperature from 290-840° K. The cross section varies linearly with temperature in both solid and liquid phases to within 1° K. of the melting point. There is a jump in cross section at the melting point of (9.4 ± 0.6)%. 13 ref. (P18j, 2-61; Pb)

351-P. The Optical Properties of Liquid Germanium Tin and Lead. J. N. Hodgson. Philosophical Magazine, v. 6, Apr. 1961, p. 509-515.

The optical constants of liquid Ge, Sn, and Pb are measured by a reflection method for wave numbers between 4000 and 27,000 cm^{-1} at 20-998° C. Effect of temperatures, free electrons and electron relaxation time on variation of properties. Comparison of calculated static conductivity with electrically measured values. 5 ref. (P17a; Ge, Pb, Sn)

352-P. Internal Magnetic Field in Iron and Iron Alloys Measured by NMR. Yashitaka Koi and Akira Tsujimura. Physical Society of Japan, Journal, v. 16, May 1961, p. 1040.

Resonance line shapes, Curie point and internal magnetic field are measured on pure Fe and Fe-1% Co alloys as a function of temperature. 8 ref. (P16, 2-61; Fe-b, Co)

353-P. (Translation - AIP.) The Thermal Conductivity of High Purity Thallium and Tin. N. V. Zavaritskii. Soviet Physics JETP (Journal of Experimental and Theoretical Physics), v. 12, June 1961, p. 1093-1097.

Thermal conductivity of several Tl and Sn single crystals of various purity is studied in the normal and superconducting states. A deviation from additivity is found in the electron scattering processes in the normal state. The variation in the ratio of the states when the scattering of electrons changes from lattice defects to thermal vibrations is investigated. Results are compared with theoretical predictions. 17 ref. (P11h; Tl, Sn, 14-61)

354-P. (Translation-ConBur.) The Temperature Dependence of the Surface Tension of Germanium. V. B. Lazarev and P. P. Pugachevich. Academy of Sciences of the USSR, Proceedings, Physical Chemistry Section, v. 134, Sept-Oct. 1960, p. 823-825.

Measurement of the surface tension of molten Ge at high temperatures using the Sugden procedure to obtain maximum gas bubble pressure. 15 ref. (P13h; Ge)

355-P. (German.) Magnetic Properties of Manganese-Bismuth Alloy Powders. G. S. Kandaurowa and Ja. S. Schur. Physikalische Abhandlungen aus der Sowjetunion, v. 4, Jan. 1961, p. 18-24.

Measurement of magnetization curves on isotropic disc shaped specimens of an unmagnetic binder containing less than 15 vol.% of a high-coercive Mn-Bi alloy powder after demagnetizing at -196° C. or at room temperature. 7 ref. (P16; Mn-b, Bi)

356-P. Thermodynamic Properties of Solid Solutions. Pt. 3. Copper-Rich Solid Solutions of Copper + Zinc + Manganese. G. A. Chadwick and B. B. Argent. Faraday Society, Transactions, v. 57, Apr. 1961, p. 619-624.

Thermodynamic functions for Zn in Cu-rich solid solutions of the system Cu + Zn + Mn calculated from measurements of the vapor pressure of Zn. The magnetic susceptibilities of the alloys are determined using a Sucksmith ring balance. 26 ref. (P12, P16n, P16p; Cu-b, Mn-b, Zn-b, 14-67)

357-P. Thermodynamic Properties of Liquid Silver-Lead Alloys. A. T. Aldred and J. N. Pratt. Faraday Society, Transactions, v. 57, Apr. 1961, p. 611-617.

Using a torsion-effusion methods, vapor pressures of Pb are measured over liquid Ag-Pb alloys and the result is used to compute their thermodynamic properties. The system is found to exhibit positive heats and positive excess entropies of formation. The results are compared with other themodynamic data and it is concluded that the specific heats of the alloys deviate positively from Neumann-Kopp behavior. 17 ref. (P12; Ag-b, Pb-b)

358-P. (German.) Permanent Magnet Properties of Workable Fe-Mn-Ti Alloys. Gunter Rassmann and Otto Henkel. Zeitschrift fur Angewandte Physik, v. 13, Apr. 1961, p. 169-170.

Measurement of coercive field strength and remanence induction of Fe-Mn-Ti alloys containing 12-20% Mn, 0-2.3% Ti, 0.02-1.52% Si, 0.09-1.46% Al and 0.03-0.25% C after 1250° C. homogenizing, 98% cold working and 525° C. annealing. Shape of hysteresis slope. (P16; Fe-b, Mn, Ti)

359-P. (German.) Coercive Force of Zone-Refined Iron. Albrecht Mager and Hans Hillmann. Zeitschrift fur Angewandte Physik, v. 13, Apr. 1961, p. 171-172.

Measurement of coercive force of Fe specimens obtained by zone-refining of sintered carbonyl-Fe without crucible under Hg-Ar protective atmosphere at zone rates of 0.3-10 mm. per min. and subsequent 880° C. annealing. Coercive force as influenced by zone rate. 12 ref. (P16a; Fe)

360-P. (German.) Influence of Cold Working and Heat Treatment on Electrical and Magnetic Properties of Fe-Al Alloys. Gunther Rassmann and Harry Wich. Zeitschrift fur Angewandte Physik, v. 13, Apr. 1961, p. 172-174.

Measurement of electrical resistance, coercive force and rolling anisotropy for cold rolled Fe-Al alloys containing 9-18% Al at room temperature and after annealing up to 600° C. Correlations between magnetic and electrical properties and lattice structure. (P15, P16, 2-64, 3-68; Fe-b, Al)

361-P. (German.) Magnetically Induced Anisotropy of FeAl and FeSi Single Crystals. Hermann Gengnagel and Hans Wagner. Zeitschrift fur Angewandte Physik, v. 13, Apr. 1961, p. 174-177.

Measurement of magnetic anisotropy constant in a vacuum furnace at up to 675° C. under the influence of a 5000 oe magnetic field for FeAl (10.1-14% Al) and Fe_3Si (13.5% Si) single crystals. 4 ref. (P16; Fe-b, Al, Si, 14-61)

362-P. Incendine Frictional Sparking From Alloys Containing Aluminium. D. Rae and B. J. Nield. Safety in Mines Research Establishment. Report no. 192, Nov. 1960, 29 p.

Replacement of Al content with inert elements to reduce incendiary sparking. Hazard as a function of hardness and heat treated conditions, as well as of Al content. Significant reduction of Al produces an alloy with much greater relative density and inferior mechanical properties. (P13)

363-P. Thermodynamic Properties of Blast Furnace Slags. John Chipman. Paper from "Physical Chemistry of Process Metallurgy". Pt. 1. v. 7. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1959, p. 27-64.

Review of data on the chemical thermodynamic properties of blast furnace slags which determine the equilibrium between slag, metal and gas. Application to the lime-alumina-silica-magnesia-sulphur, CaO-Al_2O_3, and CaO-SiO_2 systems. 47 ref. (P12, D11n)

364-P. Measurement of Vapor Pressures at High Temperatures by the Transportation Method. C. B. Alcock and G. W. Hooper. Paper from "Physical Chemistry of Process Metallurgy". Pt. 1. v. 7. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1959, p. 325-340.

A semimicro version of the transportation method is developed and used for measurements at 1000-1600° C. Study shows the effects of sample geometry, carrier gas flow rate and absolute magnitude of the vapor pressure on the results for apparent vapor pressure obtained by this method. (P12c)

365-P. The Vapor Pressure of the Liquid Metals Copper, Silver, and Gold. P. Grieveson, G. W. Hooper and C. B. Alcock. Paper from "Physical Chemistry of Process Metallurgy". Pt. 1. v. 7. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1959, p. 341-352.

Vapor pressures of liquid An and Ag are measured by the transportation technique and of liquid An and Cu by the Knudsen technique from 1100-1600° C. Results show good agreement when it is assumed that the vapors are monatomic. 17 ref. (P12c; Ag, Au, Cu, 14-60)

366-P. The Vapor Pressures of Lead-Antimony Alloys and the Atomicity of Antimony Vapor. A. W. Richards. Paper from "Physical Chemistry of Process Metallurgy". Pt. 1. v. 7. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1959, p. 353-362.

Measurements are made on liquid alloys and the pure liquid components by a transpiration method. The saturated vapor of Sb consists of approximately 90% tetratomic and 10% diatomic molecules. 13 ref. (P12c; Pb-b, Sb-b)

367-P. The Activities of Aluminum in Binary Aluminum-Iron Alloys. P. Gross, D. L. Levi, E. W. Dewing and G. L. Wilson. Paper from "Physical Chemistry of Process Metallurgy". Pt. 1. v. 7. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1959, p. 403-416.

The activities of Al in alloys containing 6.75% Al are measured at 920 and 1300° C. by determining, at the lower temperature, the aluminum monofluoride pressure in the reaction 2 Al (in alloy) + AlF_3 (solid) = 3 AlF (vapor) and at the higher temperature the Al vapor pressure over the alloy. 5 ref. (P12b; Al-b, Fe-b, 14-60)

368-P. Activation Energy of Flow in Liquid Metals. Mitsuo Shimoji. Paper from "Physical Chemistry of Process Metallurgy". Pt. 1. v. 7. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1959, p. 471-477.

The activation energy of viscosity or diffusion in liquid metals is influenced by the existence of conduction electrons. The abnormal ratio of activation energy to vaporization energy can be explained qualitatively in terms of the energy of the free electrons which is associated with the moving ion. (P13a, N14)

369-P. Determination of Solubilities in Liquid Metals. T. R. A. Davey. Paper from "Physical Chemistry of Process Metallurgy". Pt. 1. v. 7. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1959, p. 581-600.

Measurement of solubilities in low-temperature liquid metals such as Pb, Sn, Bi and Zn using a simple apparatus operating on a method involving granulating samples run from the center of a slowly cooling bath. 19 ref. (P12e; Bi, Pb, Sn, Zn, 14-60)

370-P. Further Work on the Solubility of Nitrogen in Iron-Chromium Alloys. E. T. Turkdogan and S. Ignatowicz. Paper from "Physical Chemistry of Process Metallurgy". Pt. 1. v. 7. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1959, p. 617-632.

Pure Fe-Cr alloys containing up to 30% Cr are nitrided at certain nitrogen partial pressures at 1200° C. Results obtained extend the previous data on nitrogen solubility to much higher Cr contents. 22 ref. (P12e; Fe-b, Cr, N)

371-P. (Japanese.) The Change of Magnetic Properties of Alnico 5 Magnet by Heating From 300-500° C. Yasuo Kimura. Japan Institute of Metals, Journal, v. 25, Mar. 1961, p. 191-194.

Saturation and residual induction, coercive force and demagnetization values as a result of gamma and alpha phase transformation in specimens heated at 300-500° C. after aging and annealing treatment from 575-1200° C. and cooling in a magnetic field. 6 ref. (P16, N-general, 2-62, 2-64, 2-65; Fe-b, SGA-n)

372-P. (Japanese.) The Influence of Aging Treatment on Magnetostriction in Alnico

5. Tatsuo Fujiwara and Tetsuo Kato. Japan Institute of Metals, Journal, v. 25, Mar. 1961, p. 216-220.

Measurement of saturation magnetostriction in specimens after solution heating and aging from 550-800° C. with X-ray powder pattern examination of domain structures, effect of aging and related precipitation phenomena on magnetic properties. 29 ref. (P16b, P16c, M22g, 2-65; Fe-b, SGA-n)

373-P. (Japanese.) Ferromagnetic Domain Patterns on Face-Centered Cubic Nickel-Cobalt Alloy Crystals. Pt. 1. Ferromagnetic Domain Patterns on Ni-Co Alloy and Pure Cobalt Crystals. Mikio Yamamoto and Satoshi Taniguchi. Japan Institute of Metals, Journal, v. 25, Mar. 1961, p. 225-229.

Powder pattern methods are used to examine domain structures of annealed and electrolytically polished single crystals containing 4-68% Co. Magnetocrystalline anisotropy constants, internal stress distribution and orientation relationships are related with ferromagnetic domain patterns to composition, strain and f-c-c. structure. 20 ref. (P16c, M26c, M22g, 2-60, 2-64, 3-68; Co-b, Ni-b, 14-61)

374-P. (Japanese.) Ferromagnetic Domain Patterns on Two-Phase Nickel-Cobalt Alloy and Pure Cobalt Crystals. Pt. 2. Ferromagnetic Domain Patterns on Ni-Co Alloy and Pure Cobalt Crystals. Mikio Yamamoto and Satoshi Taniguchi. Japan Institute of Metals, Journal, v. 25, Mar. 1961, p. 229-233.

Powder pattern techniques are used to examine domain structures in 69-70% Co-Ni single crystals and in Co ingots after slow solidification and varied heat treatments. Crystallographic relations are determined for epsilon and gamma phase transformations with direction of easy magnetization, banding of structures and related heat treatment phenomena. (P16c, M22g, M26, N-general, 2-60, 2-64; Ni-b, Co-b)

375-P. (Russian.) Heat Content and Melting Temperature of Carbon Steel and Low-Alloy Steels. R. P. Krenzis, P. V. Held and N. N. Serebrennikov. Chernaya Metallurgiya, Nov. 1960, p. 5-11.

Determination of heat content in rail steel and St. 3sp, 09G2 and St. 3kp steel specimens from 0-1600° C. in the open air as well as in vacuum and determination of the melting temperature by extrapolarization. Dependence of heat content on temperature and carbon content. 16 ref. (P12, D11, 2-60, 2-62; ST)

376-P. (French.) Liquid Metals as Coolants. R. Darras. Energie Nucleaire, v. 3, Mar-Apr. 1961, p. 128-138.

Density, viscosity, thermal conductivity, specific heat and electrical resistivity of Li, Na, K, Hg, Pb, Bi and some of their alloys at 450° C. Solubility of Be, Mg, Si, Ce, Cr, Fe, Ni, Zn, Zr, Mo, Ag, Sb, V, Mn, Co, Cu, Cb, W, Os and Pt in Na, K and U. Effect of O, C and N dissolved in the liquid metal on the corrosion of reactor components. Compatibility of alloy steel, Ni, Co and their alloys, refractory metals, Cu alloys, Ta, Ti, W, V, Zr, Ag, Au and Pt with liquid Na. 27 ref. (P-general, R-general; NM-h. 14-60)

377-P. (Russian.) Effect of Radiation on the Electrochemical Behavior of 1Kh18N9T Steel. V. V. Gerasimov and V. N. Aleksandrova. Atomnaya Energiya, v. 10, Feb. 1961, p. 164-166.

Samples of 1Kh18N9T alloy steel containing 0.07% C, 1.23% Mn, 19.01% Cr, 10.05% Ni and 0.53% Ti are immersed in a 0.01% N solution of Na_2SO_4 or a 0.01% N solution of NaCl used alternately as an electrolyte in a testing cell. The effect of radiation by measuring the polarization from 80-90° C. with and without simultaneous neutron irradiation at a density of 10^{12} neutrons per sq. cm. per sec. (P17g, 2-67; AY)

378-P. (Japanese.) Secondary Emission. Atsumi Kondo. Electrotechnical Laboratory Researches, no. 593, Nov. 1960, 142 p.

Theoretical calculation and experimental derivation of formulae for the yield of secondary emission of primary and secondary electrons. Observations of selective oxidation of Mg in a Ag-Mg alloy during secondary emission as influenced by the relative energies of activation and dissociation of Ag and Mg. 42 ref. (P15k; Mg-b, Ag)

379-P. (German.) Permalloys With Rectangular Hysteresis Slope. Friedrich Pfeifer. Zeitschrift fur Angewandte Physik, v. 13, Apr. 1961, p. 177-180.

Heating of 1150° C. annealed ring cores made from binary Permalloy and

ternary Supermalloy (79% Ni, 0-7% Mo, bal. Fe) strip to 750° C., cooling to soaking temperature, soaking from 350-600° C. with and without application of a magnetic field and subsequent measurement of static hysteresis slope at room temperature. Data are given for remanence, coercive force and initial permeability as influenced by heat treatment. (P16a, 2-64; Ni-b)

380-P. The Kinetics and Mechanism of the Conversion of Titanium Oxides to Titanium Nitride. D. L. Douglass, G. R. St. Pierre and R. Speiser. Paper from "Physical Chemistry of Process Metallurgy". Pt. 2. v. 8. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1959, p. 705-720.

The rates and mechanisms of nitride formation on TiO_2, Ti_2O_3 and TiO by nitridization with ammonia are studied from 900-1000° C. and 0.03-1 atm. pressure. Rate constants and activation energies are determined by gravimetric methods with topochemical and X-ray diffraction studies of end products of reduction. 23 ref. (P13b, B15p; Ti, 14-68)

381-P. Equilibria Between Lead, Lead Sulfide and Cuprous Sulfide and the Decopperizing of Lead With Sulfur. R. F. Blanks and G. M. Willis. Paper from "Physical Chemistry of Process Metallurgy". Pt. 2. v. 8. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1959, p. 991-1028.

Experimental determination of relative stability of Cu_2S and PbS, solubility of PbS in Pb, the rate of reaction of S with Pb and equilibrium between Pb, Cu_2S and PbS. Mechanism of decopperizing of Pb with S in which S is assumed to produce high sulphur potentials which cause formation of Cu deficient cuprous sulphide with substantially reduced Cu activity. Effects of Ag, As, Sb and Sn on decopperizing Sn and Bi. 45 ref. (P12d, P13; Pb-b, S)

382-P. (Russian.) Change of the Electrical Resistance of Some Metals Under Pressures Up to 200,000 Kg. Per Sq. Cm. L. F. Vereshchagin, A. A. Semerchan, N. N. Kuzin and S. V. Popova. Doklady Akademii Nauk SSSR, v. 136, Feb. 1961, p. 320-321.

Metallic Sb, As and Ca are exposed to pressure while their electrical resistance is measured. Special attention is given to the pressure range 100,000-200,000 kg. per sq. cm. (P15g, 3-74; As, Ca, Sb)

383-P. Investigation of Feasibility of Utilizing Available Heat Resistant Materials for Hypersonic Leading Edge Applications. v. 4. Thermal Properties of Molybdenum Alloys and Graphite. I. B. Fieldhouse. Armour Research Foundation (Wright Air Development Division). U. S. Office of Technical Services, PB 171390, Oct. 1960, 86 p. $2.25.

Results of measurements of thermal conductivity, specific heat, linear thermal expansion and emittance of a 0.5% Ti alloy of Mo and of siliconized ATJ graphite as a function of temperature. Emittance measurements are made on coated and uncoated materials. (P11g, P11h, P12r, P17a; Ti-b, Mo)

384-P. (Translation.) Thermal Effects in Electrical Conductivity of Germanium in Liquid Helium. E. I. Zavaritskaya. Soviet Physics--Solid State, v. 2, June 1961, p. 2673-2675. (Translation from Fizika Tverdogo Tela, v. 2, Dec. 1960, p. 2989-3196.)

Measurement of the dependence of current on voltage applied to Ge specimens in liquid He. Volt-ampere characteristic and dependence of temperature on applied voltage. (P15g, 2-66; Ge)

385-P. (Hungarian.) The Anodic Properties of Aluminum. Kerti Jozsef. Magyar Kemiai Folyoirat, v. 67, Mar. 1961, p. 97-99.

Problems of galvanic cells based on Al anodes. Electrochemical behavior of Zn and Al is compared. The limited validity of Nernst's rule, the relationship between pH and potentials and the chemical reactions involved are studied. The possibility of contact electroplating with Al is mentioned. (P15, L19, L17; Al, Zn)

386-P. Study of the Alloys of Transition Elements. Paul A. Beck. University of Illinois (Aeronautical Research Laboratory). U. S. Office of Technical Services, PB 171113, Dec. 1960, 17 p. $.50.

Measurements of electronic specific heat in b-c-c. alloys in the systems Ti-V, V-Cr, Cr-Fe, Fe-Co, Cr-Mn and V-Fe leading to information regarding the shape of the third band. (P12r; Co-b, Cr-b, Fe-b, Mn-b, Ti-b, V-b)

387-P. Thermodynamic Activities in the Fe-Mn-C System. J. F. Butler, C. L.

McCabe and H. W. Paxton. Metallurgical Society of AIME, Transactions, v. 221, June 1961, p. 479-484.

The vapor pressures of Mn in equilibrium with several alloys in the Fe-Mn system between 1200-1275° K. are measured using the Knudsen effusion technique in conjunction with a vacuum microbalance. The binary Fe-Mn system shows small negative departures from ideality and the system of mixed carbides $(Me, Mn)_7C_3$ in equilibrium with graphite behaves ideally. 14 ref. (P12, M24c, 2-60, 2-61; Fe-b, C, Mn)

388-P. Some Thermodynamic Properties of the Cadmium-Copper System. Richard Borg. Metallurgical Society of AIME, Transactions, v. 221, June 1961, p. 527-531.

The partial molal free energy of Cd in each of the four intermediate phases, Cd_3Cu, Cd_3Cu_5, Cd_3Cu_4 and $CdCu_2$, is determined using the Knudsen vapor pressure technique with 580° K. selected as the common temperature. X-ray diffraction examination is used to determine lattice parameter for the sigma, epsilon and beta phases. 17 ref. (P12, M26q, M24b, 2-60, 2-61; Cd-b, Cu-b)

389-P. The Solubility of Nitrogen in Solid Iron-Nickel Alloys Near 1000° C. H. A. Wriedt and O. D. Gonzalez. Metallurgical Society of AIME, Transactions, v. 221, June 1961, p. 532-535.

Alloys ranging from pure Fe to pure Ni are saturated with nitrogen gas from 918-1217° C. with the solubility of nitrogen at 1-atm. pressure being obtained as a function of Ni content and temperature for all the compositions. The heat of solution and the entropy of solution of nitrogen in the system are given as functions of composition up to 41% Ni. 10 ref. (P12e, 2-60; Fe-b, Ni-b, N)

390-P. The Thermal Decomposition of Cobalt Sulfate. J. Stuart Warner. Metallurgical Society of AIME, Transactions, v. 221, June 1961, p. 591-596.

The reaction yielding $CoO(c) + SO_3(g)$ is investigated at 950-1170° K. by decomposing the sulphate in a vacuum and calculating the dissociation pressure from the measured pressure and by decomposition under controlled oxygen pressure. The difference in the results obtained is attributed to the effects of thermal diffusion. Values are calculated for standard free energy change with transformations being observed by X-ray diffraction and differential thermal analysis. 15 ref. (P12, P13, M-general, 2-61; Co-b, 14-68, S)

391-P. Growth of Voids in Copper During the Creep Process by Measurement of the Accompanying Change in Density. Raymond C. Boettner and W. D. Robertson. Metallurgical Society of AIME, Transactions, v. 221, June 1961, p. 613-622.

Investigation of the change in density during the first and second stages of creep in polycrystalline and single crystal Cu as a function of stress, temperature, plastic strain, impurity and atmosphere effects and structure. Voids are hetergeneously nucleated at grain boundaries by an insoluble phase, or phases, which can be removed by directional solidification. The principal controlling mechanism of void growth appears to be condensation of vacancies at given grain boundaries. 17 ref. (P10a, P10d, N3, Q3; Cu-a)

392-P. The Solubility of Hydrogen in Alpha Iron. M. L. Hill and E. W. Johnson. Metallurgical Society of AIME, Transactions, v. 221, June 1961, p. 622-629.

Equilibrium concentrations of H in Fe are measured at H_2 pressures up to 136 atm. and temperatures down to 145° C. Residual hydrogen is prominent near 600° C. in air-melted but not in vacuum-melted Fe. The diffusible hydrogen solubility is abnormally high below 390° C., confirming the hypothesis of hydrogen trapping. 17 ref. (P12e, 2-61; Fe-b, H)

393-P. Density Anomalies in the Bi_2Te-Sb_2Te System. L. R. Testardi and J. R. Wiese. Metallurgical Society of AIME, Transactions, v. 221, June 1961, p. 647-649.

Investigation of ordering in the system as a function of composition by measurement of density using a hydrostatic weighing technique on annealed or quenched samples at room temperature. An anomaly in the density of the samples as a function of composition is related to solubility and energy gap changes. 5 ref. (P10a, N10, 2-60, 2-64; Te-b, Bi, Sb)

394-P. (German.) Second Boiling Point in the Gold-Sulphur and Gold-Selenium Systems. Rudolf Vogel and Rolfdieter Gerhardt. Zeitschrift fur Metallkunde, v. 52, May 1961, p. 318-320.

Measurement of the solubility of Se and S in liquid Au (equilibrium liquid gas) and of the second boiling point (equilibrium solid Au melt gas) in the binary Au-S and Au-Se system. Au-rich portion of the binary phase diagrams. (P12e, P12p, M24b; Au-b, S, Se)

395-P. (German.) Metal Optical Investigation of Silver-Palladium and Nickel-Chromium Alloys. Hans Eberhard Schmidt and Rolf E. Hummel. Zeitschrift fur Metallkunde, v. 52, May 1961, p. 337-343.

Measurement of optical constants (diffraction and absorption coefficients) of solid mechanically polished specimens of Ag-Pd (0-100% Pd) and Ni-Cr (0-12 at.% Cr) alloys, using light in the visible spectrum range. Examination of the applicability of the free conduction electron model. (P17a; Ag-b, Cr, Ni-b, Pd-b)

396-P. Metals Versus Plastics: Performance--The Key to Selection. Malcolm W. Rilet and and Donald Peckner. SAE Paper 381B, 1961, 8 p.

Comparison of electrical resistance, thermal conductivity and expansion, chemical resistance, tensile strength and other physical and mechanical properties of several plastics with metals, especially Zn. Fabrication and design characteristics. (P-general, Q-general; Zn, NM-d30, NM-d31)

397-P. (German.) Investigations Concerning Some Semimetals. W. Klemm, H. Spitzer and H. Niermann. Angewandte Chemie, v. 72, Dec. 1960, p. 985-994.

Crystal structure, lattice spacing and atomic bonds of P, As, Sb, Bi, Se and Te are studied from 0-1000° C., to investigate temperature dependence of specific gravity, entropy, enthalpy, magnetic susceptibility and changes in volume at melting temperatures. (P-general, 2-61; P, As, Sb, Bi, Se, Te)

398-P. Transverse Galvanomagnetic Effect of Bismuth Single Crystal in a Strong Magnetic Field. Kunihide Tanaka, Seiichi Tanuma and Tadao Fukuroi. Tohoku University, Research Institutes, Science Reports, Series A, v. 13, Apr. 1961, p. 67-81.

The twelve components of the galvanomagnetic tensor, with respect to magnetic field dependence, and their behavior near the quantum limit of the magnetic quantization, are determined for specimens in strong magnetic fields up to about 100 kilo oersted from 1.8-4.2° K. 20 ref. (P16e, 2-63; Bi, 14-61)

399-P. Activity of Chromium in Liquid Iron-Chromium Systems. Harue Wada, Yasuji Kawai and Tunezo Saito. Tohoku University, Research Institutes, Science Reports, Series A, v. 13, Apr. 1961, p. 96-104.

A vaporization method using radioactive Cr is used to determine the activities of Cr in liquid Fe-Cr and carbon-saturated Fe-Cr systems at 1630° C. up to 40% Cr negative. Deviations from Raoult's law are observed with the interchange energy being calculated from the phase diagram. 18 ref. (P12b, M24b, 1-59; Fe-b, Cr, 14-60)

400-P. Activities of the Component Metals in Fused Binary Alloys (Zn-Cd System and Zn-Sn System). Zensaku Kozuka, Jyoichiro Moriyama and Isao Kushima. Electrochemical Society of Japan, Journal (Overseas Edition), v. 28, July-Aug. 1960, p. E167-E169.

Activities of Zn and Cd at 550° C. in liquid Zn-Cd solution and of Zn in Zn-Sn alloy solution at 670, 720 and 770° C. are determined by measuring the vapor pressure of the individual components of the liquid systems by the transportation or carrier gas technique. 6 ref. (P12b, P12c, 2-61, M24b; Zn-b, Cd-b, Sn-b, 14-60)

401-P. (German.) Properties of Evaporated InSb and InAs Films. K. G. Gunther and H. Freller. Zeitschrift fur Naturforschung, v. 16a, Mar. 1961, p. 279-283.

Evaporation of thin InSb and InAs films on hard-glass plates and Al_2O_3 by the "three-temperature method" (evaporation of the two components in separate crucibles at different temperatures) and subsequent measurement of Hall coefficient (using evaporated Ag contacts), electrical conductivity and electron mobility. (P15p, P15g; In-b, As, Sb, 14-62)

402-P. Testing Anodized Aluminum. F. C. Porter. Metal Finishing Journal, v. 7, May 1961, p. 181-186.

Determination of film continuity, abrasion resistance, weight, density, thickness, corrosion resistance, sealing, reflectivity and fastness to light and thermal and electrical properties. 10 ref. (P-general, Q9, R-general; Al, 8-73)

403-P. (Russian.) Heat Holding Capacity of Different Materials and Concentrates. S. G. Bratchikov. Izvestiya VUZ--Chernaya Metallurgiya, Feb. 1961, p. 5-8.

Formulas for calculating average heat holding capacity of various metals, nonmetals and oxides as dependent on temperature of materials. 8 ref. (P12r)

404-P. Experimental Aspects and Application of the Mossbauer Effect. Paul P. Craig. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 22-35.

Review of recoil-free gamma-ray transition (the Mossbauer effect) and low temperature magnetization criteria for its existence. Application to measurement of nuclear magnetic resonance absorption and emission spectrum with attention to Doppler and red shifts of the energy level in rare earths and precious, reactive, refractory and heavy metals. 20 ref. (P16f, 1-54, 2-63; EG-c31, EG-d37, EG-g45, EG-h30)

405-P. Relaxation and Temperature in Magnetic Spin Systems. N. Bloembergen. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 36-51.

Survey of theory, thermodynamic consideration and experimental determination of spin lattice relaxation times and magnetic temperatures in crystals in terms of Zeeman, exchange and dipolar energy in various electron spin systems from 1.388-20.4° K. 29 ref. (P16f, P18m, 2-63)

406-P. Magnetism at Temperature Below 1° K. C. J. Conger. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 84-93.

Review of principle of magnetic cooling and magnetic properties and transition occurring in material as a result of cooling to temperature in and below the Curie-Weiss region. Survey of nuclear demagnetization experiments and resultant susceptibility, spin-orientation and thermodynamic relations. 17 ref. (P16, 2-63, 10-54)

407-P. Magnetic Cooling With Thorium-Dysprosium Alloys. R. D. Parks and W. A. Little. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 114-116.

Magnetic susceptibility and electrical resistivity of arc-melted alloy containing 0.28-13% Dy are measured from 1.2-4.2° K. after adiabatic demagnetization with calculation of thermal conductivity to determine the applicability of the alloys as magnetic coolants. (P15g, P16n, P16p, 2-63; Th-b, Dy)

408-P. Nuclear Spin Thermometry and Relaxation Below 1° K. C. Froidevaux, E. L. Hahn and R. Walstedt. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 118-121.

A pulsed nuclear free precession technique which measures directly the nuclear magnetism due to known nuclear spins at thermal equilibrium is used to determine thermodynamic temperature in metals below 1° K. Application to Na powder and Cu wire specimens after cooling by adiabatic demagnetization to 0.02° K. 6 ref. (P16f, P18m, 1-54, 2-63; Na, Cu)

409-P. Effect of Thermomolecular Flow on Low-Temperature Magnetic Susceptibility Measurements. A. N. Gerritsen and D. H. Damon. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 131-133.

Magnetic force measurements on specimens of Cu, Teflon, Cu-Teflon, Si and quartz, suspended in cryogenic fluids from 4.2-77° K., with calculation of susceptibility, to determine the interference of the thermomolecular flow of the heat exchange gas on precise relative measurements of susceptibility by the Faraday method. (P16n, P16p, 2-63; Cu-b, Si, NM)

410-P. Anisotropy in the Hall Effect and Magnetoresistance of Single Crystals of High Purity Copper. J. E. Kunzler, J. R. Klauder and G. F. Brennent. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 210-213.

Effect of orientation on the Hall constant and the magnetoresistance of specimens in a transverse and longitudinal rotating magnetic field from 4.2-273° K. Relation of Hall voltage and magnetoresistance measurements to topology of the Fermi surface. 6 ref. (P15g, P15p, 2-63, 3-72; Cu-a, 14-61)

411-P. The Transverse Magnetoresistance of Zinc and Cadmium at 4.2° K. in Fields From 0 to 7000 Oersteds. C. A. Renton. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 216-220.

Dependence of resistivity on direction and strength of applied magnetic field determined in pure single crystal specimens for $(10\bar{1}0)$ and $(11\bar{2}0)$ orientation. Relation of magnetoresistance to open and closed orbits and the Hall and de Haas-Van Alphen effects. (P15g, P16p, M25n, 2-63, 3-72; Zn, Cd, 14-61)

412-P. A Study of Cyclotron Resonance in Tin. M. S. Khaikin. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 220-223.

A frequency modulation method in which the specimen is part of a high frequency resonator placed in a magnetic field is used to measure resonance in high-purity single crystal specimens from 1.8-4.2° K. as a function of field orientation and intensity. 7 ref. (P18m, 2-63; Sn, 14-61)

413-P. The Oscillatory Dependence of the Surface Impedance of Metals Upon a Weak Magnetic Field. M. S. Khaikin. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 224-226.

Frequency modulation measurements on high-purity Sn, Cd and In single crystal specimens at 3.8° K., at -6 to +6 oersted with surface impedance determined as dependent upon oscillation as a function of magnetic field orientation and intensity. 6 ref. (P15g, P16, 2-63, 3-72; Sn, Cd, In, 14-61)

414-P. Cyclotron Resonance in Bismuth and Lead. J. E. Aubrey. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 226-228.

Values for the components of the reciprocal mass tensor in the electron band are determined for Bi. The quadriatic nature of the electron energy band is tested by investigating the dependence of the effective mass upon the orientation for directions of the magnetic field in Bi and Pb single crystals. The anisotropy of the specimen conductivities is correlated with predictions for the shape of the Fermi surface. 11 ref. (P18m, P16n, M25, 2-63, 3-72; Bi, Pb, 14-61)

415-P. The De Haas-Van Alphen Effect in Aluminum and Magnesium. M. G. Priestley. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 230-231.

Oscillation periods in Al and Mg single crystal specimens are investigated in fields to 160 kilogauss by the pulsed field method. Measured data for fast de Haas-van Alphen periods in (111) and (110) field directions are compared with data calculated from nearly free electron models. 5 ref. (P16n; Al, Mg, 14-61)

416-P. The De Haas-Van Alphen Effect on Calcium. Ted G. Berlincourt. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 231-232.

High-purity Ca single crystals are measured in magnetic fields to 200 kilogauss from 1.3-4.0° K. by an impulsive field technique to determine whether de Haas-van Alphen oscillation and Fermi surface effects in a divalent f-c-c. metal were similar to those in monovalent metals such as Al, Ag, Au, Pb and Cu. Orientation, temperature and field dependence of effects are correlated with predictions using a nearly free electron model. 8 ref. (P16n, M25; Ca, 14-61)

417-P. The Minimum in the Electrical Resistance Versus Temperature Curve:

The Progress Concerning the Cause. G. J. van den Berg. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 246-257.

Review of theory for causes of the anomaly in the resistance curve at low temperatures, with data for measurements of electrical resistivity, magnetoresistance and thermoelectric power in single crystal and polycrystalline wire specimens of transition and noble metals and their dilute alloys from 1.2-15° K. Relation of resistance minima to Fermi surface, nuclear orientation, magnetic properties and spin relaxation effects. 65 ref. (P15g, 2-63, 3-72)

418-P. The Electrical Resistance and Magnetoresistance of Noble Metals Diluted With Transition Elements of the Second Series. B. Knook and G. J. van den Berg. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 257-258.

Measurements on specimen strips of pure Au, Ag and Cu and on dilute alloys of Cu-Pd, Cu-Rh, Cu-Ru, Ag-Pd, Au-Pd, Au-Rh and Au-Mo at 1.2-2.73° K. Minimums in the electrical resistance and maximums in the magnetoresistance are determined as a function of temperature and concentrations. 7 ref. (P15g, P16, 2-60, 2-63; Au-b, Ag-b, Cu-b, Rh, Ru, Pd)

419-P. Magnetic Susceptibility and Electron Spin Resonance Studies in Dilute Mg-Mn and Al-Mn Alloys at Low Temperatures. E. W. Collings and F. T. Hedgcock. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 259-260.

Investigation of the magnetic properties of alloys containing 0.008-0.6% Mn from 1.9-293° K. Data are given for susceptibility, Curie-Weiss constants and relaxation time as affected by Mn ion interaction and magnetic transitions as a function of temperature and Mn concentration. 4 ref. (P16f, P16n, P16p, 2-60, 2-63; Al-b, Mg-b, Mn)

420-P. The Hall Effect of Diluted Alloys of Manganese in Silver. B. Franken and G. J. van den Berg. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 261-262.

Temperature and magnetic field dependence of the Hall effect in strip specimens of 0.01-4.2% Mn-Ag alloys, some Ag-Au alloys and pure Ag measured from 4.2-293° K. Hysteresis is found in the Hall coefficient of the alloys containing Mn at 4.2° K. (P15p, P16a, 2-60, 2-63; Au-b, Mn)

421-P. A Specific Heat Anomaloy at Low Temperatures in a Dilute Copper-Iron Alloy Showing a Resistance Minimum. Douglas L. Martin and J. P. Franck. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 262-264.

Measurement on an alloy of 0.05% Fe in Cu and on pure Cu specimens from 0.4-30° K., with a specific heat anomaly being observed at 5-10° K., which is consistent with a temperature dependent anomaly in the electrical resistance curve, both being related with a model involving two energy states of the Fe impurity ions. 4 ref. (P12r, P15g, 2-60, 2-63; Cu-b, Fe)

422-P. The Magnetoresistance Size Effect in Indium in High Magnetic Fields. C. Froidevaux, J. R. Keyston, J. L. Olsen and P. Cotti. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 265-266.

Thick polycrystalline wire specimens are measured in stationary magnetic fields to 40,000 oersted and in pulsed fields to 70,000 oersted at 2° K. to determine the influence of a magnetic field on the size effect in electrical resistivity, in particular, the extent of reduction of resistivity toward the bulk value for magnetoresistance. 5 ref. (P15g, P16, 2-63, 3-73; In-a)

423-P. Electrical Resistivities of Zirconium With Dilute Additions of Ag, Cd, In, Sn and Sb. J. O. Betterton, Jr., and D. S. Easton. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 270-273.

Effect of solute concentration and valency on electrical resistivity of hexagonal Zr alloys measured at 4.2° K. In-

fluence of thermal and impurity scattering and upward shift of the Fermi surface on resistivity values. 8 ref. (P15g, 2-60, 2-63; Zr-b, Ag, Cd, In, Sb, Sn)

424-P. Dislocation Resistance and the Variation of Lattice Conductivity With Impurity. P. Lindenfeld and W. B. Pennebaker. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 276-280.

Thermal conductivity of Cu-4% Zn alloy specimen measured at low temperature after annealing at 1000° C. for up to 24 hr. to determine the effect of random dislocation on lattice resistance as a function of impurity content. Lattice conductivity is not materially affected by removal of the dislocations by annealing, the resistivity changes being considered an intrinsic property of the alloy system. 8 ref. (P11h, M26b, 2-63, 2-64, 3-69; Cu-b, Zn)

425-P. Effect of Oxygen on the Thermal Conductivity of Silicon. M. G. Holland. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 280-284.

Lattice thermal conductivity of doped Si crystals of n-type and p-type conductivity containing dissolved oxygen as a result of oxygen atoms acting as point defects. Measurements are made on samples with and without dislocation from 4-300° K. 9 ref. (P11h, M26b, 2-63, 3-69; Si, O)

426-P. The Low Temperature Aspect of the Thermal Conductivity and the Thermoelectric Power of N-Type Germanium. J. F. Goff and N. Pearlman. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 284-288.

Effects of temperature, impurity concentration and electron-impurity conduction on the thermal conductivity of single crystal specimens doped with Sb, As and SbGa impurities are measured from 2-77° K. 10 ref. (P11h, P15j, 2-63, 3-69; Si, Sb, As, Ga, 14-61)

427-P. Infrared Absorptivity of Dilute Copper-Germanium Alloys at 4.2° K. J. H. Rayne. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 288-290.

The anisotropy of impurity scattering of electrons in Cu is investigated by infrared absorption measurements on pure Cu and 0.2-1% Ge-Cu alloys in the 1.0-4.0 micron wavelength range. Calculations are made relating absorptivity to resistivity as an indicator of scattering phenomenon. 6 ref. (P17c, P15g, 2-63; Cu-b, Ge)

428-P. Recent Experiments on the Electrical Properties of Superconductors. A. B. Pippard. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 320-327.

Review of measurements near 1° K. on Al, Sn and In for determining temperature and magnetic field dependence of penetration depth, its magnitude and anisotropy. Relation of phenomenons to BCS theory. 9 ref. (P15g, P16, 2-63, 3-72; Al, Sn, In)

429-P. Penetration Depth Measurements in Pure and Impure Aluminum at 170 Mc/s. W. L. McLean. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 330-331.

Changes in the penetration depth as a function of temperature and purity determined by resonant frequency measurements from 0.84-3.7° K. on pure Al and Al alloys containing 0.25% Mg. Correlation with predictions from BCS theory and Kramers-Kronig relations. 7 ref. (P15g, 2-63, 3-69; Al-b, Mg)

430-P. The High Frequency Surface Impedance of Aluminum. D. Llewelyn Williams. Paper from "Seventh International Conference on the Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 331-333.

The surface impedance of electropolished Al single crystals is investigated at a frequency of 3K Mc/s by the coaxial resonator technique. Data are given for penetration depth, anisotropy in the normal state conductivity and in the resistance curve near the transition temperature and superconducting resistance and inductance as a function of frequency, time and temperature. 7 ref. (P15g, 2-63, 3-67, 3-72; Al, 14-61)

431-P. Magnetic Field Dependence of the Surface Impedance of Superconducting Tin at 3K Mc/s. P. L. Richards. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 333-335.

Measurement of surface resistance and reactance of single crystals of pure Sn and Sn alloys containing up to 1% In by resonance techniques in longitudinal and transverse fields for various orientations. Variations and anisotropy in the impedance curve are related to field direction and state, demagnetization phenomena, electron orbit and temperature. 6 ref. (P15g, P16, M25, 2-63, 3-72; Sn-b, In)

432-P. On the Switching Time of Bulk Superconducting Tin. A. H. Nethercot, Jr. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 336-337.

Measurement from 2.5-3.7° K. using a pulsed microwave energy source coupled into a cavity resonant for determination of whether bulk Sn can be switched into and out of a superconducting state by application of a microwave magnetic field at 10,000 Mc/s. (P15g, P16e, 2-63; Sn)

433-P. Superconducting Properties of the Two Modifications of Mercury. C. A. Swenson and J. E. Schinber. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 338-345.

Critical field measurements from 0-3000 atm. pressure for alpha and beta Hg from 1-93° K. to determine low temperature-pressure effects on the superconducting state and the electron contributions to the low temperature thermodynamic properties. Critical field curve and data for penetration depth, lattice thermal expansion and specific heat are compared with superconductivity results for Ta. 9 ref. (P15g, P12, P11g, 2-63, 3-74; Hg)

434-P. The Pressure Effect in Superconducting Tantalum. C. A. Swenson and C. H. Hinrichs. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 345-347.

Electron beam-melted Ta wire specimens are vacuum degassed by electron bombardments heating at 2900° C. and an a-c. mutual inductance technique is used to measure superconducting transition at 10,000 atm. pressure and 0.2-1.0° K. Critical field data are determined as a function of pressure and temperature, and are used to calculate electronic specific heat and estimate low temperature lattice thermal expansion. 9 ref. (P15g, P12r, P11g, M26, 2-63, 3-74; Ta)

435-P. The Critical Field Curve of Impure Mercury. H. H. Wills, R. G. Chambers and J. G. Park. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 347-349.

Superconductivity transition curves for pure and impure (1.25% Cd) Hg are determined by critical field measurements from 1.2-4.2° K. to test Anderson's theory for "dirty" superconductors based on the pairing of time-reversed "dirty" wave functions accounting for deviations from BCS theory. 5 ref. (P15g, 2-63, 3-69; Hg, Cd)

436-P. The Specific Heats of Some Zirconium Alloys. G. D. Kneip, Jr., and J. O. Betterton, Jr. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 357-358.

The specific heats of dilute hexagonal alloys of Ag, In and Sn in Zr are measured from 1.2-4.5° K. and are found to consist of an electronic and vibrational term (except for two higher compositions Zr-Sn alloys which undergo a superconducting transformation at 1.25° K.) Debye temperature obtained and equations are derived for properties using a band model. (P12r, P15g, 2-60, 2-63; Zr-b, Ag, In, Sn)

437-P. Low Temperature Heat Capacities of Superconducting B-C-C Ti-Mo Alloys. R. R. Hake. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 359-361.

Calorimetric measurements from 1.1-4.3° K. on a series of metastable Ti-Mo alloys at Mo concentrations

(6.25-8.60%) near the minimum required to stablize the b-c-c. phase. The superconducting electronic heat capacity is determined as a function of temperature and Mo concentration. Data for superconductivity transitions are correlated with predictions from the BCS theory and from a band model. 8 ref. (P12r, P15g, 2-60, 2-63; Ti-b, Mo)

438-P. Critical Current for Superconducting Niobium Wire and Ribbons in External Magnetic Fields. M. A. R. Leblanc and W. A. Little. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 362-365.

The effect of strain, shape and temperature on the critical current is measured for annealed and rolled specimens from 1.7-4.2° K. in longitudinal and transverse fields to determine the applicability of superconducting properties in electromagnets. 7 ref. (P15g, 2-63; Cb, 4-53, 4-61)

439-P. The Importance of the Differential Paramagnetic Effect in Superconductors. R. L. Falge, Jr., and R. A. Hein. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 365-367.

Application of the excessive paramagnetism occurring just below the transition temperature of superconductors as an indicator of the reversibility of the magnetization curve. Determination of PME in spherical Sn and Ta specimens from 2.13-2.93° K. by measuring the magnetic moment using a sample displacement method and by measuring the susceptibility with a-c. and d-c. ballistic mutual inductance techniques, a large hysteresis or irreversibility being found for Ta. 4 ref. (P15g, P16p, P16n, 2-63; Ta, Sn)

440-P. The Intermediate State of Tin. W. DeSorbo. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 367-370.

Observation of superconducting and normal regions in the intermediate state in polycrystalline specimens at 1.40° K. in a pulsed field by magneto-optical measurement of flux trapping using polarization methods. 10 ref. (P15g, P16, 2-63; Sn)

441-P. Anisotropy of the Interphase Surface Tension in the Intermediate State of Tin. Yu. V. Sharvin and V. F. Gantmacher. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 370-373.

The dependence of the surface tension on the orientation of the interphase boundary and the tensorial character of the anisotropy are determined by domain orientation examination for cylindrical single crystals and by torsion balance measurement of magnetic properties for monocrystalline sphere, both from 3-3.6° K. (P13h, P16c, P15g, 2-63, 3-72; Sn)

442-P. The Intermediate State Structure and Surface Energy of Mercury. C. A. Shiffman. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 373-375.

Measurements of domain distribution in the intermediate state of cylindrical specimens of pure Hg at liquid He temperatures using a small Bi probe along the surface. Ginsburg-Landau and Bardeen theories are used to calculate surface energy. 9 ref. (P13h, P16c, P15g, 2-63; Hg)

443-P. Measurement of Surface Energy in Superconductors by Intermediate State Powder Patterns. F. Haenssler and L. Rinderer. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 375-376.

Domain periodic structures are determined from photographs of powder (Cb) patterns formed on In plate specimens at 2° K. by application of an electric current to the surface in a magnetic field. 7 ref. (P13h, P15g, P16c, 2-63; In)

444-P. A Search for New Superconductors. Henry A. Fairbank and Myron Strongin. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 377-379.

Investigation of superconductivity properties of high purity unannealed specimens of Y, Mo and W from 0.035-0.07° K. with low temperatures obtained by demagnetizing salt pills. Data are given for magnetic susceptibility with no superconducting transitions being found. 8 ref. (P15g, P16n, P16p, 2-63; Mo-a, Y-a, W-a)

445-P. Superconductivity in the System Niobium-Tin. H. G. Jansen and E. J. Saur. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 379-382.

Determination of superconducting midpoint transition temperatures vacuum sintered alloys containing 50-90% Cb and admixtures of Cb_3Sn with Ta_3Sn as a function of composition. Effect of sintered density, crystal structure and physical properties on superconductivity transition. 5 ref. (P15g, 2-60, 2-63, 3-73; Cb-b, Sn-b, Ta, 6-72)

446-P. Superconducting Properties of the $(Nb, Ta, V)_3$ Sn System. G. D. Cody, J. J. Havak, G. T. McConville and F. D. Rosi. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 382-385.

Transition temperatures and widths measured for powder metallurgy produced specimens of solid solution alloys in the system as a function of composition using mutual induction methods from 6-18° K. Effect of inhomogeneity and lattice parameters on properties. (P15g, 2-60, 2-63, 3-73; Sn-b, Cb, Ta, V)

447-P. Superconductivity and Ferromagnetism in the System $GdRu_2$-$ThRu_2$. R. M. Bozorth, B. T. Matthias and D. D. Davis. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 385-389.

Critical temperatures for superconductivity and the magnetic Curie points are determined in the system of solid solutions of $GdRu_2$ in $ThRu_2$ by measurement in a weak magnetic field, using mutual inductance methods, by noting the temperature of maximum initial susceptibility and by a molecular field calculation. The presence of either ferromagnetism or superconductivity exerts a decided effect on the other. (P15g, P16d, 2-63; Ru-b, Gd, Th, 14-67)

448-P. Superconducting Transition Temperatures of Titanium and Titanium Isotopes. R. G. Netzel and J. R. Dillinger. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 389-391.

Calorimetric measurements on isotopically enriched Ti^{46}, Ti^{48}, Ti^{50} and crystal bar Ti at temperature down to -20° K. with temperature-dependent transitions being observed as a function of purity and sample metallurgy. 7 ref. (P15g, 2-60, 2-63; Ti)

449-P. Irradiation Effect on the Transition Temperature of Superconducting Tin. L. Rinderer and E. Schmid. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 395-396.

Time and temperature dependent superconductive transition temperatures as a function of irradiation lattice defects are examined by resistivity measurements on strip specimens irradiated with alpha particles at 4.2° K. Radiation defects (Frenkel pairs) are shown to be homogeneously distributed in the sample and to anneal out at room temperature. (P15g, M26s, 2-63, 2-64, 2-67; Sn)

450-P. Impurity and Strain Effects in Superconductors. Bernard Serin. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 391-393.

Measurement of the change in superconductive transition temperature of impure Sn and Al as a function of coherence length and electron mean free path as influenced by impurity content. Determination of low temperature-dependent transitions and resistivity caused by electron scattering as a function of deformation strain and heat treatment time and temperature for Al rod specimens and filings aged at room temperature and annealed at 500° C. after plastic deformation. (P15g, 2-63, 2-64, 3-68, 3-69; Sn, Al)

451-P. The Specific Heat of Superconductors Near the Critical Temperature. John F. Cochran and Pieternella Cochran. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 397-399.

Measurement of the temperature dependence of the specific heat of high-purity Sn and Ta polycrystalline specimens from 3.694-4.401° K. Data are given for resistivity and the interval of the transition shift. 6 ref. (P12r, P15g, 2-63; In, Ta)

452-P. Specific Heat of Indium Between 0.35 and 4.5° K. C. A. Bryant and P. H. Keesom. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 400-403.

Equations are derived for the lattice and electron terms of the specific heat for samples in the superconducting state with data derived from heat capacity measurements. 6 ref. (P12r, P15g, 2-63; In)

453-P. Heat Capacity of Gallium and Mercury at Temperatures Below 1° K. N. E. Phillips, R. L. Douglass and R. G. Petersen. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 403-404.

Calculations using the quadrupole coupling constant are combined with measurements at 1.2° K. to determine the electronic heat capacity of Ga in the superconducting state. The superconducting state heat capacity of Hg is measured calorimetrically from 0.1-0.5° K. and correlated with a Debye temperature of 73° K. 4 ref. (P12r, P15g, 2-63; Ga, Hg)

454-P. Thermal Conductivity of Superconductors, Al, Zn and Cd. C. B. Satterthwaite. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 405-407.

Single crystal and polycrystalline specimens of varying purity are measured in magnetic fields at 0.32° K. to determine impurity and resultant electronic mean free path effects on thermal conductivity. Measured values are compared with theoretical predictions. (P11h, P15g, 2-63, 3-69; Al, Zn, Cd)

455-P. Thermal Conductivity of Pure Indium. R. E. Jones and A. M. Toxen. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 407-409.

The thermal conductivities of polycrystalline wire specimens in the normal and superconducting states are measured from 1.5-4.2° K. The phenomena are discussed in terms of theories for thermal resistance caused by phonon scattering of electrons and for the added effect of the ratio of phonon to impurity resistance, both as a function of temperature. 6 ref. (P11h, P15g, 2-63; In-a)

456-P. Thermal Conduction in Tin and Indium. A. M. Guenault. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 409-412.

Investigation of the thermal conductivity of single crystal specimens of varying purity and orientation from 2.4-4.2° K. in the superconducting state without a magnetic field and in the normal state in a field greater than the critical field. Thermal conduction phenomena are discussed in terms of impurity and electron scattering, both as a function of temperature. 4 ref. (P11h, P15g, 2-63, 3-69, 3-72; In, Sn, 14-61)

457-P. Size and Impurity Effects in Nuclear Spin Relaxation in Superconductors. Yoshika Masuda and A. G. Redfield. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 412-413.

Measurement of nuclear relaxation rate in pure Al, Al-0.3% Zn and colloidal Al from 0.5-3.00° K. as affected by impurity and particle size to investigate the density of states near the energy gap. Results for the experiments are affected by the impurities causing strain-induced electric field gradients which interact with the nuclear electric quadrupole moments and influence the nuclear relaxation process. 4 ref. (P15g, P18m, 2-63, 3-69; Al-b, Zn)

458-P. Thermodynamic and Vibrational Properties of Simple Solids at Low Temperatures. T. H. K. Barron. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 655-670.

Review of theoretical analyses and experimental measurements of lattice and electronic vibrations as a function of low temperature in transition and alkali metals, ionic alkalides and organic

compounds in solid and thin film forms to predict thermodynamic properties and to correlate them with each other and properties of the solid. Application of thermal and metallographic methods at below 1-300° K. and harmonic and anharmonic oscillation theories to determination of properties. 24 ref. (P11, P12, M-general, 2-63, 10-54)

459-P. The Debye Temperature of Beta-Tin From Elastic Constant Measurements at 4.2° K. B. S. Chandrasekhar and J. A. Rayne. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 672-675.

Measurements on single crystals specimens of 99.999% purity having various orientations from 4.2-300° K. with the Debye temperature being obtained numerically by directly diagonalizing the propagation matrix at 4.2° K. for 450 directions in the solid defined by polar co-ordinates referred to the C-axis. Results are compared with calorimetric data. 5 ref. (P12r, Q21, 2-63, 3-72; Sn, 14-61)

460-P. The Electronic Heat Capacity of Potassium, Rubidium and Cesium. W. H. Lien and N. E. Phillips. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 675-677.

A temperature scale obtained by extrapolation of the susceptibility of copper potassium sulphate from above 1° K. according to a Curie-Weiss law are used with experimental methods to obtain the electronic heat capacity for K, Ru and Cs from 0.25-1.0° K. The effective mass ratio is compared with band theory. 9 ref. (P12r, M25, P16, 2-63; K, Rb, Cs)

461-P. Thermal Expansion of Solids at Low Temperatures. G. K. White. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 685-688.

Capacitance measurements from 1.5-10° K. on Be specimen cylinders in OFHC Cu cells. Thermal and electronic expansion coefficients and Gruneisen anharmonicity parameters are determined with data given for Al, Fe and Pb. 8 ref. (P11g, Q21, 2-63; Al, Fe, Pb)

462-P. Thermal Expansion of Aluminum at Low Temperatures. C. P. Abbiss, Eva Huzan and G. O. Jones. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 688-689.

The coefficient of thermal expansion and the Gruneisen anharmonicity parameter are determined for Al crystals below 10° C. using a method employing the optical lever principle. 7 ref. (P11g, M23, Q21, 2-63; Al, 14-61)

463-P. The Coefficient of Linear Expansion and Gruneisen Parameter of Cu, Ag, Au, Fe, Ni and Al From 4° K. to 300° K. D. B. Frazer and A. C. Hollis. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 689-692.

Interferometric determination of thermal expansion in annealed, thick-walled cylindrical tube specimens with the Gruneisen anharmonicity constant being determined from elastic constant data. 6 ref. (P11g, M21g, Q21, 2-63; Cu, Ag, Au, Fe, Ni, Al)

464-P. Specific Heat of Dysprosium Metal. J. G. Dash, R. D. Taylor and P. P. Craig. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 705-706.

Measurements on samples cooled by demagnetization of Ce-Mg nitrate from 0.25-2° K. The specific heat has a hyperfine contribution and an anomaly in the entropy is observed which is compared to Gd and Tb at higher temperatures. (P12r, P12s, M25, 2-63; Dy)

465-P. (Russian.) Some Theoretical Problems on Cast Iron Heat Resistance. F. N. Tavadze. Liteinoe Proizvodstvo, Mar. 1961, p. 31-34.

Investigation of 60 high-frequency electric furnace melted cast iron specimens containing Cr, Mn, Si and C in varying amounts at temperatures of 600, 700 and 750° C. Determination of phase transformations, crystallization, hardness, mechanical heat resistance, creep resistance and growth under the influence of heat and oxidation. 27 ref. (P11h, N-general, Q29, Q3; CI)

466-P. The Thermodynamics of Activated Processes at High Pressures. Robert W.

Keyes. Paper from "Progress in Very High Pressure Research". John Wiley & Sons, Inc., New York 16, 1961, p. 70-81.

Analysis of the atomic defects responsible for the phenomena of diffusion and ionic conduction. Application of the strain energy model of lattice imperfections for calculating the changes in entropy and volume of activation. Tabulation of activation parameters for diffusive processes in solid AgBr, Na, Pb, white P, Ag, Li, V, Fe and Ag-Zn. Comparison of atomic activation with electronic activation. 23 ref. (P12, P13a, M26s, N1, 3-74)

467-P. Some Experiments at High Pressures and Low Temperatures. C. A. Swenson. Paper from "Progress in Very High Pressure Research". John Wiley & Sons, Inc., New York 16, 1961, p. 195-202.

High pressure techniques used to obtain the equation of state and thermodynamic functions of solids such as Na, or Ta as a function of temperatures and volume. Measurement of the pressure dependence of the critical field curve using an apparatus in which solid He applies pressures up to 2500 atm. to superconductors at liquid He temperatures. 18 ref. (P12, P13, P15g, 2-63, 3-74; Na, Ta)

468-P. Effect of Pressure on EMF of Thermocouples. F. P. Bundy. Paper from "Progress in Very High Pressure Research". John Wiley & Sons, Inc., New York 16, 1961, p. 256-265.

Absolute pressure thermal emf.'s are measured for constantan, Pt, Ni, alumel, 10% Rh, Cu, chromel and Ni 18% Mo for a temperature change of 100-1200° C. at pressures of 0-100,000 atm. (P15g, P15j, X9q, 2-61, 3-74)

469-P. Effects of Pressure on Magnetic Interactions in Metals. J. S. Kouvel and R. H. Wilson. Paper from "Progress in Very High Pressure Research". John Wiley & Sons, Inc., New York 16, 1961, p. 271-286.

Pressure dependence of magnetic interactions such as Curie temperature, saturation magnetization and magnetic moment are measured for specimens of Fe, Ni and their alloys and for a single Si-Fe crystal at 3000 atm. from 293-800° K. 34 ref. (P16, 2-61, 3-74; Fe-b, Ni-b, Si)

470-P. The Emittance of Stainless Steels. W. D. Wood, H. W. Deem and C. F. Lucks. Defense Metals Information Center, Battelle Memorial Institute, DMIC Memo. 111, June 12, 1961, 67 p. (Available as PB 171630 from U. S. Office of Technical Services, Washington 25, D.C.)

Compilation of test data on emittance, reflectance and absorptance of 18-8 stainless steel, Type 300 and 400 series, 17-7 PH, PH 15-7 Mo and Vickers FDP stainless steels. Data are separated according to material and to the type of measurement, spectral or total. 15 ref. (P17; SS, 10-54)

471-P. The Variation of the Surface Tension of Nickel With Crystallographic Orientation. H. Mykura. Acta Metallurgica, v. 9, June 1961, p. 570-576.

Interference microscopy is used to measure the grooves formed during heat treatment (1000° C., 50 hr. in vacuum) at the intersection of twin boundaries with the surface. The orientation derivatives of the surface tension are obtained from the interferograms. By graphical integration of the graphs of these derivatives plotted against orientation, the orientation dependence of the surface tension is obtained. 12 ref. (P13h, M21, 2-64, 3-72; Ni)

472-P. Theory of Al-Zn Alloy Resistivity During Pre-Precipitation. M. Asdente. Acta Metallurgica, v. 9, June 1961, p. 587-589.

The electrical resistivity of Guinier-Preston zones in Al-Zn is calculated as a function of zone radius for 50-100% Zn concentrations within the zone using an approximation by the partial wave method. The usual hypotheses of zone formation and growth are modified to suggest that the early stages of zone growth will yield a resistivity maxium. 11 ref. (P15g, N7, 2-60, 3-73; Al-b, Zn-b)

473-P. The Effect of Impurity Absorption on the Surface Energy and Surface Self-Diffusion in Nickel. J. M. Blakely and H. Mykura. Acta Metallurgica, v. 9, June 1961, p. 595-599.

Striations observed on Ni heated in vacuum at 900° C. The distribution of striating orientations suggests the presence of point cusps in the plot of surface free energy at (100),

(110) and (210) orientations and a line cusp between (410) and (510). Surface diffusion is fast at (110) and for atomically rough planes between (410) and (210) in addition to smooth (100) and (111) planes. Both effects are ascribed to impurity absorption. 7 ref. (P13h, N1d, 2-62, 3-69, 3-72; Ni)

474-P. (French.) Determination of the Diffusivity Coefficient of Metals and Semiconductors. Jean Oualid. Journal de Physique et le Radium, v. 22, Feb. 1961, p. 124-126.

Computation of the coefficient of thermal diffusivity from the heat quantity supplied to the end of an infinitely long strip or film of a metal, the side edges of which are heat insulated, the contribution of free electrons to the diffusivity, thermal conductivity and the temperature measured at a known distance from the heated end. 5 ref. (P11m, 1-54; EG-j31)

475-P. (French.) Nuclear Resonance in Cobalt Powders. G. Berthet and J. Dupuis. Archives des Sciences, v. 13, Sept. Sept. 12-16, 1960, p. 422-424.

Description of electronic equipment used in nuclear resonance measurements. The particle size of the powder tested is 2-5 microns and it shows 59% cubic as well as hexagonal structure. (P18m, 1-54; Co)

476-P. (English.) Nuclear Magnetic Resonance in Vanadium Alloys. L. E. Drain. Archives des Sciences, v. 13, Sept. 12-16, 1960, p. 425-432.

Change of V^{51} resonance in dilute solid solutions of Cr, Mn, Fe, Co or Ni in V as a function of concentration. Effect of transition metal character of the solute. 9 ref. (P18m, 2-60; V-b, Cr, Mn, Fe, Co)

477-P. (French.) Nuclear Magnetic Resonance of Fe^{57} in the Local Field of Metallic Iron. C. Robert and J. M. Winter. Archives des Sciences, v. 13, Sept. 12-16, 1960, p. 434-435.

The nuclear resonance of Fe^{57} present in the quantity of 2.25% in a Fe sample is determined by observing the dispersion of Mossbauer rays. Effects of temperature and applied magnetic field. 5 ref. (P18m; Fe)

478-P. Industrial Uses of the Platinum Metals. A. G. Dowson. New Scientist, v. 10, June 29, 1961, p. 796-799.

Review of the corrosion and oxidation resistance and catalytic activity of Ru, Rh, Pd, Os, Ir and Pt. Application of these metals in the chemical, electric, glass, petroleum and drug industries. (P13c, R-general, T-general, 17-57; EG-c, 10-54)

479-P. Research in Beryllium. W. D. Bennett. Canadian Metalworking, v. 24, July 1961, p. 29-31.

Physical and mechanical properties; machining and welding procedures; future applications. (P-general, Q-general, G17, K-general; Be, 17-57)

480-P. The Debye Temperature of Carbonyl Iron. Charles P. Gazzara. Paper from "Advances in X-Ray Analysis", v. 4. Plenum Press, New York, 1961, p. 93-107.

The Debye characteristic temperature is determined as being between 433 and 445° K. at an ambient temperature of 310° K. from an X-ray diffraction study utilizing both monochromatized and filtered radiation by both stationary and scanning slit methods. 26 ref. (P12r, M22g; Fe-a)

481-P. The Specific Heat of Hyper-Eutectoid Steel. B. Gregory and H. J. Bray. Metallurgia, v. 63, June 1961, p. 276-278.

Technique for the derivation of specific heat values for hypereutectoid steel from 500-1000° C. involves accurate thermal analysis from which it is possible to derive a differential area curve and subsequently the specific heat curve using a radiation relationship. 6 ref. (P12r, M23r, 2-61; AY)

482-P. (Translation-Brutcher no. 4989.) Solubility of Certain Transition Metals in Aluminum. V. M. Glazov, G. P. Lazarev and G. A. Korol'kov. Metallovedenie i Termicheskaya Obrabotka Metallov, Oct. 1959, p. 48-50.

Previously abstracted from original. See item 16-P, 1960. (P12e, Q29q; Al-b, Zr, Cb, Ta)

483-P. (German.) Copper and Copper Alloys. Pt. 3. Properties. A. Schwarz. Draht, v. 12, May 1961, p. 227-232.

Review of electrical, thermal and mechanical properties, corrosion and

scaling resistance, microstructure and structural changes (recrystallization) of Cu and Cu alloys. Influence of alloying elements on properties. 45 ref. (P-general, M27, N5, Q-general, R-general, 2-60; Cu)

484-P. (Translation-ConBur.) Thermodynamic Properties of Liquid Metallic Solutions in the Systems Zn-Bi and K-Cd. M. F. Lantratov and E. V. Tsarenko. Journal of Applied Chemistry of the USSR, v. 33, May 1960, p. 1107-1117.

Thermodynamic properties of the systems are calculated from the values of emf. and temperature coefficients of emf. of the concentration cell. The Zn-Bi system is studied from 420-800° C. for atomic fractions of 0.144-0.9664 Zn and the K-Cd system is investigated from 475-575° C. for atomic fractions of 0.025-0.95 K. 24 ref. (P12, P15j, 2-60, 2-61; Bi-b, Zn, Cd-b, K, 14-60)

485-P. (Japanese.) Standardization of Testing Methods for Lead Solder Wettability by Contact Angles. Ken'ichi Goto and Seinosuke Sugawara. Metal Finishing Society of Japan, Journal, v. 12, May 1961, p. 173-181.

The contact angles of melted Pb-Sn solder drops on test metal surfaces are measured by goniometer during standardized heating and melting procedure. Determination of effects of Pb-Sn ratio, melting temperature, cleanness of metal surface and type of metal and flux on wettability. (P13h, 2-60, 2-61; Pb-b, Sn-b, SGA-f)

486-P. (Translation.) Investigation of Thermal Expansion of GaAs and ZnSe. S. I. Novikova. Soviet Physics--Solid State, v. 3, July 1961, p. 129-130. (Translation of Fizika Tverdogo Tela, v. 3, Jan. 1961, p. 3-310).

Investigation carried out by using a quartz dilatometer. The GaAs sample is smelted from spectroscopically pure elements and the ZnSe samples are compressed, in a N atmosphere, into cylinders 4.78 mm. long which are annealed at 1350° C. Results correspond to the increase in strength of the ionic components of the bonds. (P11g; Ga-b, As, Zn-b, Se, 14-68)

487-P. The Effects of Alloying Elements in Titanium. Volume B. Physical and Chemical Properties, Deformation and Transformation Characteristics. D. J. Maykuth, F. C. Holden, D. N. Williams, H. R. Ogden and R. I. Jaffee. Defense Metals Information Center, Battelle Memorial Institute, DMIC Report 136B, May 29, 1961, 150 p. (Available as PB 171424 from U. S. Office of Technical Services, Washington 25, D. C.)

Diffusion of interstitial and substitutional elements. Effects of alloying additions on deformation mechanisms and textures, recovery, recrystallization and grain-growth characteristics. Reaction kinetics of Ti alloys in terms of effects of alloying additions on martensitic, beta-to-alpha, beta-to-omega and/or eutectoid transformation temperatures. 169 ref. (P-general, Q24, N-general, 2-60; Ti-b)

488-P. (Translation-ConBur.) Investigation of the Thermo-Dynamic Properties of Liquid Metallic Solutions in the Potassium-Mercury System. M. F. Lantratov and E. V. Tsarenko. Journal of Applied Chemistry of the USSR, v. 33, July 1960, p. 1524-1530.

Results of emf. measurements of K/glass/K-Hg concentration cells are used to calculate the partial and integral thermodynamic characteristics for the K-Hg system from 250-350° C. and composition of 0.04992-0.898 volume fraction K. Formation of the alloys is found to be accompanied by an exothermic heat effect. 20 ref. (P12, 2-60, 2-61; K-b, Hg-b, 14-60)

489-P. Platinum Alloy Permanent Magnets. R. A. Mintern. Platinum Metals Review, v. 5, July 1961, p. 82-88.

Magnetic properties, hardness, linear expansion coefficient, corrosion resistance and applications of Platinax II magnetic alloy of the Co-Pt system. The alloy can be machined, rolled or drawn into complex shape or very small magnets without difficulty. Magnetizing procedure. Effect of temperature cycling. 7 ref. (P16, P11g, Q29n, R-general; Pt-b, Co, SGA-n)

490-P. (Russian.) Factors Increasing the Thermoelectric Properties of a Semiconductor Type Zn-Sb Alloy. D. I. Lainer and L. M. Golubtsova. Tsvetnye Metally, Feb. 1961, p. 69-74.

Effect of Ag, Cd, In, Sn, Te, Bi, Pb, Cu, Si, Ge, Al and Fe present in quantities up to 1.50% in a Sb-Zn

alloy containing 35% Zn on thermoelectric effect and conductivity, microstructure and phase diagrams. 7 ref. (P15g, P15j, M27, 3-69; Sb-b, Zn, EG-j)

491-P. The Polarization of Metals in Boiling, Distilled Water. J. E. Draley, F. E. DeBoer and C. A. Youngdahl. Electrochemical Society, Journal, v. 108, July 1961, p. 622-628.

Samples of Al, Ti, V, Cr, Fe, Co, Ni, Cu, Y, Cb, Mo, Ag, Sn, Ta, Pt and Au are placed in contact with boiling, distilled water. Polarization curves are obtained by continuously increasing the applied current at a constant rate for about 10 min. and measuring the potential about 10 times per sec. 9 ref. (P15, R4)

492-P. Anodic Polarization Curves in Molten Carbonate Electrolysis. George J. Janz and Fumihiko Saegusa. Electrochemical Society, Journal, v. 108, July 1961, p. 663-669.

Curves for Pt, Au and Ag in molten (Li, Na, K) CO_3 at 500-900° C. are obtained with a kinetic analysis of possible process contributing to anodic oxygen evolution. 18 ref. (P15, R6m, 2-62; Pt, Au, Ag)

493-P. (German.) Metallurgical Aspects of High-Pressure Technology. Technica, v. 10, June 9, 1961, p. 782.

Physical properties of pure metals (melting and transition temperatures) and metal alloys (solubility relations) as influenced by high pressures. Technical applications of pressure relations in construction of high-pressure cells, pressure gages, control of precipitation hardening and elimination of dislocations. (P-general, 3-74)

494-P. (German.) Influence of Cu Additions on Thermal Expansion of Fe-Ni-Co Alloys. Horst Ringpfeil and Otto Henkel. Neue Hutte, v. 6, May 1961, p. 310-316.

Dilatometric investigation of thermal (-180 to 650° C) expansion of Fe-Ni-Co (45% Co+Ni) alloy with 0-11% Cu additions. Microstructure, microhardness and X-ray examination of martensite formation. 4 ref. (P11g, M23b, M-general, N6q, 2-61; Fe-b, Ni, Co)

495-P. (German.) Measurement of Heats of Mixing as Influenced by Temerature in Binary Metal Melts Using an Adiabatic High-Temperature Calorimeter. Erich Scheil and Hans Leo Lukas. Zeitschrift fur Metallkunde, v. 52, June 1961, p. 417-422.

Measurement of enthalpy of mixing in formation of binary solution for the system Sb-Zn as influenced by concentration and for the systems In-Pb, Tl-Pb and Cd-Sb as influenced by concentration and 300-600° C. temperature. (P12r, 2-60, 2-61; Cd-b, In-b, Pb-b, Sb-b, Tl-b)

496-P. (German.) Diffusion After Effect of Permeability in Iron-Nickel Alloys. Dieter Gerstner and Eckart Kneller. Zeitschrift fur Metallkunde, v. 52, June 1961, p. 426-436.

Magnetic investigations on multicrystalline Fe-Ni (50-85% Ni) specimens including measurement of initial permeability as a function of time during isothermic annealing at 300° C. to Curie temperature; magnetic saturation and electrical resistance as function of time during isothermic annealing at 460° C.; and permeability as a function of field strength from 20-800° C. and field strengths of up to 1 Oe. (P16q, P16d, Ni, 2-61, 2-64, 3-67; Fe-b, Ni, SGA-n)

497-P. Influence of Some Platinum Metals on the Wettability of Silver. J. B. Adamec and R. N. Rhoda. Welding Journal, v. 40, July 1961, p. 330s-336s.

Wetting tests at 1200° C. with Ag alloys containing up to 20% Pd, Pt and Ru. Nature of films formed on Inconel and Inconel X alloys in wet and dry Ar and H atmospheres and their effects on wetting. 10 ref. (P13h, 2-60; Ag-b, Pt, SGA-f, Ni-b)

498-P. Hybrid Metals Tame Corrosive Chemicals, Deadly Radiation. Asarco Digest, v. 3, no. 1, p. 20-22.

Heat resistance, strength and heat transfer ability are imparted to Pb by bonding it metallurgically to a base metal of Al, Cu, low-carbon steel, stainless steel and Ni alloys. Composites provide shielding requirements of the nuclear industry and pressure-corrosion resistance requirements in the chemical processing field. (P11g, P11k, L22, Q27a; Al, Cu, CN, SS, Ni-b, Pb)

499-P. Thermal Properties of Indium Selenide. Tatsuo Yoshioka. Tohoku University, Science Reports, v. 44, Nov. 1960, p. 99-102.

Specific heat, heat absorption and thermal expansion of $InSe_{1.25}$, 1.5, 1.75, 2.00 are measured from 20-300° C. (P12r, P11g; In-b, Se)

500-P. (German.) A New Chromium-Free Iron-Nickel Alloy for Microwave Tube Manufacture. W. Dusing. Telefunken Zeitung, v. 34, Mar. 1961, p. 64-68.

Investigation of Fe-Ni-Cu and Fe-Ni-Mn alloys to determine thermal expansion and residual stresses after melting in glass and effect of electroplating with Ag and Au with subsequent sintering to increase density. (P11g, L17c, Q25h, T1j; Fe-b, Ni, 17-57)

501-P. (German.) Determination of Specific Heat of Sodium and Potassium Amalgam. J. Balej and J. Vondrak. Collection of Czechoslovak Chemical Communications, v. 26, Mar. 1961, p. 881-883.

Calorimetric measurement of specific heat of liquid NaHg and Na-K amalgams at 20-50° C. (P12r; Na-b, K, Hg, 14-60)

502-P. (French.) Study of the Expansion of Zircaloy-2 Tubes on Steel. J. Jay, J. Dreuilhe and P. Thome. Revue de Metallurgie, v. 58, Apr. 1961, p. 351-362.

Determination of the expansion characteristics of Zircaloy-2 tubes--18-8 steel sheath assemblies at 60-950° C. in a nuclear reactor. A mandrel is used for testing the tightness of the joint. Replacement of this assembly while the reactor is operating is performed by remote manipulation. (P11g, 1-54, W11p; Zr-b, 4-60, SS, 4-53)

503-P. (Book-Translation.) Soviet Electrochemistry. v. 2. Oxidation and Reduction. 1961. 264 p. Consultants Bureau, Inc., 227 W. 17th St., New York 11, N. Y.

Proceedings of the Fourth Conference on Electrochemistry (Oct. 1-6, 1956) published by the Academy of Sciences of the USSR Press, Moscow, 1959. Topics include mechanisms and kinetics of electrodeposition, electroreduction, electrosolution, oxygen overvoltage, electrochemical oxidation and passivity and corrosion. (P15, A-general, L-general, 10-54)

504-P. (Russian.) Separation of Components of Alloys With Variation in Temperature. D. S. Kamenetskaya. Doklady Akademii Nauk SSSR, v. 137, Jan. 1961, p. 94-95.

Variation of free energy during redistribution of components in the process of thermal diffusion is investigated as a function of concentration and temperature. (P12a, 1-54, P11, 2-60, 2-61)

505-P. (Russian.) Anomaly in the Electroresistivity of Cold Deformed Fe_3Al Alloy Observed in Heat Treatments at Moderate Temperatures. Ya. P. Selisskii. Fizika Metallov i Metallovedenie, v. 10, Dec. 1960, p. 829-834.

Samples containing 8.3-13.9% Al, 0-0.2% Mn, 0-0.2% Si, 0.02% C and balance Fe are subjected to cold deformation of 6.5-88.8% and subsequently held at 150-250° C. for up to 8 hr. Effects of degree of deformation and heat treatment time and temperature on electrical resistivity are attributed to change of the electron structure resulting from diffusion. 10 ref. (P15g, N1, 2-61, 2-64, 3-68; Fe-b, Al)

506-P. (Russian.) Determination of the Enthalpy and Specific Heat of Beryllium From 600-2200° K. P. B. Kantor, R. M. Krasnovitskaya and A. N. Kisel'. Fizika Metallov i Metallovedenie, v. 10, Dec. 1960, p. 835-837.

Calorimetric measurements on Be samples of 99.8% purity with enthalpy and specific heat determined as functions of temperature. 7 ref. (P12r, P12s, 2-61; Be)

507-P. The Thermoelectric Power of Magnesium-Cadmium Alloys. Seiichiro Noguchi. Physical Society of Japan, Journal, v. 16, June 1961, p. 1145-1150.

Measurements are made relative to pure Cu from 20-300° C. and over the entire range of composition. Data are analyzed by a band model approximation to determine band structure of the alloys. 19 ref. (P15j, 2-60, 2-61; Cd-b, Mg-b)

508-P. The New Magnetic Phase in Manganese-Aluminum-Nickel System. Ichiro Tsuboya and Makoto Sugihara. Physical Society of Japan, Journal, v. 16, June 1961, p. 1257.

Magnetic properties, structure and composition are determined for a

magnetic cubic phase formed in the alloy by annealing at 900° C. in vacuum and cooling to room temperature at a rate of 150° C. per hr. (P16, M24c, 2-62; Al-b, Ni-b, Mn-b)

509-P. Magnetic Properties of B8 Type Compounds in Manganese-Tin System. Mitsuru Asanuma. Physical Society of Japan, Journal, v. 16, June 1961, p. 1265-1266.

Data on the variation of magnetic moments of the system as a function of composition are used to estimate the magnetic moments of Mn atoms in each lattice site. (P16, M26, 2-60)

510-P. (Italian.) Characteristics and Applications of Metallic Alloys in the Foundry. Dario Fortino. Fonderia Italiana, v. 10, May 1961, p. 174-178.

Physical and mechanical properties and corrosion resistance are discussed for Al, Mg, Zn and Cu alloys in foundry applications. Nicro-Silal, Ni-Resistal and Ni-Hard, high corrosion resistant and nonmagnetic alloys are reviewed in terms of applications in the chemical industry. (P-general, Q-general, R-general, T29; CI, Al-b, Mg-b, Zn-b, Cu-b, Ni-b, 17-57)

511-P. (Translation-ConBur.) The Problem of the Penetration of Silver Into Tungsten. V. I. Rakhovskii, A. P. Lyubimov and V. M. Garmash. Academy of Sciences of the USSR, Proceedings, Physical Chemistry Section, v. 135, Nov-Dec. 1960, p. 1139-1141.

Tungsten sheets are held in liquid radioactive Ag at elevated temperatures for extended periods to establish the possibility of penetration of Ag into W. Measurements of the sample activity are then used to determine the total amount of penetration. (P10m, R6m, 1-54; W, 4-53, Ag)

512-P. (German.) Causes of Increasing Coercive Force in Decreasing the Thickness of Ferromagnetic Sheets. W. A. Saikowa and Ja. S. Schur. Physikalische Abhandlungen aus der Sowjetunion, v. 4, Mar. 1961, p. 195-205.

Measurement of coercive force on cold rolled and electrolytically eroded single crystal and polycrystalline Fe-Si (3.5% Si) and 78-Permalloy specimens of various orientations and investigation of domain structure from -195 to 400° C. 13 ref. (P16a, P16c, 2-61, 3-72, 3-73; Fe-b, Si, Ni-b)

513-P. (German.) Fermi Surface of Tin. N. Je. Alexejewski, Ju. P. Gaidukow, I. M. Lifschiz and W. G. Pestschanski. Physikalische Abhandlungen aus der Sowjetunion, v. 4, Mar. 1961, p. 232-248.

Galvanomagnetic measurements of resistivity of zone-refined single crystal Sn disk specimens at 4.2° K. using a magnetic field of up to 27,000 A. per cm. for establishment of the geometry of the Fermi surface. 6 ref. (P15, P16, 2-63; Sn, 14-61)

514-P. The Knight Shift of Cd in Some Alloys With Group IB and IIB Metals. R. F. Grant and W. G. Henry. Canadian Journal of Physics, v. 36, June 1961, p. 841-844.

The Knight shift of the Cd^{111} and the Cd^{113} resonance in the primary solid solutions of Ag, Au, Mg, Zn and Hg in Cd are investigated. The effect of the solute metal on the Knight shift of the solvent is discussed in terms of the charge displacements. 15 ref. (P16, 2-60; Cd-b, Ag, Au, Mg, Zn, 14-67)

515-P. (Russian.) Enthalpy of Chromium and Several Chromium-Bearing Iron Alloys at High Temperatures. R. P. Krentsis, P. V. Geld and N. N. Serebrennikov. Izvestiya VUZ--Chernaya Metallurgiya, Dec. 1960, p. 5-11.

Enthalpy measurements and specific heats from 0-1600° C. investigated for aluminothermic Cr (98.66%), carbonless Fe-Cr, nitrided Fe-Cr and Cr-Al alloy containing 63.91% Cr, 18.11% Al and 16.55% Fe. 20 ref. (P12r, 2-61; Cr-b, Fe-b, Al)

516-P. (Russian.) Effect of Alloying Elements on Surface Properties of Iron. B. V. Tsarevskii and S. I. Popel'. Izvestiya VUZ--Chernaya Metallurgiya, Dec. 1960, p. 12-16.

Investigation of surface tension, contact angle, adhesion and adsorbtion of Fe-Si, Fe-Mn, Fe-Ni, Fe-Cr and Fe-O alloys on an Al_2O_3 surface utilizing the stationary drop method in an Ar atmosphere at a test temperature of 1560° C. Relation of properties to alloy composition. 14 ref. (P13h, 1-54; Al-b, Fe-b)

517-P. Effect of Magnetic Clusters on the Specific Heat of Ni-Cu and Fe-V Alloys.

K. Schroeder. Journal of Applied Physics, v. 32, May 1961, p. 880-882.

Review of data for specific heat measurements at 2-18° K. for 59-64% Cu-Ni and 70-76% V-Fe alloys with equations derived by an Einstein function for a new term, in addition to the lattice and electronic terms, on the basis of ferromagnetic clusters. 14 ref. (P12r, P16, 2-63, 3-71; Cu-b, Ni, V-b, Fe)

518-P. (German.) Temperature Hysteresis in Domain Structure of Iron-Silicon Crystals. Ja. S. Schur and I. Je. Starewa. Physikalische Abhandlungen aus der Sowjetunion, v. 4, Mar. 1961, p. 182-194.

Investigation of irreversible change of domain size during temperature cycling (20-550° C.) under vacuum using 1250° C. vacuum annealed disk shaped Fe-Si (3.5% Si) single crystals and polycrystalline specimens of 0.03-0.07 mm. thickness. 8 ref. (P16a, P16c, 2-61; Fe-b, Si)

519-P. The Market for Special Materials and Metals. D. A. Boettcher. Industrial Challenge of Nuclear Energy. Stresa Conference. Pt. 3. Organization for European Economic Co-Operation, European Nuclear Energy Agency, p. 77-90.

Radiation resistance, neutron capture cross section, cost and applications are given for Zr, Hf, Be, Ca, Mg, Cb, Zircaloy, steels, Al alloy, Sm, Gd and Eu. Permeability, density and temperature resistance are given for graphite moderator material. (P16, P17, P18, T11h; SGA-g, SGB-p)

520-P. Electrochemical Applications of Platinized Titanium. Charles E. Tirrell. Crucible Titanium Review, v. 9, July 1961, p. 2-6.

Physical properties of Pt-coated Ti anodes include "electrolytic valve" properties of Ti which passivates when made anodic in most electrolytes forming a thin, tenacious, nonconducting oxide layer on the surface. Applications include membrane cells and impressed current marine cathodic protection systems as well as potential use in caustic-chlorine industry. 11 ref. (P15; Ti, Pt, SGA-g, 17-57)

521-P. Thermal Expansion of Technical Solids at Low Temperatures. R. J. Corruccini and John J. Gniewek. U. S. Dept. of Commerce, National Bureau of Standards Monograph 29, May 19, 1961.

Tables are given of the linear concentration relative to 293° K. and the linear expansion coefficient of 35 elements, 45 alloys, 22 other inorganic substances and 20 plastics and elastomers from 0-300° K. (P11g)

522-P. Anodic Polarization of Stainless Steel in Chloride Solutions. G. M. Schmid and Norman Hackerman. Electrochemical Society, Journal, v. 108, Aug. 1961, p. 741-744.

Polarization curves are obtained for 18-8 stainless steel in KCl solution up to 1N. Maxima in the potential-time curve depend on solution pH. 16 ref. (P15; SS)

523-P. Thermodynamics of the Interaction of Niobium and Tantalum With Oxygen and Nitrogen at Temperatures Near the Melting Point. J. Paul Pemsler. Electrochemical Society, Journal, v. 108, Aug. 1961, p. 744-750.

Concentration of N and O in Cb and Ta in equilibrium with the pure gases is determined as a function of pressure at three temperatures near the melting point and at the melting point. Data are used to calculate thermodynamic constants. 12 ref. (P12d, P12n, N16; Cb, Ta)

524-P. (German.) Influence of Electrolytically Precipitated Hydrogen on Magnetization of Nickel. H. J. Bauer and E. Schmidbauer. Naturwissenschaften, v. 48, June 1961, p. 425.

Measurement of magnetic saturation and remanence of Ni foils and layers electrolytically deposited on Cu. Magnetization as a function of hydrogen charge. (P16a, 2-66; Ni, 8-62)

525-P. Thermal Coefficients of EMF of the Silver (I) and the Silver (II) Oxide-Zinc-45% Potassium Hydroxide Systems. Stanley Hills. Electrochemical Society, Journal, v. 108, Aug. 1961, p. 810-811.

Coefficients are calculated at -0.000169 and +0.0000570 v. per ° C. for cells with mono and divalent Ag, respectively, along with other electrochemical data and thermodynamic values. (P12r, P15g; Ag, Zn)

526-P. (Russian.) Heat Content and the Heat Required for Melting of Medium and High-Alloy Steels. N. N. Serebrennikov, P. V. Gel'd and R. P. Krentsis. Izvestiya VUZ--Chernaya Metallurgiya, Mar. 1961, p. 5-10.

Investigation of high-alloy (austenite base) and medium-alloy (ferrite-carbide base) steels to find their heat holding capacity, heat content from 0 to 1600° C. and the heat required to melt them. 7 ref. (P12r, P12n, 1-54; SS)

527-P. (Russian.) Influence of Carbon, Sulphur and Silicon on the Surface Tension of Cast Iron. K. I. Vashchenko and A. P. Rudoi. Izvestiya VUZ--Chernaya Metallurgiya, Mar. 1961, p. 11-15.

Measurement of pressure inside a bubble to determine influence of C, Si and S on the surface tension of molten synthetic cast iron of various compositions from 1300-1500° C. with various amounts of thermodynamic activity at the surface. 6 ref. (P13h, 2-62, 3-69; CI, C, Si, S)

528-P. (Russian.) Abnormal Change of the Properties of Chromium at Room Temperature. N. N. Myuller, E. E. Orlovskaya, E. V. Panchenko and E. M. Strug. Izvestiya VUZ--Chernaya Metallurgiya, Mar. 1961, p. 134-137.

Investigation of various compositions at various temperatures (-20 to 140° C.) to determine changes in volume, electrical resistance and emf. forces. (P10a, P15g, 2-60, 2-61; Cr)

529-P. (Italian.) Research on the Electrochemical Behavior of Metallic Monocrystals. Guido Poli and Bruna Rivolta. Rendiconti, v. 94, Nov. 1960, p. 299-308.

Study of cathodic-anodic behavior of Ag monocrystal electrodes in AgCN, AgI and AgCNS solutions at 25° C. having the active surface oriented according to the crystallographic planes (111), (110) and (100). Effects of crystallographic orientation and the nature of the solution on electrolytic overvoltage of the Ag ionic exchange. (P15, 2-66, 3-72; Ag, 14-61)

530-P. (Translation.) Investigation of the Surface Properties of Germanium at Different Temperatures. Pt. 1. Amplitude Characteristics. V. G. Litovchenko and V. I. Lyashenko. Soviet Physics--Solid State, v. 3, July 1961, p. 44-52. (Translation of Fizika Tverdogo Tela, v. 3, Jan. 1961, p. 3-310.)

Temperature dependence at 170-305° K. of the field effect, zone bending, work function, field effect mobility, surface electron state energy and surface electron state concentration. 39 ref. (P-general, 2-61; Ge)

531-P. (Translation.) Investigation of the Surface Properties of Germanium at Different Temperatures. Pt. 2. Kinetics of the Processes. V. G. Litovchenko and V. I. Lyashenko. Soviet Physics--Solid State, v. 3, July 1961, p. 53-64. (Translation of Fizika Tverdogo Tela, v. 3, Jan. 1961, p. 3-310.)

Kinetics of the field effect and photoconductivity. Temperature dependence at 170-305° K. of hole and electron capture cross sections, field effect, photoconductivity relaxation times, activation energy and concentration of surface levels. 46 ref. (P-general, 2-61; Ge)

532-P. Kinetics of Adsorption of Iodide and Sulfate Ions on Copper. H. J. Arnikar and O. P. Mehta. Journal of Scientific and Industrial Research, v. 20B, May 1961, p. 209-212.

The time rate of adsorption is determined at 25° C. in KI and K_2SO_4 solutions (10^{-3}--10^{-12}M) using radioactive isotopes I^{131} and S^{35}. An alternative hypothesis based on chemisorption is also discussed. 11 ref. (P13d, 1-59; Cu, 14-68)

533-P. (German.) New Method for Measuring Thermal Conductivity of Metals at High Temperatures. Karl-Heinz Bode. Allgemeine Warmetechnik, v. 10, June 1961, p. 110-120.

Theoretical derivations for measurements above 800° C. by electrical resistance heating of metal wire. Applications to Ni, Mo, Pt. (P11h, 1-53; Ni, Mo, Pt)

534-P. Work Function Measurements of the Platinum Alloys of the Alkaline-Earth Metals. H. Batey. Institution of Electrical Engineers, Proceedings, Pt. 3, v. 108, July 1961, p. 468-469.

Measurement of thermionic emission for alloys of the alkaline-earth metals, Ba, Sr and Ca with Pt. The work

functions of the binary alloys are compared with those of the pure metals. (P15k; EG-f43)

535-P. (German.) Sensitivity and Significance of Measurements With a Small Size Calorimeter. Eberhard Schurmann and Heiner Trager. Archiv fur das Eisenhuttenwesen, v. 32, June 1961, p. 397-408.

Phase diagrams and thermodynamic properties of the systems Sn-Zn and Pb-Sb are established by calorimetric measurements using a small water calorimeter. 19 ref. (P12, M24b, X24e; Sn, Zn, Pb, Sb)

536-P. (Translation-Brutcher no. 5196.) Surface Heat Exchange Between Contacting Metal-Powder Components. V. S. Miller. Dopovidi Akademii Nauk Ukrainskoi RSR, Jan. 1961, p. 40-43.

Study of contact heat exchange between metal-powder products, on the one hand, and such products and fusion-made metals, on the other. Formulas for determining the thermal resistances between powder compacts and such compacts and cast metals. (P11k; 6)

537-P. Temperature Effects on the Remanence of Permanent Magnets. Rudolf K. Tenzer. Applied Magnetics, v. 9, 2nd quarter 1961, p. 2-9.

Reversible, irreversible and material effects on Alnico, Indox I and Cunife magnets as functions of heat treatment and temperature cycling between 25-550° C. (P16a, 2-61, 2-64, X11g; SGA-n)

538-P. Vapor Pressures of Platinum, Iridium and Rhodium. R. F. Hampson, Jr., and R. F. Walker. Journal of Research, National Bureau of Standards, Physics and Chemistry, v. 65A, July-Aug. 1961, p. 289-295.

Measurement by a microbalance technique based on the Langmuir method. Heats of sublimation at 298° K. are calculated with the aid of free energy functions. 16 ref. (P12c, 1-53; Pt, Ir, Rh)

539-P. Some Mechanical and Electronic Properties of Columbium, Hafnium and Their Alloys. D. J. Maykuth, J. B. Baker, G. S. Root and G. B. Gaines. Paper from "Advances in Electron Tube Techniques". Fifth U. S. National Conference, Proceedings (Sept. 1960). Pergamon Press Inc., New York 22, 1961, p. 10-20.

Evaluation of Cb-0.65 Zr, Cb-40 Ta and Hf alloys containing Al, Zr, Mo and Cb as materials for electron tubes using data from bend and tensile tests and electrical resistivity and secondary emission measurements. 15 ref. (P15, Q-general, T1; Cb-b, Hf-b, 17-57)

540-P. (English.) The Additional Magnetic Anisotropy Induced by Magnetic Anneal in Ferromagnetic Face-Centered Cubic Solid Solutions. Pt. 1. Mikio Yamamoto, Satoshi Taniguchi and Keizo Aoyagi. Tohoku University, Science Reports of the Research Institutes, v. 13, June 1961, p. 117-136.

Effect of temperature and duration of magnetic anneal, measuring temperature and alloy composition on induced magnetic anisotropy of fcc. Ni-Co alloys as measured by a torque magnetometer. 20 ref. (P16, 2-60, 2-61, 2-64; Ni-b, Co)

541-P. (English.) The Additional Magnetic Anisotropy Induced by Magnetic Anneal in Ferromagnetic Face-Centered Cubic Solid Solutions. Pt. 2. Keizo Aoyagi. Tohoku University, Science Reports of the Research Institutes, v. 13, June 1961, p. 137-150.

Measurement of induced uni-axial ferromagnetic anisotropy as a function of crystal orientation using a torque magnetometer with magnetically annealed disk single crystals of 12 and 20% Co-Ni and 17 and 46% Fe-Ni alloys. 12 ref. (P16, 3-72, 2-64; Ni-b, Co, Fe)

542-P. Boron Diffusion in Silicon. E. L. Williams. Electrochemical Society, Journal, v. 108, Aug. 1961, p. 795-798.

The diffusion coefficient examined from 1050-1350° C. is observed to decrease gradually as the purity of the n-type Si increases. 17 ref. (P15g, N1, 2-60, 2-62; EG-j, B, Si)

543-P. (English.) Plane Polarization of 8.5 MeV Bremsstrahlung. Katsufusa Shoda. Physical Society of Japan, Journal, v. 16, July 1961, p. 1271-1280.

The polarization produced by 8.5 MeV electrons incident on thin Al, Ag, Au and

U targets in a betatron is studied with D_2O-loaded nuclear emulsions. Polarization is measured by observing the szimuthal angular distribution of photoprotons from deuterons. 22 ref. (P18n, 2-67; Al, Ag, Au, U)

544-P. (English.) Antiferromagnetism of MnHg. Yasuaki Nakagawa and Tomiei Hori. Physical Society of Japan, Journal, v. 16, July 1961, p. 1470.

Magnetic susceptibility, electrical resistivity and crystal structure are obtained at 90-360° K. 5 ref. (P16 p, P15g, M26q, 2-63; Hg-b, Mn-b)

545-P. (English.) A Note on the Magnetoresistance of PbTe at High Magnetic Fields. Eizaburo Yamada and Kisaburo Shogenji. Physical Society of Japan, Journal, v. 16, July 1961, p. 1475.

Discussion of the oscillatory behavior of the magnetoresistance of PbTe crystals as a function of magnetic field. 5 ref. (P16, P15g; Pb-b, Te-b, 14-68)

546-P. (English.) Magnetic Annealing Effect in Cobalt. Takashi Sambongi and Tadayasu Mitui. Physical Society of Japan, Journal, v. 16, July 1961, p. 1478.

Study of the origin of the ferromagnetic anisotropy induced in Co when annealed in a magnetic field. Temperature dependence of the induced anisotropy energy is measured at 90-700° K. and compared with the crystal anisotropy energy. 4 ref. (P16, 2-61, 2-64, 3-72; Co)

547-P. (English.) Mossbauer Effect of the Intermetallic Compound UFe_2. Shigehiro Komura, Nobuhiko Kunitomi, Poh-Kun Tseng, Naomoto Shikazono and Hidekuni Takekoshi. Physical Society of Japan, Journal, v. 16, July 1961, p. 1479.

The hyperfine field at the position of the Fe 57 nuclei in UFe_2 is measured at liquid nitrogen temperature using the Mossbauer effect and compared with values determined for UFe_2, stainless steel and metallic Fe at 20° C. (P18m; Fe-b, U-b, 14-68)

548-P. (English.) Magnetic Annealing of Cobalt. C. D. Graham, Jr. Physical Society of Japan, Journal, v. 16, July 1961, p. 1481-1482.

Measurement of the uniaxial anisotropy at 20-325° C. on a polycrystalline Co disc cooled in a hydrogen atmosphere from 900-20° C. with a field of 3000 Oe applied along a diameter. 3 ref. (P16, 2-61, 2-64, 3-72; Co)

549-P. (English) Ferromagnetism of the Intermetallic Compound UFe_2. Shigehiro Komuro, Nobuhiko Kunitomi, Yoshikazu Hamaguchi and Masanobu Sakamoto. Physical Society of Japan, Journal, v. 16, July 1961, p. 1486.

Magnetic properties of UFe_2 are investigated from 100-300° K. UFe_2 shows evidence of ferromagnetism at a Curie temperature of 195° K. (P16, 2-61; Fe-b, U-b, 14-68)

550-P. Observations on the Oxygen Solubility and Magnetic Susceptibility of Body-Centered Cubic Transition Metal Alloys. R. T. Bryant and E. W. Evans. Philosophical Magazine, v. 66, June 1961, p. 805.

Effect of the electron to atom ratio on solubility and susceptibility properties of alloys of Cb with additions of 10-75% Mo, 35% Re or 25% Ru. Electronic behavior is determined as a function of composition at 20° C. (P12e, P16, M25, 2-60; Cb-b, Mo, Re, Ru, O)

551-P. Thermal Expansion at Low Temperatures. Pt. 2. Electronic Component in Metals. G. K. White. Philosophical Magazine, v. 6, June 1961, p. 815-818.

Values are given for the linear and lattice components of thermal expansion as related to electronic specific heat and for the Gruneisen constant of Cu, Al, Pd, Fe, Cr and Be specimens below 10-12° K. Electron band structures, Fermi energy and density-of-state relations are drawn for the expansion coefficient. 12 ref. (P11g, M25, 2-63; Cu, Al, Pd, Fe, Cr, Be)

552-P. (Japanese.) The Solubility of Graphite in Nickel and Cobalt and Effects of Alloying Elements. Yasushi Kojima and Kokichi Sano. Tetsu-to-Hagane (Iron and Steel Institute of Japan, Journal, v. 47, July, 1961, p. 897-902.

Solubilities and free energy relations are determined thermodynamically as a function of composition and temperature (500-1600° C.) with calculation of Wagner interaction parameters for graphite in pure Ni and Co, in Ni-Co solutions and in Ni or Co systems containing Si, Mn, Cr, V and Mo. 9 ref. (P12e, 2-60, 2-61; Co-b, Ni-b, NM-k36)

553-P. (Russian.) Surface Tension of Fe-S-C, Fe-Mn-S and Fe-Mn-C Alloys.

Van T'szin-Tan, R. A. Karasev, A. M. Samarin and A. G. Shalimov. Izvestiya Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk, Metallurgiya i Toplivo, Jan. 1961, p. 15-19.

Determination of surface tension of Fe-S-C alloys with up to 0.720% S, 3.95% C and 0.005% O, Fe-Mn-S alloy with up to 1.27% Mn, 1.38% S and 0.011% O and Fe-Mn-C alloys with up to 2.96% Mn, 2.42% C and 0.003% O from 1230-1600° C. Effect of sulphur content and activity and Mn concentration. (P13h, 2-60, 2-61; Fe-b, S, C, Mn, O)

554-P. (Russian.) Surface Energy on the Crystal Melt Interface. S. N. Zadumkin. Izvestiya Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk, Metallurgiya i Toplivo, Jan. 1961, p. 55-57.

Computation of the free surface energy of the interface polycrystal-melt from the free energy of the whole system, the free energy of the two phase-volume units, the interface area, distance of surfaces, melting heat, co-ordination number and the surface energy of the interface area in question measured with reference to a vacuum. 9 ref. (P13h, 1-54, M26)

555-P. Thermodynamic Functions for the Columbium-Hydrogen System. O. M. Katz and E. A. Gulbransen. Paper from "Columbium Metallurgy". v. 10. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 523-537.

The system is investigated between 225-513° C. and 0.01-760 mm. of Hg of H_2. Interpretation of the data is based on solid-solution behavior in this range. (P12, M24b, 2-60, 2-61; Cb-b, H)

556-P. (Translation.) The Effect of Thallium on the Thermal Conductivity of Polycrystalline Selenium. G. B. Abdullaev, M. I. Aliev and S. A. Akhundova. Soviet Physics--Solid State, v. 3, Aug. 1961, p. 234-235. (Translation of Fizika Tverdogo Tela, v. 3, Feb. 1961, p. 317-670).

Measurement of the thermal conductivity and the temperature coefficient of Se containing 0.0125-1.5% Tl at 20-90° C. A mechanism for the observed minimum is proposed in terms of phonon-scattering center formation and grain dimension increase influenced by concentration of Tl. 10 ref. (P11h, 2-59, 2-60; Se-b, Tl)

557-P. (Translation.) Vaporization of Silicon in Tellurium Vapor. V. E. Kosenko and B. A. Nesterenko. Soviet Physics--Solid State, v. 3, Aug. 1961, p. 484-485. (Translation of Fizika Tverdogo Tela, v. 3, Feb. 1961, p. 317-670).

The influence of Te vapor pressure on the vaporization rate and the heat of vaporization from 700-1150° C. (P12c, P12p, N15, 2-61; Si, Te)

558-P. Magnetic Properties of Cast Carbon Steel. Pt. 2. W. J. Jackson. Journal of Steel Castings Research, no. 21, Apr. 1961, p. 9-12.

Determination of optimum magnetic properties for minimum heat treating time. Experiments show that magnetic permeability is decreased by increasing carbon content and that annealing develops higher maximum permeability than normalizing. Optimum magnetic properties for minimum heat treatment are obtained by slowly cooling from 1380-1200° F. and then air cooling. Relationship between tensile strength and magnetic properties of steels in annealed and normalized conditions. (P16, Q27a, 2-64; CN, 5)

559-P. Magnetic Properties of Cast Carbon Steels. W. J. Jackson. Journal of Steel Castings Research, no. 20, Jan. 1961, p. 10-15.

Effect of heat treatment on magnetic permeability of cast carbon steel with 0.10-0.34% carbon. When the cast steels are slowly cooled from 1380-1200° F. and then air cooled, the permeability is higher at both low and high field strengths than that for the same steels in the fully annealed conditions. (P16q, 2-64; CN, 5)

560-P. (Translation.) Investigation of Coarse-Grained Germanium Layers Produced by Pyrolysis of Gas. G. A. Kurov, N. N. Sheftal' and N. P. Kokrish. Soviet Physics--Solid State, v. 3, Aug. 1961, p. 269-270. (Translation of Fizika Tverdogo Tela, v. 3, Feb. 1961, p. 317-670).

The influence of grain size and impurities on conduction type and electrical resistivity of Ge polycrystals. 7 ref. (P15g, 2-59, 3-69; Ge)

561-P. (Translation.) Changes in the Thermal Conductivity of Tin, Bismuth and Gallium on Melting. B. P. Pashaev. Soviet Physics--Solid State, v. 3, Aug. 1961, p. 303-305. (Translation of Fizika Tverdogo Tela, v. 3, Feb. 1961, p. 317-670).

Variations in the thermal conductivity of specimens in the solid and liquid states are measured as a function of temperature and related to changes in structure, co-ordination number and short range order. (P11h, M25, N10, 2-61, 3-73; Sn, Bi, Ga)

562-P. (Translation.) The Effect of Annealing on the Electrical and Magneto Electric Properties of Indium Antimonide. V. E. Il'in and I. E. Gorbacheva. Soviet Physics--Solid State, v. 3, Aug. 1961, p. 392-398. (Translation of Fizika Tverdogo Tela, v. 3, Feb. 1961, p. 317-670).

Influence of 300-500° C. annealing on the temperature (90-400° K.) and magnetic field dependence of the Hall constant, electrical conductivity, carrier concentration, carrier mobility, conduction type and magneto resistance. 7 ref. (P15, P16, 2-61, 2-64; In-b, Sb, 14-68)

563-P. (Italian.) Hydrogen Overvoltage on Zinc Single Crystals. Roberto Piontelli, Luisa P. Bicelli and Mariarosa Graziano. Atti della Accademie Nazionale dei Lincei, v. 30, Feb. 1961, p. 149-154.

Determination of hydrogen overvoltage on mono and polycrystalline Zn electrodes in acid bath (0.01 M $HClO_4$ and 0.01 M HCl) at 25° C. and 40° C. Effect of crystal orientation, temperature and acid concentration. (P15m, 2-61, 2-66, 3-72; Zn)

564-P. The Effects of Residual Elements on the Magnetic Properties of Carbon Steel Castings. W. J. Jackson and E. J. Ridal. Journal of Steel Castings Research, no. 21, Apr. 1961, p. 12-15.

Individual residual elements (Sn, Ni, Pb, Cu, Cr, Mo, Ti and V) slightly impair magnetic properties but combined addition of Ni, Cr and Mo slightly improves them except at low field strengths. Increasing Mn to 0.93% has only a slight effect on remanence and coercivity but lowers maximum permeability and flux density at the higher magnetizing fields. Deoxidation with 2 lb. per ton Al does not affect magnetic properties. (P16, 2-60; CN, 5)

565-P. Electrical Resistivity, Hall Effect and Superconductivity of Some b.c.c. Titanium-Molybdenum Alloys. R. R. Hake, D. H. Leslie and T. G. Berlincourt. Physics and Chemistry of Solids, v. 20, Aug. 1961, p. 177-186.

Resistivities, Hall coefficients and superconducting transition temperatures are measured between 1.1-300° K. in magnetic fields up to 30 k G and for concentrations of 7-24% Mo. The resistivities decrease with increase of Mo; the Hall coefficients are positive and are concentration and temperature dependent only below solute concentrations of 12% Mo; and the alloys are all superconducting at liquid helium temperature. 40 ref. (P15, 2-60, 2-61, 3-73; Ti-b, Mo)

566-P. The Adsorption of Chlorine on Clean Germanium Surfaces. Mino Green and K. H. Maxwell. Physics and Chemistry of Solids, v. 20, Aug. 1961, p. 274-280.

Adsorption studies at -78-20° C. in an all-glass system by crushing a single disk of Ge in the presence of the gas and following the pressure changes. Surface areas of the powders are measured by the B.E.T. method using Kr at liquid nitrogen temperature. Cl adsorbs on Ge to monolayer coverage and a slow desorption of a fraction of the adsorbed chlorine follows the rapid adsorption. 27 ref. (P13d, 2-61; Ge, Cl)

567-P. Specific Heat and Spin Susceptibility of Dilute Alloys. A. Houghton. Physics and Chemistry of Solids, v. 20, Aug. 1961, p. 289-293.

The change in the specific heat and spin susceptibility of a metal of a given valence due to the introduction of a small number of impurity atoms with added valence is calculated by the Thomas-Fermi method. In the case of Cu an exact calculation accounts approximately for the seemingly linear behavior of the change. A check on the validity of the theory is made by recalculating the properties by the techniques of many-body perturbation theory. 10 ref. (P12r, P18m, M25, 2-60, 3-69; Cu-b)

568-P. The Emittance of Iron, Nickel and Cobalt and Their Alloys. W. D. Wood, H. W. Deem and C. F. Lucks. Defense Metals Information Center, Battelle Memorial Institute, DMIC Memo. 119, July 25, 1961, 82 p.

Normal and total emittance and reflectance as functions of temperature and wavelength of solid and molten Fe, Fe-Ni alloys, Fe-18% W, HH and HT (molten) Fe alloys, Ni, Nichrome V, Inconel, Inconel B and X, K-Monel 5700, Haynes alloys B, C, X and 25, Nimonic 75, Co, Co-35% Ni, Co-40% Fe and Co alloy N-155. (P17a, P17d, 2-61; Fe, Ni, Co)

569-P. Some Properties of In_2Te_3 and Ga_2Te_3. J. C. Wooley and B. R. Pamplin. Electrochemical Society, Journal, v. 108, Sept. 1961, p. 874-879.

Summary of measurements of physical parameters at -190 to 600° C. for zone refined and annealed specimens. Data are given for thermal expansion and conductivity, electrical conductivity, Hall effect and lattice parameters with discussion of electron mobility, activation energy, conduction band minimum and energy gap relations to order-disorder condition. 19 ref. (P-general, P11, P15, N10, 2-61; Te-b, In, Ge, 14-68)

570-P. Influence of Surface Energy on Friction and Wear Phenomena. E. Rabinowicz. Journal of Applied Physics, v. 32, Aug. 1961, p. 1440-1444.

Friction and wear phenomena are discussed in terms of surface energy of adhesion of contacting materials. In a friction field, high friction coefficients are found for sliding materials with high surface energy/hardness ratios. An expression is derived for the size of loose wear particles and is tested by experiment with 15 different materials. 14 ref. (P13h, Q9p)

571-P. Temperature-Compensated Debye Temperature of Carbonyl Iron. C. P. Gazzara and R. M. Middleton. Journal of Applied Physics, v. 32, Aug. 1961, p. 1546-1548.

Explicit temperature function which relates the Debye temperature to a change in temperature is determined from X-ray diffraction integrated intensity measurements. The corresponding Debye temperature, corrected for temperature diffuse scattering, is calculated to be 435° K. at temperature of 310° K. 17 ref. (P12r, 2-61; Fe-a)

572-P. Electrical Resistivity of Chromium in the Vicinity of the Neel Temperature. M. J. Marcinkowski and H. A. Lipsitt. Journal of Applied Physics, v. 32, July 1961, p. 1238-1240.

Investigation of the sharply cusped minimum in the resistivity-temperature (35° C.) Plastic deformation eliminates the minimum and causes pronounced change in resistivity-temperature relationship over a wide range of temperatures centered about the Neel temperature. The behavior is analyzed and interpreted in terms of the dependence of Neel temperature on hydrostatic stresses arising from presence of dislocations in deformed material. 15 ref. (P15g, M26b, 2-61, 3-66, 3-68; Cr)

573-P. Magnetization of Nickel Single Crystals. Lambros Tterlikkis and Alvin W. Jenkins, Jr. Journal of Applied Physics, v. 32, July 1961, p. 1293-1296.

Calculation of the off-axis magnetization curves of specimen crystals made by the Lawton and Steward method for arbitrary orientation of the crystal in the magnetic field. Anisotropy coefficients are determined from experimental curves with applied field in symmetry directions. A correcting field determined from the easy axis magnetization curve is utilized to compensate for internal strain effects. 8 ref. (P16, 3-72; Ni, 14-61)

574-P. Two-Phase Permalloy for High-Speed Switching. E. A. Nesbitt and E. M. Gyorgy. Journal of Applied Physics, v. 32, July 1961, p. 1305-1308.

Addition of 2-14% Au to Permalloy for precipitating a second phase in the alloy to control the coercive force and the threshold for rotational flux reversal by appropriate heat treatments. The alloy is prepared by annealing at solution temperature of 900° C. and cooling rapidly, followed by cold rolling tape from approximately 0.014-0.00013 in. thickness for switching applications. The material is then annealed at 600-650° C. (P16a, N-general, 2-60, 2-64; Ni-b, Au)

575-P. Heats of Activation of the Cu/Cu^{++}_{aq} Electrode. Tor Hurlen. Acta Chemica Scandinavica, v. 15, Mar. 1961, p. 621-629.

Determinations of the effect of temperature (0-45° C.) on anodic polarization of Cu in H saturated sulphuric acid solution plus known temperature coefficient data make possible the determination of heats of activation. An apparent Arrhenius factor is calculated. 14 ref. (P15j, P13, 2-61, Cu)

576-P. On the Kinetics of the Cu/Cu^{++}_{aq} Electrode. Tor Hurlen. Acta Chemica Scandinavica, v. 15, Mar. 1961, p. 630-644.

Measurements on a high purity Cu electrode in a hydrogen saturated cupric sulphate-sulphuric acid solution show dependence of the reactions on the Tafel relationship. The deposition rate is proportional to the square of the cupric ion activity. 36 ref. (P13b, P15; Cu)

577-P. High Temperature X-Ray Study of the Thermal Expansion of $IrAs_3$ and $IrSb_3$. Arne Kjekshus. Acta Chemica Scandinavica, v. 15, Mar. 1961, p. 678-681.

The X-ray powder method is used at temperatures from 20-998° C. to determine both linear and volume expansion coefficients. (P11g, 1-54)

578-P. (German.) Magnetic Measurements on One and Two Phase Separation of Nitrogen in Alpha Iron During Aging. Witold Precht. Bergakademie, v. 13, Apr. 1961, p. 265-266.

Measurement of coercive force and electrical resistance with electron microscopic and fracture analysis of nitrided specimens of sintered Armco iron of varying nitrogen content and degree of deformation after aging. (P16, P15g, M-general, N7, 2-60, 2-65, 3-68; Fe-a, N)

579-P. (English.) Initial Magnetization of Nickel Under Tension and High Hydrostatic Pressure. Roman Golebiowski and Roland Wisniewski. Acta Physica Polonica, v. 20, May-June 1961, p. 391-402.

Magnetostriction is discussed as it interacts with internal stresses, deriving an expression relating initial acceptability of strained Ni to its magnetostrictive tensions and crystal isotropy. Initial magnetization of wire is measured under tension and under hydrostatic pressure. (P16b, 3-68, 3-74)

580-P. Effect of Plastic Deformation on Resistivity of Gold-Palladium Alloys. H. J. Logie, J. Jackson, J. C. Anderson and F. R. N. Nabarro. Acta Metallurgica, v. 9, Aug. 1961, p. 707-713.

Strain induced resistivity changes in wire specimens of alloys in the system 0-100% Pd are measured at 77° K. after plastic extension. Resistivity decreases at this temperature at 10-60% Pd and increases for other compositions, the effect being removed by annealing. A theoretical explanation, which depends on the local shifts of Fermi level produced by the deformation potential around a dislocation, predicts effects similar to those observed. 25 ref. (P15g, M26b, 2-60, 2-61, 2-64, 3-68; Au-b, Pd-b)

581-P. Semiconductors and Semimetals. R. W. Ure, Jr. Chapter 3 from "Thermoelectricity--Science and Engineering". Interscience Publishers, Inc., New York 1, 1961, p. 19-74.

The relationship between electrical conductivity, thermal conductivity and the Seebeck coefficient is shown qualitatively for semiconductors and semimetals. The electronic properties are determined by the electron energy levels and distribution. The theory of the transport properties of semiconductors is developed and electron scattering mechanisms discussed. 53 ref. (P15g, P11g; EG-j)

582-P. Thermal Conduction in Thermoelectric Materials. R. W. Keyes and J. E. Bauerle. Chapter 5 from "Thermoelectricity--Science and Engineering". Interscience Publishers, Inc., New York 1, 1961, p. 91-119.

The mechanisms by which heat transportation takes place through thermoelectric materials and the factors which influence it are discussed. Transportation is shown to be limited by various scattering mechanisms. Lattice conduction, electronic conduction and radiative heat conduction are discussed. 35 ref. (P11h)

583-P. (Italian.) On the Possibility of the Reaction $Si + 2CO \rightleftharpoons SiO_2 + 2C$ in the Steelmaking Process. Agostino

Bargone. Technica Italiana, v. 26, Apr-May 1961, p. 173-178.

Thermodynamic considerations during the degassing of molten steel. Results indicate that in the presence of FeO, Fe, CO, Si, SiO_2 and C for temperatures corresponding to the solidification of steel or higher, conditions do not favor the reaction. (P12q, D11)

584-P. (Translation-ConBur.) Reactions of Selenium With Aqueous Solutions of Alkali-Metal Sulphites. G. S. Klebanov and N. A. Ostapkevich. Journal of Applied Chemistry of the USSR, v. 33, Sept. 1960, p. 1938-1941.

Solubility data for Se in Na and K sulphite solutions at 0-152° C. are studied as functions of SO_3 concentration, pH and stirring rate. 5 ref. (P12; Se, EG-e41, 14-68)

585-P. (Translation-ConBur.) Cathodic Behavior of Tellurium in Electrolysis of Alkaline Solutions. O. A. Khan and L. A. Saltovskaya. Journal of Applied Chemistry of the USSR, v. 33, Sept. 1960, p. 2112-2114.

The rate of cathodic liberation of Te is studied as a function of concentration at 20-60° C. Data are given for current efficiency at various current densities and Te concentrations. 6 ref. (P15, 2-60; Te)

586-P. (Russian.) Influence of Prolonged Heating at 350-600° C. on the Viscosity of Austenitic-Ferritic Weldments. S. V. Yunger, M. P. Melnikov and V. I. Logvinov. Avtomaticheskaya Svarka, v. 14, June 1961, p. 14-20.

Investigation of weldments obtained by manual or automatic welding using different electrodes, welding rods and fluxes. Effect of isothermal heat treatment. Phase transformation, microscopy, electrolytic etching and radiography. 11 ref. (P10f, M-general, N-general, 2-64; ST, 7-51)

587-P. Some Physical Properties of Martensitic Stainless Steels. J. G. Hoag. Defense Metals Information Center, Battelle Memorial Institute, DMIC Memo. 68, Sept. 28, 1960, 30 p.

Summary of data for martensitic steels including AISI 403, 410, 414, 416, 420, 431, 440A, 440C, Type 422 and USS 12 MoV. Properties examined include density, specific heat and gravity, moduli of rigidity and elasticity, melting point, thermal conductivity and diffusivity, linear thermal expansion, electrical resistivity, Poisson's ratio and magnetic permeability. 24 ref. (P-general, Q21, 10-54; SS-c)

588-P. (German.) Heat of Formation of $PuBe_{13}$. V. V. Achacinskij and L. M. Kopytin. Kernenergie, v. 4, June 1961, p. 519-520.

Measurement of the heat of formation of the intermetallic compound $PuBe_{13}$ in a micro water calorimeter at 298° K. (P12q; Pu-b, Be-b, 14-68)

589-P. (German.) Direction of Magnetization in Walls of Ferromagnetic Layers. Ekkehard Fuchs. Naturwissenschaften, v. 48, June 1961, p. 450.

Electron microscopic investigation of intensity of radiation through a 400 Å-thick FeNi film and estimation of direction of magnetization. (P17c, P16, 1-54; Fe, Ni, 14-62)

590-P. The 1961 Howe Memorial Lecture--Iron and Steel Div. Role of Chemistry in Metallurgical Research. Lawrence S. Darken. Metallurgical Society of AIME, Transactions, v. 221, Aug. 1961, p. 654-670.

Review of principles of physical chemistry as applied to understanding metallurgical phenomena, particularly in the high temperature field and in areas related to Fe and steel. Consideration of thermodynamic and thermochemical relations, oxidation and diffusion kinetics, phase equilibria, reduction and transformation reactions and liquid-solid phenomena in metals, alloys and alloy systems. 22 ref. (P12, P13, A9k, D11, N-general, 2-62, 10-54)

591-P. The Heats of Solution in Liquid Tin of the Group III Elements Aluminum, Gallium, Indium and Thallium. J. B. Cohen, B. W. Howlett and M. B. Bever. Metallurgical Society of AIME, Transactions, v. 221, Aug. 1961, p. 683-686.

The partial molar heats of solution at infinite dilution in Sn of Al at 300 and 350° C. and of Ga, In and Tl at 240, 300 and 350° C. are measured by Sn solution calorimetry. Al, Ga and Tl are endothermic on solution;

In is exothermic. There is no temperature dependence of the heats of solution and only Al has a measurable change in its heat of solution with composition. 19 ref. (P12e, 2-60, 2-61; Sn-b, Al, Ga, In, Tl)

592-P. The Columbium-Oxygen Equilibrium in Liquid Iron. Michel Elle and John Chipman. Metallurgical Society of AIME, Transactions, v. 221, Aug. 1961, p. 701-703.

The equilibrium of gaseous H_2O-H_2 mixture with liquid Fe-Cb alloys containing 0.2-2.4% Cb shows that the activity coefficient of O is strongly diminished by Cb. The oxide in equilibrium with the melts is identified as CbO_2 with the equilibrium constant being determined at 1600° C. The deoxidizing power is comparable to that of vanadium. 10 ref. (P12e, D11r, 2-61; Fe-b, Cb, O)

593-P. Magnetism in a High-Carbon Stainless Steel. S. M. Purdy. Metallurgical Society of AIME, Transactions, v. 221, Aug. 1961, p. 787-788.

Under certain conditions of hot rolling and air cooling from the hot rolling temperature, bars of a high carbon (0.40% C) chrome-nickel austentic alloy show magnetism even though no ferrite or martensite can be detected by microscopic or X-ray methods. The appearance of magnetism in such alloys is attributed to Cr impoverishment of the austenite grains near the precipitated carbide particles. (P16, N7, N8, 2-64, 3-68; SS-e)

594-P. Density of Liquid Iron Silicates. John Henderson, R. G. Hudson and G. Derge. Metallurgical Society of AIME, Transactions, v. 221, Aug. 1961, p. 807-811.

Densities of melts of the FeO-SiO_2 system in contact with solid Fe are measured by the maximum bubble pressure method for 0-37% SiO_2 and 1255-1410° C. The constitution of the melts is discussed and it is postulated that the structure changes from a distribution of Fe ions in an oxygen ion network at pure "FeO" to a distribution of Fe ions in a network of silicate tetrahedra at the orthosilicate composition. 19 ref. (P10a, P12, D11n, 2-60; Fe-b, Si-b, 14-68)

595-P. Mn Vapor Pressures in the Mn-Fe System. J. H. Smith, H. W. Paxton and C. L. McCabe. Metallurgical Society of AIME, Transactions, v. 221, Aug. 1961, p. 895-896.

Solid solutions in the system containing 61.8-74.5% Mn are analyzed by the Knudsen effusion method at 1185° K. Data are given for Mn activity and vapor pressure with construction of phase equilibrium diagrams and correlation with Raoult's Law as a function of composition and temperature. 6 ref. (P12c, P12b, 2-60, 2-61; Mn-b, Fe)

596-P. Superconducting Wire Solenoids. Australasian Manufacturer, v. 46, July 22, 1961, p. 70, 72, 74-75.

Fabrication of solenoid coils of Cb_3Sn, an extremely brittle compound that becomes superconducting at 18° K. and will sustain magnetic fields of up to 100,000 gauss and can carry current densities of over 150,000 A/sq. cm. (P15g, T1c, 17-57; Cb-b, Sn)

597-P. Some Aspects of Superconductivity. William B. Gager. Battelle Technical Review, v. 10, Sept. 1961, p. 14-17.

The nature of electrical resistance at very low temperatures and the magnetic and thermal properties of superconductors are reviewed with potential applications in frictionless devices, electromagnets and switching devices. (P15g, 17-57)

598-P. Surface Tension of Refractory Metals. S. V. Radcliffe and H. Udin. Manufacturing Laboratories, Inc. Wright Air Development Div. U. S. Office of Technical Services, AD-258567, Dec. 1960, 45 p. $1.25.

The electron bombardment heating technique is shown by this research to be a valid procedure in the measurement of the surface tension of solid refractory metals having low rates of evaporation in vacuum at high temperature. Applied to the measurement of the surface tension of solid Cb, the technique gives values consistent with a theoretical estimate. (P13h, J2g; Cb, EG-d37)

599-P. Heat Transfer Between Metals in Contact. Metallurgia, v. 64 July 1961, p. 26.

Measurements of heat transfer between machined brass and Al in contact with steel and brass, all surfaces having different roughness values. Heat transfer is by surface contact and conduction

through an intervening fluid. Effect of applied pressure, surface finish and thermal conductivities of the solids. (P11k, 3-74; Cu-n, Al, ST)

600-P. (English.) The Influence of Demagnetization and Stress on the Resonance Condition of Spin Wave Resonance. D. Fraitana. Czechslovak Journal of Physics, v. 11, July 1961, p. 500-509.

Thin, monocrystalline and polycrystalline, oriented thin films of Co and Ni are vacuum deposited on cold and heated slides to study saturation demagnetization under a static magnetic field. The magnetization, spin wave resonance spectrum and isotropy constant of magnetostriction are interpreted in terms of Zeeman, dipolar and exchange interactions. 24 ref. (P16, P18m, 1-53, 14-62; Co, Ni)

601-P. Importance of Purity in Manufacturing Brazing Filler Metals for High Temperature Service Applications. Forbes M. Miller. Welding Journal, v. 40, Aug. 1961, p. 821-827.

Application recommendations, composition and physical and metallurgical properties of typical Ni-base brazing alloys for joining stainless steel and Inconel. Effects of refractory oxides and oxygen and nitrogen inclusions on flow properties and brazability of the alloys. Diffusion and erosion and testing techniques. (P-general, Q-general, 2-60; SGA-f, 9-69)

602-P. Nature of Radiation Damage Due to Fast Neutron Bombardment in Ferromagnetic Materials--Very High Permeability Pure Iron and Nickel. G. Biorci, A. Ferro and G. Montalenti. Il Nuovo Cimento, v. 20, Apr. 1961, p. 617-637.

Effects of irradiation with doses of 10^{18} nvt. on permeability, coercive force and approach to saturation. Effect of subsequent annealing at 100-200° C. Theoretical interpretations. (P16, 2-64, 2-67; Fe, Ni)

603-P. (English.) Electrochemical Studies of the Behavior of Metals in Fused Chlorides. R. Littlewood and E. J. Argent. Electrochimica Acta, v. 4, Aug. 1961, p. 155-169.

Electrode potential behavior of Ni and Fe in equimolar NaCl-KCl melts at 700° C. under argon. Effect of melt impurity content and surface area of metal volume of melt ratio on the redox potential of the melt and the Nernst potential of the metal. Effect of $NaNO_3$ additions to the melts. 10 ref. (P15, 2-66; Ni, Fe)

604-P. (German.) Thermal Conductivity of Tellurium. Hans Sussmann. Wissenschaftliche Zeitschrift der Martin-Luther-Universitat Halle-Wittenberg, v. 10, Jan. 1961, p. 33-39.

Measurement of thermal conductivity of polycrystalline plate shaped Te specimens at temperatures from 100-500° K. using a stationary absolute method. Theoretic interpretation in terms of "exciton conductivity". (P11h, 1-53; Te)

605-P. (German.) Influence of the Boundary on Remagnetizing Behavior of Thin Permalloy Films. J. Brackmann, W. Kusterer and W. Metzdorf. Zeitschrift fur Angewandte Physik, v. 13, July 1961, p. 313-321.

Investigation of hysteresis slopes in remagnetization of round and rectangular 500-2500 Å thick films, containing 79-81% Ni and 21-19% Fe, as influenced by boundary structure and film thickness. (P16a, 3-71, 3-73; Ni, Fe)

606-P. (Russian.) Reversible and Irreversible Processes in the Magnetic Reversal of Iron-Silicon Monocrystals. N. M. Salanskii, A. M. Rodichev and V. A. Buravikhin. Fizika Metallov i Metallovedenie, v. 11, June 1961, p. 843-850.

Magnetization, reversible susceptibility and Barkhausen effect in magnetic reversal in different crystallographic directions. Domain structure; micrography. 11 ref. (P16, 3-71, M21; Fe-b, Si, 14-61)

607-P. (Russian.) Influence of Sample Shape on Anisotropy of Coercive Force of Cold Rolled Iron-Silicon. V. P. Abel's and E. L. Nikolaeva. Fizika Metallov i Metallovedenie, v. 11, June 1961, p. 851-855.

Effect of width of an Fe-Si strip on coercive force. Observation of magnetic structure by using Fe powder. 7 ref. (P16a, 3-72, 3-73; Fe-b, Si, 4-53)

608-P. (Russian.) Thermodynamic Properties of Interstitial Solid Solutions With Body-Centered Cubic Lattice. N. S. Fastov. Fizika Metallov i Metallovedenie, v. 11, June 1961, p. 856-863.

Characteristics of a solid solution with unbalanced atoms after an elastic deformation. Dependence of Young's modulus and chemical potential of the dissolved particles on volume change and elongation. 7 ref. (P12, Q21a, 3-68, 3-71; 14-67)

609-P. (Russian.) "Large Drop" Method for the Determination of Surface Tension and Density of Molten Metals at High Temperatures. Yu. V. Naidich and V. N. Eremenko. Fizika Metallov i Metallovedenie, v. 11, June 1961, p. 883-888.

Measurements on the convex meniscus of Cu and Al in a 19-20 mm. diameter graphite or berylium oxide crucible. Temperature coefficient of the surface tension. 9 ref. (P13h, P10a, 1-54; Cu, Al, 14-60)

610-P. (Russian.) Surface Activity of Hydrogen in Liquid Iron. B. A. Baum, K. T. Kurochkin and P. V. Umrikhin. Fizika Metallov i Metallovedenie, v. 11, June 1961, p. 960-961.

"Large drop" method for measuring surface tension. Comparison of results with He activity. 9 ref. (P13h, 1-54, 2-60; Fe, H, 14-60)

611-P. Glassing Characteristics of Low-Alloy Steels. George J. Dormer, George R. Norton and Burton S. Payne. American Ceramic Society, Journal, v. 44, Aug. 1961, p. 375-381.

Thermal expansion, creep, hardenability and thermal shock tests on glass coated A285B, Mayari-R, A203A A225-A, A203-D and German Ti low-alloy and plain carbon steels to determine effects of residual stresses, composition and temperature on mechanical and physical properties of the steel, the coating and the composite layer. (P-general, Q-general; ST, 8-71)

612-P. (German.) Investigation of Silver-Selenium Films. Gerhard Kienel. Wissenschaftliche Zeitschrift der Martin-Luther-Universitat Halle-Wittenberg, v. 10, Jan. 1961, p. 29-32.

Measurement of electrical resistivity and thermovoltage of evaporated Se-Ag films, containing 30-75% Ag, as influenced by composition of film. Au is used as a basis for comparison. (P15g, 1-53, 2-60; Se, Ag)

613-P. (German.) Thermochemistry of Alloys. A. Schneider, H. Klotz, J. Stendel and G. Strauss. Pure and Applied Chemistry, v. 2, no. 1-2, 1961, p. 13-16.

Measurement of enthalpy of formation of InSb, $MgZn_2$, Mg_2Zn_{11} and MgZn; and of enthalpy, free enthalpy and entropy of formation of Fe_2Zr, Al_4Zr_3, Al_3Zr and Al_2Zr. Calorimetric methods are used, including the drop method and ignition by Fe-S mixture. (P12r, P12s, 1-54; In, Mg, Fe, Al, Sb, Zn, Zr)

614-P. (German.) Thermal Effects in the Investigation of the Electrical Conductivity of Germanium in Liquid Helium. E. I. Sawarizkaja. Physikalische Abhandlungen aus der Sowjetunion, v. 4, May 1961, p. 416-418.

Current-voltage measurements of Ge specimens containing small amounts of elements of the 2. and 5. group at 1.7 and 4.2° K. Stepwise and irreversible change of amperage; hysteresis effects. (P11, P15g, P16a, 2-63; Ge-b)

615-P. (German.) Experimental Evaluation of Galvanomagnetic Constants of Copper Single Crystals. H. Bross and Th. Ricker. Zeitschrift fur Physik, v. 163, June 1961, p. 489-498.

Measurement of resistance changes in Cu single crystals containing 0.003% Fe, 0.001% Bi and 0.02% alpha O given orientation in magnetic fields of varying field strength at room temperature, 77.3 and 90.2° K. (P15g, 2-60, 2-61, 3-72; Cu, 14-61)

616-P. (German.) Conductivity Characteristics of Polycrystalline Selenium. F. Eckart. Zeitschrift fur Naturforschung, v. 16a, June 1961, p. 631.

Measurement of electrical conductivity of Se at high temperatures (290-450° K.) after purging by O, N, H and air at 300° C. Conductivity as influenced by small halide impurities in Se. (P15g, 1-53, 3-69; EG-j43)

617-P. Copper-Alloy Extrusions. J. P. Lynch, C. F. DeVarney and C. J. Connors. Machine Design, v. 33, Sept. 28, 1961, p. 156-162.

Tabulation of physical, mechanical and fabricating properties and design recommendations for extruded parts of Cu-base alloys as a guide to material selection. Alloys covered include ASTM

B124, B16, B21-A, B21-C, B138, B133, B187 and B150 alloys, architectural and aluminum-silicon bronzes, free-cutting muntz and muntz metal, tellurium copper and Ni-Ag alloys. (P-general, Q-general, G17k; Cu-b, 4-58, 17-57)

618-P. (Translation-Brutcher no. 5165.) Effect of Carbon and Silicon on the Surface Tension of Pig Iron. K. I. Vashchenko and A. P. Rudoi. Izvestiya VUZ-Chernaya Metallurgiya, v. 3, Mar. 1961, p. 11-15.

Study of synthetic pig irons within fairly wide composition and temperature ranges. Effect of increasing carbon contents on surface tension of hypoeutectic, eutectic and hypereutectic pig irons. Surface tension of pig irons with 0.10-0.15% Si and with 1.13 and 1.50% Si as function of carbon additions. (P13h, 2-60; CI-a, C, Si)

619-P. (English.) Magnetic Susceptibilities of Cr and Cr-Fe Alloy. Masao Shimizu and Takeshi Takahashi. Physical Society of Japan, Journal, v. 16, Aug. 1961, p. 1544-1548.

Magnetic susceptibilities are investigated using the band picture for 3d electrons as a model in order to explain the increase of susceptibility with decreasing temperature at low temperatures. 8 ref. (P16n, P16p, 1-54; Cr, Fe)

620-P. (English.) Measurement of Seebeck Effect in Plastically Bent Germanium. Tadayoshi Yumashita and Tokio Ohta. Physical Society of Japan, Journal, v. 16, Aug. 1961, p. 1565-1569.

Changes of thermoelectric power and electrical resistivity in n and p-type Ge due to plastic bending are measured at 25-300° C. and analyzed theoretically. Value of the dislocation-acceptor level is estimated. 5 ref. (P15j, 1-54, 3-68; Ge)

621-P. (English.) Theory of Seebeck Effect in Plastically Deformed Semiconductors. Tokio Ohta. Physical Society of Japan, Journal, v. 16, Aug. 1961, p. 1561-1564.

Effect of the reduction of free electron density due to the dislocation-acceptors and the scattering due to the space charge around the dislocation on the thermoelectric power of n-type materials is theoretically investigated. Results are compared with experimental data for near intrinsic n-Ge. 10 ref. (P15j, 1-54; EG-j41)

622-P. (English.) Magnetic After Effects in Manganese Zinc Ferrites. Tsuneo Akashi and Takashi Okada. Physical Society of Japan, Journal, v. 16, Aug. 1961, p. 1641.

Influence of partial oxygen pressure during sintering at 1200° C. for 4 hr. on the Richter type after-effect and time decrease of initial permeability in Mn-Zn ferrites. 6 ref. (P16q, 1-54, 2-66, 3-74; 14-68)

623-P. (English.) Linewidth of Cyclotron Resonance of Pure Germanium. Hazimu Kawamura, Masakazu Fukai, Yoshikazu Hayashi and Tamotsu Hashimura. Physical Society of Japan, Journal, v. 16, Aug. 1961, p. 1646.

Study of the cyclotron resonance absorption of pure Ge at 1.6° K. using a 6 mm. microwave shows that the width of the resonance line increases with increased microwave power absorption because of the resulting rise of electron temperature and increased collision frequency. (P16, 1-54, 2-63; Ge)

624-P. Arc-Imaging Furnace Tests Materials in High Thermal Flux. Octave Romaine. Space/Aeronautics, v. 36, Sept. 1961, p. 71-74.

Specimens such as Cu, stainless steel and bakelite are tested for high-temperature properties, comparative performance evaluation under specified thermal flux and atmospheric conditions, determination of thermal constants and investigation of heat transfer. (P11, P12, 1-53; Cu, SS, NM-d)

625-P. (Translation-ConBur.) The Electrochemical Behavior of Titanium. L. P. Zhilina. Journal of Applied Chemistry of the USSR, v. 33, Nov. 1960, p. 2490-2494.

Determination of polarization curves for Ti in a H_2SO_4 solution containing added $K2SO_4$ and HF. Curves are measured by the potentiostatic method at 25° C. (P17g, 1-54; Ti)

626-P. (Translation-ConBur.) Influence of Alloying Additives on Hydrogen Absorption of Steels. S. A. Balezin and N. I. Narushevich. Journal of Applied

Chemistry of the USSR, v. 33, Nov. 1960, p. 2500-2505.

Hydrogen absorption of alloy steels during chemical pickling as affected by percentage contents of Cr, Ni and Cu. 13 ref. (P13d, L12g, Q26s, 2-60; ST, Cr, Ni, Cu, H)

627-P. (Translation.) Adsorption, Migration and Evaporation of Cadmium on Tungsten. Sokol'skaya. Soviet Physics--Solid State, v. 3, Sept. 1961, p. 574-579. (Translation of Fizika Tverdogo Tela, v. 3, Mar. 1961).

Study at various temperatures indicates that adsorption varies in accordance with the geometric proportions of the adsorbed atoms and the tungsten lattice. The work function of a thick layer of Cd is measured and the heat of evaporation of Cd from W is found to be 1.5 ± 0.1 ev. per atom. (P12, P13, P15, 1-54; Cd)

628-P. Non-Ferrous Metals in Missiles. P. N. Cornall. Metal Industry, v. 99, Sept. 1, 1961, p. 162-167.

Properties given for FV520 stainless steel, RR58 Al alloy, ZTY Mg alloy and D.T.D. 5053 Ti include stiffness as influenced by temperature, Young's modulus, expansion coefficient, thermal stress modulus, thermal conductivity, specific heat, density, thermal diffusivity, corrosivity, ultimate strength, proof strength and elongation. (P-general, Q-general, 2-61; T24e; SS, EG-a38, Al-b, Mg-b, Ti)

629-P. Densities of Molten Aluminum Silicon and Lead Tin Alloys. Rajendra Sharan and D. Swarup. Banaras Hindu University, Journal of Scientific Research, v. 11, Dec. 1961, p. 62-72.

Using the displacement method and the constant volume method, the density of Al-Si alloys (3.765-10.731% Si) is determined at 730° C. The influence of 50 and 100° C. of superheat on Pb-Sn alloys is studied as a function of density. (P10a, 2-61; Al-b, Si, Pb-b, Sn, 14-60)

630-P. (Russian.) Effect of Apparent Variation in Liquid Metal Specific Gravity Caused by Electromagnetic Forces. L. A. Verte. Tsvetnye Metally, June 1961, p. 61-64.

Use of electromagnetic field in molten metal to increase its specific gravity and to cause dielectric inclusions either to sink to the bottom of the hearth or to ascend to the surface of the melt. Experiment with Hg as the molten metal and W as the dielectric inclusion suggesting application for metal purification. (P10a, P16, C-general; Hg, W, 9-69)

631-P. Vacuum-Processed Alloys for Tomorrow's Automobile. A. M. Aksoy and P. Lillys. SAE Journal, v. 69, Sept. 1961, p. 60-63.

Testing of low-alloy steels, tool-steels, magnetic materials and Fe-Al alloys to determine the effects of vacuum induction melting, vacuum arc remelting and vacuum degassing processes on the physical and mechanical properties of the materials. (P-general, Q-general, D-general, 1-73, T21; SGA-n, AY, TS, Al)

632-P. Structural Materials. E. J. Zeil Berger and J. H. Lieb. Space/Aeronautics R & D Technical Handbook, v. 4, 1961-1962, p. H16-H17.

Physical and mechanical properties of refractory metals (Cb, Mo, Ta, W) and alloys, graphite, refractory oxides, carbides, nitrides and borides and plastic-glass structures. (P-general, Q-general; SGB-s)

633-P. (Ukranian.) Study of Electric Transfer in Some Alloys of High Electric Resistance. I. N. Francevich and I. I. Kovenskyj. Dopovidi Academii Nauk Ukrainskoi SSR, May 1961, p. 636-638.

Determination of charge values carried by the ions in Fe-Cr, Fe-Cr-Al and Fe-Cr-Ni alloys in the temperatures of 1100-1400° C. by radioactive isotopes. 7 ref. (P15, 1-59, 2-62; SGA-q, Fe-b, Al, Cr, Ni)

634-P. (Ukranian.) Heat Capacity of Plastically Deformed Copper. V. A. Pervakov and V. I. Khotkevych. Ukrainskyi Fizychnyi Zhurnal, v. 6, Feb. 1961, p. 240-243.

Effect of high degree (40-75%) plastic deformation of Cu on its heat capacity measured from -196° C. to 120° C.; comparison of heat capacity of annealed and deformed samples. 6 ref. (P12r, 2-64, 3-68; Cu)

635-P. (Ukranian.) Thermodynamics of Boiling Layer in Reactors for Direct Reduction of Iron From Iron Ores. O. S. Nechyporenko. Dopovidi Academii Nauk Ukrainskoi RSR, Apr. 1961, p. 495-499.

Calculation of optimal conditions for the boiling Fe ore layer in calcining and reduction reactors, as influenced by the speed of injected flame jet, the sinter diameter and the pressure. 9 ref. (P12, B15; Fe)

636-P. (Ukranian.) Heat Transfer During Reduction of Iron in a Boiling Charge Layer. O. S. Nechyporenko. Dopovidi Akademii Nauk Ukrainskoi RSR, June 1961, p. 749-752.

Heat transfer processes in the boiling charge layer during reduction from ore are evaluated by the equations of Reynolds and Grashof and formulas are developed for design of roasting and reduction equipment. 9 ref. (P11k, D-general)

637-P. (French.) Helicoidal Antiferromagnetism of $MnAu_2$, Studied by Neutron Diffraction. Andre Herpin and Pierre Meriel. Journal de Physique et le Radium, v. 22, June 1961, p. 337-348.

Determination of crystal structure and of magnetic structure from 100-403° K. with and without simultaneous exposure to a magnetic field based on neutron diffraction measurement. 9 ref. (P16p, N22j, N23a, 2-61; Mn, Au)

638-P. (Czech.) Tensimetric Measurement of Thermodynamic Functions of Silver in Silver-Copper Alloy by the Method of Isotope Exchange. J. Kucera, L. Dvorak and Z. Kudelasek. Ceskoslovensky Casopis Pro Fysiku, v. 11, no. 4, 1961, p. 277-284.

The rate of evaporation of Ag at 690-885° C. as indicated by radioactive Ag^{110} is used to determine thermodynamic functions and the phase diagram for an Ag-Cu alloy. Data are given for vapor tension, thermodynamic activity, activity coefficient, partial molar free mixing enthalpy, sublimation heat and partial molar mixing enthalpy and entropy. 10 ref. (P12, M24b, 1-59, 2-60; Cu-b, Ag)

639-P. (English.) The Influence of Plastic Deformation on the Magnetostriction Constant of Iron-Nickel Alloys. P. Suda and J. Paces. Czechoslovak Journal of Physics, v. 11, Aug. 1961, p. 602-608.

The magnetostriction constant and volume magnetostriction of wire specimens containing 28.16-76.60% Ni and 22.95-63.35% Fe, with an alloy containing 17.42% Co, are determined by tensometric measurement after annealing and plastic elongation. The influence of crystallographic texture is examined by X-ray diffraction. Phenomena observed in the decrease of magnetostriction are explained in terms of a stress-induced mechanism, assuming the influence of lattice deformation on spin-orbital interaction. 13 ref. (P16b, M26, 3-66, 3-68; Fe-b, Ni-b, Co)

640-P. (English.) Studies on the Nickel Matte. Pt. 1. Nickel-Iron-Sulphur System. Kiyokado Nishihara and Yoshio Kondo. Kyoto University, Faculty of Engineering, Memoirs, v. 23, Apr. 1961, p. 242-263.

Thermomagnetic analyses, X-ray studies and magnetization intensity measurements to determine magnetic properties of smelted specimens of the binary system Ni-S and of the ternary system Ni-Fe-S. 25 ref. (P-general, 1-53; Ni)

641-P. The Chemistry of the Rare Earths. Therald Moeller. Chapter 2 from "The Rare Earths". John Wiley & Sons, Inc., New York 16, 1961, p. 9-28.

Rare-earth metal chemistry is discussed in terms of electron configuration and related properties. Review of oxidation states, magnetic characteristics, light absorption properties, size relationship and stabilities of polyamine and polycarboxylic acid chelates. 75 ref. (P-general, R1h; EG-g45)

642-P. Physical Properties of the Rare Earth Metals. A. H. Daane. Chapter 13 from "The Rare Earths". John Wiley & Sons, Inc., New York 16, 1961, p. 177-189.

Review of melting points, transition temperatures, vapor pressures, crystal structures, densities, electrical resistivities, heat capacities, magnetic properties, thermal expansion coefficients, corrosion resistance, thermal conductivity and Hall coefficient for each rare-earth metal. 52 ref. (P-general, M26, R1, 10-54; EG-g45)

643-P. Rare-Earth Metals in Magnesium Technology. T. E. Leontis. Chapter 19 from "The Rare Earths". John Wiley & Sons, Inc., New York 16, 1961, p. 455-498.

Mg-rare earth alloys of high strength and creep resistance are prepared for jet engine parts in the form of sand and permanent mold

castings. Physical, mechanical and electrical properties are presented with special reference to the effects of other metals at 90-700° F. 44 ref. (P-general, Q-general, 2-60, 3-69, T24b; Mg, EG-g45, 5-60, 5-63)

644-P. An Approach to Extreme Temperature Alloys for Liquid Metal Space Power Applications. B. E. Farwell, R. S. Carey and D. E. Deutsch. Society of Automotive Engineers, 417A, 1961, 5 p.

Outline of presently available alloys and refractory metals for use in jet engines, steam power plants and other space power systems. W, Ta, Mo, Cb, Cr, Fe, Co and Ni are alloyed, fabricated and tested at 900-2500° F. with tabulation of physical and mechanical properties. 5 ref. (P-general, Q-general, T24e; SGA-h, Cb, Co, Cr, Fe, Mo, Ni, Ta, W, 14-60)

645-P. (German.) Viscosity of Pure Liquid Ferric Oxide (FeO) at Temperatures Between 1380 and 1490° C. Hermann Schenck, Martin G. Frohberg and Walter Rohde. Archiv fur das Eisenhuttenwesen, v. 32, Aug. 1961, p. 521-523.

Measurement of viscosity of FeO in a pure Fe crucible using a rotation viscosimeter with a rotating body of pure iron. (P10f, 1-54; Fe, 14-60, 14-68)

646-P. General Development in Ceramics for Marine Engineering. F. H. Aldred and N. W. Hinchliffe. American Society of Naval Engineers Inc., Journal, v. 73, Aug. 1961, p. 453-462.

Physical and mechanical properties are given for various metallurgical applications including the use of refractories in furnaces and of ceramics in welding and sand blast nozzles, heat engines in boiler plants, gas turbines and nuclear power plants and electronic equipment. 19 ref. (P-general, Q-general, T22; NM-f, 17-57)

647-P. (Russian.) Investigation of the Electric Resistance of Ce, La and Nd at Pressures Up to 250 Atm. L. F. Vereshchagin, A. A. Semerchan and S. V. Popova. Doklady Akademii Nauk SSSR, v. 138, May 1961, p. 1059-1061.

Maximum and minimum resistance are determined as functions of polymorphous transformations. (P15g, N-general, 3-74; Ce, La, Nd)

648-P. (Ukranian.) Study of the Influence of Plastic Deformation on Electric Resistance of Alloys. I. Y. Dikhtyar, S. H. Lytovchenko, R. H. Fedchenko. Ukrainskyi Fizychnii Zhurnal, v. 6, Feb. 1961, p. 233-237.

Dislocations and vacancies in Fe-Mo alloys are studied as they affect resistance. 4 ref. (P15g, M26b, 3-71; Fe, Mo)

649-P. (Russian.) Surface Tension of Certain Intermetallic Alloys. V. N. Eremenko, V. I. Nyzhenko and Y. V. Naidych. Izvestiya Akademii Nauk SSSR--Metallurgiya i Toplivo, Mar. 1961, p. 150-154.

Isothermic curves are established for surface tension and density of Cu-Al, Ni-Al and Ni-Be alloy systems at 1640° C. by the falling drop method. 20 ref. (P10a, P13h; Al, Be, Cu, Ni)

650-P. (Russian.) Viscosity of Liquid Nickel-Aluminum Alloys. A. A. Vertman and A. M. Samarin. Izvestiya Akademii Nauk SSSR--Metallurgiya i Toplivo, Mar. 1961, p. 159-160.

Study of kinematic viscosity at 1600-1700° C. with special reference to the effect of Ni_3Al on viscosity. (P10f, 2-60, 2-62; Ni, Al, 14-60)

651-P. (French.) Effect of Nonmagnetic Substitution Impurities on the Interatomic Magnetic Points in a Metal. Y. A. Rocher. Journal de Physique et le Radium, v. 22, June 1961, p. 367-376.

To explain the change of electrical and magnetic properties of a magnetic metal in the presence of Al, Cu, Zn, Ga and other nonmagnetic impurities, the case is studied when the spins of two magnetic atoms are coupled through an intermediate impurity atom. Effect of impurities on Curie point and electrical resistivity. 11 ref. (P16, P15, 2-60, 3-69; Al, Cu, Ga, Zn)

652-P. Pole Figures for Randomly Oriented Sheets of Silicon Steel and Aluminum. K. D. Maji and E. G. Ramachandran. NML (National Metallurgical Laboratory) Technical Journal, v. 3, May 1961, p. 28-35.

Calculation of the intensities of emergent X-rays after passage over an entire Debye cone through sheets of silicon and Al tilted at various angles. Tables showing emergent X-ray intensities versus

azimuth angle for angles of tilt from 10-67.5°. (P17c, M22f, 1-54; ST, Al)

653-P. (Translation-AIP.) Photoelectric Yield for Soft X-Rays. A. S. Ganeev and I. M. Izrailev. Soviet Physics--Technical Physics, v. 31, Sept. 1961, p. 270-274.

Cathodes made of Al, Ag, Ta and W are irradiated with X-rays with energies from 4-9 kev. to determine the dependence of photoelectric yield on energy and incidence angle. 7 ref. (P15k, 1-54; Al, Ag, Ta, W)

654-P. Cathodic Behavior of Iron Single Crystals and the Oxides Fe_3O_4, Gamma-Fe_2O_3 and Alpha-Fe_2O_3. C. D. Stockbridge, P. B. Sewell and M. Cohen. Electrochemical Society, Journal, v. 108, Oct. 1961, p. 928-933.

Potential current time relations are studied for Fe and Fe oxide surfaces during cathodic reduction in borate/HCl solution at 7.6 pH. Effect of crystallographic orientation and changes in surface microstructure on hydrogen overpotential. Comparison with reactions occurring on surfaces exposed to air. 10 ref. (P15, R1h; Fe-b, 14-61, 14-68)

655-P. Composition and Thickness Effects on Magnetic Properties of Electrodeposited Nickel-Iron Thin Films. Irving W. Wolf. Electrochemical Society, Journal, v. 108, Oct. 1961, p. 959-964.

A magnetic field is used during deposition to align the magnetic axes in films in one direction so that the film exhibits a single "easy" axis of magnetization, establishing an "induced" anisotropy. Effect of thickness (500-6000 Å) and composition (60% Ni-100% Ni) on the anisotropy field, H_k, as well as on wall coercive force, H_c and easy direction disturb, H_{cd}, are presented with evidence for stress interaction with magnetization and effects on substrate roughness. 10 ref. (P16, L17, 2-60, 3-72, 3-73; Ni-b, Fe, 14-62)

656-P. (English.) Swelling in Alpha Uranium Due to Irradiation. S. F. Pugh. Journal of Nuclear Materials, v. 4, July 1961, p. 177-199.

Review of phenomena causing volume expansion in specimens irradiated to about 1/2% burn-up at 400-650° C. in Na with and without thermal cycling as determined by metallography and mechanical testing. Relation to structural variations, properties of the specimen and irradiation variables with special attention to grain boundary cracking, distortion and embrittlement and nucleation and growth of fission product gas bubbles causing void formation. 34 ref. (P10d, M27, M28n, Q-general, 2-67; U)

657-P. The Calculation of Metallic Hall Constants--Topological Aspects and Applications to Copper. John R. Klauder. Bell System Technical Journal, v. 40, Sept. 1961, p. 1349-1367.

A numerical method for calculating the Hall constant which requires a topological investigation to be carried out on a two-dimensional plane. Each of several parallel two-dimensional planes in crystal-momentum space are analyzed to find, on a single sheet of Fermi surface, the number of non-intersecting closed contours that surround an arbitrary point. Application of this technique for the Pippard model for copper. 11 ref. (P15p, 1-54; Cu)

658-P. Properties of High-Resistivity Gallium Arsenide Compensated With Diffused Copper. J. Blanc, R. H. Bube and H. E. MacDonald. Journal of Applied Physics, v. 32, Sept. 1961, p. 1666-1679.

Hall effect and photocurrent are measured from low temperatures to 300° K. The temperature and wavelength dependence of photosensitivity is determined and donor and acceptor energies are discussed. Spectral response, optical quenching and the compensation process. 17 ref. (P15p; EG-j)

659-P. Flash Method of Determining Thermal Diffusivity, Heat Capacity and Thermal Conductivity. W. J. Parker, R. J. Jenkins, C. P. Butler and G. L. Abbott. Journal of Applied Physics, v. 32, Sept. 1961, p. 1679-1684.

A high intensity light pulse and thermocouple and oscilloscope and used to measure samples of Cu, Ag, Fe, Ni, Al, Sn, Zn, 1020 steel, 4340 steel, HK31 Mg alloy and 6Al-4V Ti alloy. 6 ref. (P11, 1-54; Ag, Al, Cu, Fe, Ni, Zn ST, Mg-a, Ti-a)

660-P. Cross-Section Ratios of Sensitizing Centers in Photoconductors. R. H. Bube. Journal of Applied Physics, v. 32, Sept. 1961, p. 1707-1709.

CdS, CdSe, ZnSe, GaAs, InP, GaSe and ZnTe photoconductors doped with Cu, Br, Ag, As, Si, Sn, Cl and In are investigated and the ratio of capture cross section to free electron cross section is determined from measurements of thermal quenching as a function of excitation intensity. Doubly charged centers are detected. 10 ref. (P18j, 1-54)

661-P. Effect of Temperature on the Exoemission of Electrons From Abraded Aluminum Surfaces. W. T. Pimbley and E. E. Francis. Journal of Applied Physics, v. 32, Sept. 1961, p. 1729-1733.

Exoemission of a surface abraded to produce vacancies is measured with a Geiger counter and found to depend upon the vacancy diffusion and temperature (9.9-44.4° C.). Activation energies are measured. 11 ref. (P17, P13a, 2-61, 3-71; Al)

662-P. Characteristics of the Annealing Kinetics of Tin Films Deposited at 88° K. J. Priest, C. Chior and H. L. Caswell. Journal of Applied Physics, v. 32, Sept. 1961, p. 1772-1776.

The electrical resistance of high-purity films is measured to 180° K. and the annealing behavior is found to depend upon the oxygen content of the atmosphere and on film thickness. Defect resistivity and annealing peak activation energies are determined. 17 ref. (P15g, P13a, N7d, 2-60, 3-73; Sn, 14-62)

663-P. Thermionic Emission of UC-Nb. R. H. Abrams, Jr., and F. E. Jamerson. Journal of Applied Physics, v. 32, Sept. 1961, p. 1783-1784.

A cathode is prepared from 80 vol.% UC and 20 vol.% Cb by pressure bonding at 1700° K. under He pressure of 680 atm. The thermionic emission and work function are measured by vacuum heating to 1960° K. using electric fields to 23,000 v. per cm. The saturation current is determined. (P15k, 1-54)

664-P. Angular Dependence of Torque in Anisotropic Permalloy Films. W. D. Doyle, J. E. Rudisell and S. Shtriknam. Journal of Applied Physics, v. 32, Sept. 1961, p. 1785-1787.

Thin films of 77% Ni are vacuum deposited in a magnetic field and the torque is measured with a torque magnetometer. The angular dependence is determined as well as the anisotropy and the rotational hysteresis. 10 ref. (P16, 1-54; Ni-b, 14-62)

665-P. Photovoltaic Effects in Cs_3Sb Films. Frederick Wooten. Journal of Applied Physics, v. 32, Sept. 1961, p. 1789-1790.

Thin films are vapor deposited on glass substrates using Al electrodes. Electrical resistivity, thermoelectric power and Seebeck coefficient are measured. The photovoltaic effect is determined and the influence of band bending on the photoemission is discussed. 4 ref. (P15j, N15g, 1-54; Cs, Sb)

666-P. Voids in Resolidified Drops of Molten Metal. J. C. Kelley. Journal of Applied Physics, v. 32, Sept. 1961, p. 1797-1798.

Metal rods of spectroscopically pure Ni, Cb and W are suspended in glass tubing and melted with an electron gun to form a molten drop, then resolidified. Voids in the drops are indicated as introducing errors in the measurement of surface tensions. 4 ref. (P13h, 1-54; Cb, Ni, W)

667-P. Thermal Conductivity in Two-Phase Alloys. J. B. Schroeder. Journal of Applied Physics, v. 32, Sept. 1961, p. 1798-1799.

A mechanism is proposed for thermal conductivity in two-phase bismuth telluride which involves circulating currents, the Seebeck emf. and the Peltier effect. Grain structure is shown to affect conductivity. 4 ref. (P11h, P15j, 1-54)

668-P. Angular Dependence of Magnetoresistance in HgSe. T. C. Harman. Journal of Applied Physics, v. 32, Sept. 1961, p. 1800-1801.

Crystals are grown and samples are cut, lapped, annealed and etched. Electrodes are attached and the magnetoresistance is measured as a function of magnetic field orientation. Conduction band anisotropy is detected. 5 ref. (P15, P16, 1-54)

669-P. Thermoelastic Equations and Grueneisen's Relation. A. M. Freudenthal. Journal of Applied Physics, v. 32, Sept. 1961, p. 1801-1802.

Thermoelastic and thermoinelastic equations are derived by a stress analysis invoking the Gureneisen relation, thermal expansion, bulk modulus and specific heat. Thermal wave propagation is discussed. 5 ref. (P11, 1-54)

670-P. Thermionic Emission From a Tantalum Crystal in Cesium or Rubidium Vapor. H. F. Webster. Journal of Applied Physics, v. 32, Sept. 1961, p. 1802-1803.

The thermionic emission patterns are obtained using a phosphor screen and hemispherical cathode technique. Emission is found to depend upon crystallographic orientation. Vapor deposition changes the work function as well as the pattern form. (P15k, N15g, 1-54)

671-P. Theory and Use of Thermostatic Bimetals. P. Martin and N. Yarworth. Engineering, v. 192, Sept. 22, 1961, p. 366-367.

Thermostatic bimetals tested are Fe-base alloys containing 14-50% Ni with small additions of Cr and Mn. Determination of the effect on thermal activity of varying and low expansion component in combination with a common high expansion alloy at -70 to 500° C. Application of thermostatic bimetals for industrial and domestic use (thermostat, voltage regualtor). (P11, 1-54; SGA-a, Fe, Ni, Cr, Mn)

672-P. (German.) Electron Diffraction Technique for Thermomagnetic Analysis. S. Yamaguchi. Zeitschrift fur Instrumentenkunde, v. 69, Aug. 1961, p. 224-226.

Measurement of magnetic induction of Invar (64% Fe, 36% Ni) powder and investigation of magnetic anisotropy of Co crystals by double electron diffraction exposures at low (40° C.) and high (300° C.) temperatures. (P16, 1-54, 2-61; Co, Fe, Ni)

673-P. Some Electrical Resistivity Measurements on a Series of Iron-Chromium Alloys. R. W. Powell, R. P. Type and Margaret J. Woodman. Philosophical Magazine, v. 6, July 1961, p. 857-862.

Electrical resistivities of Fe and five 1.2-5.58% Cr-Fe alloys measured at -269 to 910° C. Both the temperature of alpha to gamma transformation and the consequent decrease in apparent electrical resistivity (neglecting dimensional changes) are approximately linear functions of the Cr content. Hysteresis is observed on cooling. 5 ref. (P15g, 2-60, 2-61, 2-64; Fe-b, Cr)

674-P. Reinterpretation of Discordant X-Ray Results for the Debye Temperature of Silver. F. H. Herbstein. Philosophical Magazine, v. 6, July 1961, p. 863-869.

Values given in the literature for the Debye temperature of Ag as a function of temperature are derived from measurements of elastic constants and from the temperature variation of Bragg intensities and are not in good agreement. Reinterpretation of the X-ray measurements, by a method due to Chipman (1960), gives new values which agree satisfactorily with the elastic-constant values. 15 ref. (P12r, M22g, Q21, 2-61; Ag)

675-P. The Interfacial Energy of Coherent Twin Boundaries in Copper. M. C. Inman and A. R. Khan. Philosophical Magazine, v. 6, July 1961, p. 937-938.

Electron transmission microscopy study of thin films of OFHC Cu annealed at 950° C. Coherent twin boundary-grain boundary intersections are observed and correlated with data for the inclination of the twin plane to the surface for computing the true dihedral angles of intersections. 4 ref. (P13h, M27e, 2-64; Cu-a)

676-P. The Solubility of Krypton in Liquid Cadmium and Indium. G. W. Johnson. Philosophical Magazine, v. 6, July 1961, p. 943-946.

Measurements at 1000-1300° C. on liquid In and at 1150° C. for Cd, with thermodynamic calculation of the solubility of Kr as a function of temperature, using the Ostwald solubility coefficient. Surface energy and vibrational entropy relations are derived with comparison made to Pb and Sn. 7 ref. (P12e, 2-61; In, Cd, Kr)

677-P. The Effect of Various Gases and Vapors on the Surface Tension of Mercury. M. E. Nicholas, P. A. Joyner, B. M. Tessem and M. D. Olson. Journal of Physical Chemistry, v. 65, Aug. 1961, p. 1373-1375.

The effects of He, H_2, N_2, O_2, CO_2, H_2O, CH_4, C_3H_8, stopcock grease and pump oil on surface tension of purified Hg is determined in vacuo at 25°. Na, Mg, Zn, Cd, Ph, Sn, Tl, Ni, Al, Cr, Cu, Au, Pt and Ag are removed by HNO_3, amalgams and vacuum distillation. 16 ref. (P13h, 1-54; Hg)

678-P. Rare Earths. Pt. 2. A Mass Spectrometric Determination of the Heats of Sublimation (or Vaporization) of Neodymium, Praseodymium, Gadolinium, Terbium, Dysprosium, Holmium, Erbium and Lutetium. David White, Patrick Walsh, Harold W. Goldstein and David F. Dever. Journal of Physical Chemistry, v. 65, Aug. 1961, p. 1404-1409.

A mass spectrometer is adapted for thermodynamic investigations at elevated temperatures. Chemical reactions and effusion are observed. Heats of transition, sublimation and vaporization are determined. 13 ref. (P12, 1-54; EG-g45)

679-P. Rare Earths. Pt. 3. A Mass Spectrometric Investigation of the Isomolecular Oxygen-Exchange Reactions of Lanthanum, Cerium, Praseodymium and Neodymium With Their Monoxides. Patrick N. Walsh, David F. Dever and David White. Journal of Physical Chemistry, v. 65, Aug. 1961, p. 1410-1413.

Equilibrium constants, heat of reaction and dissociation energies are determined for the exchange reactions at 1900° K. The electronic contributions to the entropy of the gaseous monoxides are discussed. 13 ref. (P12, 1-54; EG-g45)

680-P. Correction of the Potassium Vapor Pressure Equation by Use of the Second Virial Coefficient. R. J. Thorn and G. H. Winslow. Journal of Physical Chemistry, v. 65, Aug. 1961, p. 1297-1302.

Absolute vaporization energy, dissociation energy, heat of vaporization and free energy are determined at high temperatures. 21 ref. (P12, 1-66; K)

681-P. (German.) Use of Modern Statistical Methods in Production Control of Light Metal Die Casting. Metall, v. 15, Sept. 1961, p. 863-869.

Electromagnetic induction measurements of electrical conductivity in quality control of homogenized and warm aged AlSiMg alloy die casting. (P15g, P16, 1-53, 17-54; Al-b, Si, Mg, 5-61)

682-P. Magnetic Materials. Edgar Allen News, v. 40, Sept. 1961, p. 196-198.

Magnetic properties of hot worked W, Cr and Co steel magnets after annealing, solution treatment and quenching. Determination of the demagnetization curves and the effects of the alloy composition, heat treatment, quenching, section thickness and the manufacturing method on remanence, coercivity and maximum energy product. (P16, 2-60, 2-64, 3-73; ST, SGA-n)

683-P. (German.) Electrochemical Properties of Various Electrolytic Nickel Types. Pt. 1. E. Raub and A. Disam. Metalloberflache, v. 15, July 1961, p. 193-197.

Measurement of electric potential and anode potential versus current density curves for various types of electrolytic Ni and for rolled Ni in NaCl and 0.1 n H_2SO_4 solution at room temperature in the presence of air and emf. measurements in chloride, sulphate and sulphite containing solutions using electrodes of electrolytic Ni or NiCr alloys. (P15, L17c, 2-61, 2-66; Ni, Cr)

684-P. (German.) Electrochemical Properties of Various Electrolytic Nickel Types. Pt. 2. E. Raub and A. Disam. Metalloberflache, v. 15, Aug. 1961, p. 229-233.

Investigation of corrosion and contact corrosion of various electrolytic Ni and NiCr electrodes by emf. measurements of the investigated metals. (P15, L17c, R-general, 1-54; Ni, Cr)

685-P. (Russian.) Magnetic Properties of a Polycrystalline Alloy, Cu + 22.8 at.% Manganese. I. G. Fakidov and B. V. Znamenskii. Zhurnal Eksperimental'noi i Teoreticheskoi Fiziki, v. 40, May 1961, p. 1522-1523.

Detailed investigation of physical properties in an unregulated condition including magnetocalorific effect. Magnetization curves. 9 ref. (P16; Cu, Mn)

686-P. (Russian.) Paramagnetic Resonance in Metallic Al. A. A. Galkin and V. P. Naberezhnykh. Zhurnal Eksperimental' noi i Teoreticheskoi Fiziki, v. 40, June 1961, p. 1876-1877.

Observation of electronic paramagnetic absorbtion on an Al monocrystal of a residual resistance of 6.7×10^{-5}, corresponding to the length of the free path of an electron, $2. \times 10^{-2}$ cm. 8 ref. (P16p; Al, 14-61)

687-P. (German.) Magnetic Investigation of Gold-Chromium Alloys. Ernst

Wachtel and Ursula Vetter. Zeitschrift fur Metallkunde, v. 52, Aug. 1961, p. 525-529.

Measurement of magnetic susceptibility of specimens (7.5-29.2 at.% Cr) homogenized at 1000° C., at temperatures from 173-1000° K., using a magnetic balance. Magnetic properties are studied as influenced by temperature and composition. Charge of Cr atoms in Au lattice. (P16n, P16p, M26, 2-60, 2-61; Au, Cr)

688-P. (Translation.) Electric Transport in Interstitial Solid Solutions. D. F. Kalinovich. Soviet Physics--Solid State, v. 3, Oct. 1961, p. 812-815. (Translation from Fizika Tverdogo Tela, v. 3, Apr. 1961.)

Forces acting on the ions of elements (C, Fe, Ni, Ti, N, O, Pd, H, Cu, Al, Ag, Au, Cd, Zn and Cr) interstitially embedded in various systems under the influence of an electrical field are discussed in terms of the theory of electric transference. 26 ref. (P15, 1-54; 14-67)

689-P. (Translation.) Electrical and Galvanomagnetic Properties of n-Type Indium Antimony at Low Temperatures. Lien Chih Ch'ao and D. N. Nasledov. Soviet Physics--Solid State, v. 3, Oct. 1961, p. 861-864. (Translation from Fizika Tverdogo Tela, v. 3, Apr. 1961.)

Investigation of the impurity band and magnetoresistance oscillations in InSb (10^{12} to 10^{15} cm^{-3}) in the temperature range 4-77° K. (P15, P16, 1-67, 3-69; In, Sb)

690-P. The Physical and Mechanical Properties of Metals and Alloys. Precision Metal Molding, v. 19, Oct. 1961, p. 60-67.

Properties of metals are tabulated for applications in plaster mold, die, permanent mold and investment castings and extrusions. (P-general, Q-general, E-general, F24, 17-57)

691-P. Basic Studies of the Metallic State. A. I. Schindler. Report of the NRL (Naval Research Laboratory) Progress, Sept. 1961, p. 40-41. (Available as PB 171322 from U. S. Office of Technical Services, Washington 25, D.C.) $1.25.

Effects of neutron irradiation on the magnetic characteristics of metal alloys and ferrites including coercive force, remanence, shape of the hysteresis loop, Curie temperature and magnetic moment. Radiation sensitivity appears to be related primarily to the dependence of magnetic properties on the ease of short-range ordering of the atoms along certain crystallographic directions. (P16, N10, 2-67)

692-P. (Czech.) Quality of Pole Shoes Manufactured by Powder Metallurgical Methods. Zdenek Ministr. Electrotechnicky Obzor, v. 50, no. 4, 1961, p. 210-214.

Testing of the magnetic properties of sintered iron samples. Effects of composition, deformation, heat treatment, density and the direction of pressing on magnetic induction and permeability. (P16, 2-60, 2-64, 3-68, 3-72, 3-74; Fe, 6-71)

693-P. (English.) Internal Magnetic Field in Rare Earth Metals. Jun Kondo. Physical Society of Japan, Journal, v. 16, Sept. 1961, p. 1690-1691.

Calculation of the effective magnetic field, taking into account the contribution from the orbital angular momentum of 4 f-electrons. 10 ref. (P16, 1-54; EG-g45)

694-P. (German.) Investigation of Heat Treatment of Magnetically Soft Iron-Aluminum Alloys. G. W. Krassnoperow and N. I. Lapkin. Physikalische Abhandlungen aus der Sowjetunion, v. 4, no. 6, 1961, p. 442-446.

Measurement of ultimate and initial magnetic permeability, coercive force and electric resistivity of hot rolled sheet specimens of a FeAl alloy containing 15.7% Al after various heat treatments such as annealing at 800-1200° C., controlled cooling and quenching in NaOH solution (20%). (P15g, P16a, P16q, 2-64, 1-54; Fe-b, Al)

695-P. (Ukranian.) Concentration Dependence of Electric Transfer of Nickel-Chromium Alloy Components. I. M. Franzevich and M. D. Smolin. Dopovidi Akademii Nauk Ukrainskoi RSR, July 1961, p. 908-910.

Ni-Cr alloys with Cr content from 4.76-31.01 at.% are investigated to derive formulas for calculation of composition with reference to transfer at 1250° C. 6 ref. (P15, 2-60; Ni, Cr)

696-P. (German.) Measurement of Electromotive Forces on Liquid Cadmium-Arsenic and Cadmium-Antimony Alloys. Erich Scheil and Arno Kalkuhl. Zeitschrift fur Metallkunde, v. 52, Sept. 1961, p. 557-564.

Emf. measurements on binary Cd-As and Cd-Sb alloys in the concentration ranges 0-70 at.% As and 0-100% Sb at temperatures from 400-800° C. and evaluation of thermodynamic activities and partial molal energy properties using a UCl-LiCl-$CdCl_2$ mixture as electrolyte. Density measurements and investigation of undercooling effects to explain abnormal activity behavior. (P10a, P15g, 2-60, 2-61, 1-54; Cd-b, As, Sb)

697-P. (German.) Surface Changes in Reactions of Solids. Georg Maria Schwab and Reinhard von Ammon. Zeitschrift fur Metallkunde, v. 52, Sept. 1961, p. 583-587.

Investigation of specific surface area and reaction mechanism as a function of temperature (0-1000° C.), during sintering of metal powders, reduction of oxides by less noble elements and decomposition of oxides, formiates and oxalates. Binary systems include Fe-Co, Co-Ni, Fe-Ni, Fe-W, Co-W, Ni-W and Co-Cr; oxide systems include CuO-Fe, WO_3-Fe and Fe_2O_3-C; single compounds include Ni $(CO_2)_2$, Ni $(HCO_2)_2$, Co $(HCO_2)_2$, AgO and $KMnO_4$. (P10, P13, H15, C26, 1-54)

698-P. (English.) X-Ray Studies on Solid Solutions of Oxygen in Alpha Zirconium. Bo Holmberg and Tore Dagerhamn. Acta Chemica Scandinavica, v. 15, Apr. 1961, p. 919-925.

Effect of temperature (400-800° C.) and increasing oxygen content on solubility . Tabular data on sample composition, density, lattice parameter, unit cell volume, powder pattern and superstructure reflection intensity. 9 ref. (P12e, 2-60, 2-61; Zr, EG-q)

699-P. (French.) Properties and Applications of Austenitic "Ni-Resist" S. G. Cast Irons. J. Grilliat. Revue du Nickel, v. 27, July-Aug. 1961, p. 87-96.

Cast specimens containing various amounts of Ni, Cu, Cr or Si are tested with regard to density, melting point, thermal expansion and conductivity, electrical resistivity, magnetic permeability, tensile and creep properties at 20-760° C., hardness, modulus of elasticity, shear strength, compressive strength and resilience at room temperature. Wear and corrosion resistance, weldability and machinability are also considered, along with types of heat treatment. (P-general, Q-general, K9s, G17k, 10-54; CI-r)

700-P. Vapor Pressure of Antimony by the Torsion Effusion Method. Gerd. M. Rosenblatt and C. Ernest Birchenall. Journal of Chemical Physics, v. 35, Sept. 1961, p. 788-794.

Simultaneous measurement of pressures and mean molecular weights of the vapors over solid Sb (420-550° C.) and solid Zn (250-335° C.) by torsion momentum and Knudsen weight loss methods. Calculation from data of entropy and enthalpy of vaporization and standard heats of reaction. 14 ref. (P12c, P12r, P12s, 1-54; Sb, Zn)

701-P. Cohesive Energies of Europium, Gadolinium, Holmium and Erbium. O. Conrad Trulson, Donald E. Hudson and Frank H. Spedding. Journal of Chemical Physics, v. 35, Sept. 1961, p. 1018-1026.

Calculation of enthalpy and heat of sublimation of metallic and gaseous states from the study of solid-gas phase changes by the mass spectrometric method down to 298° K. Summary of cohesion in the rare earth series. 19 ref. (P12q, P12r, 1-54; EG-g45)

702-P. Low Temperature Specific Heat of Molybdenum. C. A. Bryant and P. H. Keesom. Journal of Chemical Physics, v. 35, Sept. 1961, p. 1149-1150.

One specimen is a pellet prepared by melting Mo powder of 99.8% purity in a helium arc furnace and quenching on a water-cooled copper hearth; the other is a sintered and ground rod of nominal 99.99% purity and a density nearer that of a perfect crystal. Data are taken between 1 and 4.5° K. 6 ref. (P12r, 1-54, 1-67; Mo)

703-P. (French.) New Aeronautic Materials. H. Buckle. Technique Moderne, v. 53, July 1961, p. 53-64.

W, Re, Ta, Os, Mo, Cb, Ir, Ru, Hf, Rh, Cr, V, Zr, Pt, Ti, Be, graphite, binary Mo-Re and W-Re alloys, Ni-Cr alloys, $MoSi_2$, B_4C, WC, TiN,

TaB_2, TiC, CbC and HfC are mechanically tested at -160 to 2900° C. and corrosion tested in various solutions. Tabulation of physical and mechanical properties. 11 ref. (P-general, Q-general, R-general, T24, 1-53, 17-57)

704-P. (Russian.) Thermochemical Characteristics of PbO-SiO_2-Na_2O Melts. H. A. Toporishchev, O. A. Esin and S. H. Bratchikov. Izvestiya VUZ--Tsvetnaya Metallurgiya, Mar. 1961, p. 37-43.

Determination of heat capacity and enthalpy of PbO-SiO_2-Na_2O systems at 400-1200° C. with variable SiO_2 content; graphs; formulas. 18 ref. (P12r, 1-54, 2-60; Pb, Si, EG-g40, 14-68)

705-P. Some Thermal and Magnetic Properties of Tantalum, Niobium, and Vanadium at Helium Temperatures. A. Calverley, K. Mendelssohn and P. M. Rowell. Cryogenics, v. 2, Sept. 1961, p. 26-33.

Properties determined include thermal conductivity, thermal resistance in the intermediate state and critical field behavior. Results obtained by zone refining are compared with results of similar measurements on Pb. 34 ref. (P11, P16, 1-54, 2-63; Cb, Ta, V)

706-P. An Apparatus for Studying Ultrasonic Absorption in Metals at Low Temperatures. A. A. Galkin and A. P. Korolyuk. Cryogenics, v. 2, Sept. 1961, p. 48-52.

The sound intensity of a signal transmitted through a small crystal specimen of Sn is automatically recorded as a function of magnetic field. Resultant data enable determination of the Fermi surface. 8 ref. (P15, P17c, 1-53; Sn)

707-P. The Ferromagnetic-Antiferromagnetic Properties of Copper-Manganese and Silver-Manganese Alloys. J. S. Kouvel. Physics and Chemistry of Solids, v. 21, Oct. 1961, p. 57-70.

Magnetic hysteresis loops displaced from their symmetrical positions about the origin are observed in alloys of 5-30% Mn in Cu and 10-25% Mn in Ag cooled to 1.8° K. in a magnetic field. Remanent magnetizations are related to a ferromagnetic alignment of Mn atomic moments. The hysteresis loop displacement and hysteresis losses, magnetic susceptibility electrical resistivity and magnetic transition are determined as a function of temperature and alloy composition and are consistent with a microscopic exchange anistropy model based on the coexistence of antiferromagnetic and ferromagnetic interactions between Mn atoms. 16 ref. (P16, 2-60, 2-61, 3-72; Cu-b, Ag-b, Mn)

708-P. Electronic Specific Heat of Mn-Cu Alloys. J. E. Zimmerman and H. Sato. Physics and Chemistry of Solids, v. 21, Oct. 1961, p. 71-75.

The specific heats of f-c-c. Mn-Cu alloys containing 3 1/2-90% Cu are measured at 4.2% K. The major specific heat component is electronic which varies with Cu concentration according to gamma, beta and alpha phase state. Implications of the specific heat data on the electronic density of states curve and on the magnetic properties of Mn-Cu alloys are discussed. The lattice component of the heat capacity varies only moderately with concentration. 26 ref. (P12r, P15g, P16, M25, 2-60, 2-63; Cu-b, Mn)

709-P. Surface Magnetoconductivity Experiments on Silicon. R. E. Coovert. Physics and Chemistry of Solids, v. 21, Oct. 1961, p. 87-98.

Measurements of the Hall coefficient and magnetoconductivity of holes and electrons trapped in the space charge region adjacent to a thermally oxidized surface on high resistivity p-type and n-type samples at 90° C. as a function of field induced surface conductance. The results are compared with theories for random and specular surface scattering as influenced by ionized impurities. 31 ref. (P15g, P16, 3-69; Si)

710-P. The Van Vleck Temperature-Independent Magnetism of Metals. L. E. Orgel. Physics and Chemistry in Solids, v. 21, Oct. 1961, p. 123-124.

Calculations are made suggesting that the van Vleck paramagnetism due to induced orbital motion makes an important contribution to the susceptibility, magnetic shielding, Knight shift and relaxation time of body centered transition metals, examples being given for Co and V. 5 ref. (P16; Co, V)

711-P. Theory of the Resistance Minimum in Dilute Paramagnetic Alloys. A.

D. Brailsford and A. W. Overhauser. Physics and Chemistry of Solids, v. 21, Oct. 1961, p. 127-128.

Calculations indicating that the s-d. exchange scattering of conduction electrons by ferromagnetically coupled ion pairs constitutes a mechanism for the occurrence of a resistivity minimum in dilute paramagnetic alloys at low temperatures. 11 ref. (P15g, M25, 2-63; SGA-n)

712-P. (English.) Anomalous Electrical Resistivity of Ordered Cu_2NiZn at Low Temperatures. V. A. Phillips. Acta Metallurgica, v. 9, Oct. 1961, p. 976-978.

Resistivity measurements at 4.2-298° K. on polycrystalline wire specimens ordered by heating in air to 900° K. and slow cooling to room temperature, the residual resistivity being determined as higher in the ordered than disordered state. The anomaly for long range order induced resistivity is analyzed in terms of Brillouin zone splitting and the presence of antiphase boundaries. 7 ref. (P15g, N10, 2-61; Cu-b, Ni, Zn)

713-P. (English.) A Note on the Freezing Range of the Equiatomic Ag-Au Alloy. C. J. Coake and W. Hume-Rothery. Acta Metallurgica, v. 9, Oct. 1961, p. 982.

The liquidus point is determined at 1032.5° C. for specimen ingots by a cooling curve. After solidification, the ingots are annealed for 1/2 hr. with the solidus point being established from a heating curve. The freezing range is calculated at 1.7° C. and compared with values in the Hansen equilibrium diagram and with those calculated by Wagner. (P12n, N12, 2-60, 2-61; Ag-b, Au-b)

714-P. (Russian.) Effect of Atom Thermal Vibrations on the Process of Melting the Thin Structure of X-Ray Absorption Spectra. Pt. 1. Investigation of the Solid Solution Copper-Platinum. I. B. Borovskii and G. N. Ronami. Izvestiya Akademii Nauk SSSR--Seriya Fizicheskaya, v. 25, Aug. 1961, p. 999-1001.

Investigation of absorption spectrum of Cu and Pt in pure Cu, pure Pt and an alloy of CuPt stoichiometric composition. Effect of temperature and thermal fluctuations of atoms on the disappearance of the fine absorption spectrum. 7 ref. (P17c, M25h; Cu-b, Pt-b)

715-P. Thermal Conductance of Machined Metal Contacts. L. C. Laming. Paper from "International Developments in Heat Transfer Conference", Aug-Sept. 1961, American Society of Mechanical Engineers, New York 18, Pt. 1, p. 65-76.

Determination of the total thermal conductance per unit area on machined plates of mild steel, brass and Al using interface fluids of air, glycerol and water. Measurements of conductance versus load are made. The effects of fluid film conductance, metallic a-spot conductance and hardness on the total thermal conductance. 9 ref. (P11h, 1-54; CN, Cu-n, Al, 4-53)

716-P. The Thermal and Electrical Conductivity of Liquid Mercury. R. W. Powell and R. P. Tye. Paper from "International Development in Heat Transfer Conference", Aug-Sept. 1961, American Society of Mechanical Engineers, New York 18, Pt. 4, p. 856-862.

A comparative longitudinal heat flow method is used to determine the thermal conductivity, electrical resistivity and Lorenz function of Hg at 30-200° K. A description of the heat flow apparatus is given. 25 ref. (P11h, P15g, P16, 1-54; Hg, 14-60)

717-P. The Density of Liquid Plutonium Metal. C. Z. Serpan, Jr., and L. J. Wittenberg. Metallurgical Society of AIME, Transactions, v. 221, Oct. 1961, p. 1017-1020.

The density of liquid Pu was determined by a pycnometric technique at 664-788° C. and exhibits a temperature dependence which is expressed by an equation. These density values compare favorably with the values previously obtained by a technique utilizing Archimedes' principle. The apparatus and method were evaluated when the densities of molten Sn and Bi were measured. 7 ref. (P10a, 2-61; Pu, 14-60)

718-P. Thermodynamics of Silicon Monoxide. H. F. Ramstad and F. D. Richardson. Metallurgical Society of AIME, Transactions, v. 221, Oct. 1961, p. 1021-1028.

The equilibria $SiO_2 + H_2 = SiO + H_2O$ and $Si + SiO_2 = 2SiO$ are studied at 1425-1600° C. and 1310-1485° C. respectively by measuring the amounts of silica which could be condensed

from streams of H_2 or H_2 + H_2O brought into equilibrium with silica or by measuring the material that could be condensed from streams of H_2 or Ar brought into equilibrium with mixtures of Si and silica. The standard free energy changes for the reactions are given by equations which remove certain anomalies in existing high-temperature data for equilibria involving SiO_2 and Si in Fe. 21 ref. (P12a, P12d, 2-60, 2-61; Si-b, 14-68)

719-P. Axial Thermal Expansion of Rhenium. R. J. Wasilewski. Metallurgical Society of AIME, Transactions, v. 221, Oct. 1961, p. 1081-1082.

Discontinuities along the a and c lattice parameters are observed in vacuum annealed Re specimens as a function of temperature at 25-1288° C. by X-ray diffraction examination and least squares method calculations. 8 ref. (P11g, M26, 2-61; Re)

720-P. Hydrogen From a Hydrocarbon Lubricant Absorbed by Ball Bearings. D. E. Swets and R. C. Frank. Metallurgical Society of AIME, Transactions, v. 221, Oct. 1961, p. 1082-1083.

Steel bearings are fatigue tested for varying times in mineral oil lubricants, containing deuteroparaffin as a source for radioactive H_2 with subsequent hot extraction and isotope measurement techniques used to determine hydrogen pickup by the bearings as caused by decomposition of the hydrocarbon lubricant. 6 ref. (P13d, T7d, 1-59, 18-73; ST, 17-57, H)

721-P. (French.) Properties of High-Purity Aluminum. Georges Chaudron. Revue de l'Aluminium, no. 288, June 1961, p. 755-762.

Aluminum of 99.7-99.999% purity is held at 400° C. for four days with measurement of the variation of electrical conductivity and residual resistance with the degree of purity. Recrystallization velocity after 97% deformation and subsequent treatment at 79° C. is determined as a function of purity. (P15g, N5, 2-60, 2-64; Al-a)

722-P. (Russian.) Thermodynamic Properties of Silver-Antimony Alloys. A. A. Vecher and Ya. I. Gerasimov. Doklady Akademii Nauk SSSR, v. 139, Apr. 1961, p. 863-865.

Cell potential measurements of molten Ag-Sb alloys (10.3-79.5% Ag) at 630-830° C. providing activity, enthalpy and enthropy values as functions of composition. 9 ref. (P12, 2-60, 2-61; Ag-b, Sb)

723-P. (Russian.) Heat of Dissociation of the Kurnakov Compounds Ni_3Fe, Ni_3Mn, Ni_3Cr and Ni_3V. I. I. Kornilov and N. M. Matreev. Doklady Akademii Nauk SSSR, v. 139, Apr. 1961, p. 880-883.

Thermal analysis used to determine enthalpies of transformation into solid solutions of Ni_3V, Ni_3Fe, Ni_3Mn and Ni_3Cr compounds. Effect of previous annealing time and temperatures and location in the periodic table on enthalpy. 13 ref. (P12r, P12e, 2-64; Ni-b, 14-67)

724-P. (Russian.) Magnetic and Magnetoelastic Properties of Dyprosium and Gadolinium. K. P. Belov, R. Z. Levitin, S. A. Nikitin and A. V. Ped'ko. Zhurnal Eksperimental'noi i Teoreticheskoi Fiziki, v. 40, June 1961, p. 1562-1569.

Investigation of magnetic transformations, temperature dependences of magnetization; elasticity modulus and internal friction at 80-178° K. 12 ref. (P16, Q22, 2-63; Dy, Gd, EG-g31)

725-P. (German.) Contribution to the Problem of Heat Transfer on Metal-Liquid Interfaces. P. Csokan. Harterei-Technische Mitteilungen, v. 16, July 1961, p. 75-79.

Measurement of heat transfer on metal/liquid interface during quenching of Cu specimens from 850° C. in water and various oils of given physical properties as influenced by temperature of specimen and initial temperature of quenching liquid. (P11k, J26, 2-61; Cu)

726-P. (German.) Thermoelectric Measurements on Unalloyed Toolsteel. P. Fischer. Harterei-Technische Mitteilungen, v. 16, July 1961, p. 110-112.

Investigation of alpha-gamma transitions by thermovoltage measurements on annealed C 100 W 1 steel and austenitic 18/8 steel wire specimens; and measurement of thermovoltage as influenced by annealing temperature of oil-hardened (790-830° C.) C 100 W 1 steel. (P15j, N-general, 2-61, 2-64; TS, SS-e)

727-P. (German.) Effect of Bath Nitriding on Several Physical Properties of Low-Carbon Steels. A. Kettmann and W. Stuhlmann. Harterei-Technische Mitteilungen, v. 16, July 1961, p. 112-114.

Investigation of magnetic properties, with emphasis on coercive force, and of technological properties such as wear and corrosion resistance of bath nitrided low-carbon steels including MK 3 steel, St 3 steel, AISI 8620, X 10 Cr 13, X 8 Cr 17 and X 12 CrNi 18 8 steel. 4 ref. (P16, P-general, J28, Q-general; ST)

728-P. Magnetic Materials. Edgar Allen News, v. 40, Aug. 1961, p. 169-172.

Review of principles of magnetism and characteristics of permanent magnets including magnetizing and demagnetizing relations and maximum energy product, design of magnets and properties of magnetic materials such as Alcomax, Alnice, Alni, Nial, lodestone and Cr, W and C steels. (P16; SGA-n, 10-54)

729-P. Transfer of Heat Below 0.15° K. A. C. Anderson, G. L. Salinger and J. C. Wheatley. Review of Scientific Instruments, v. 32, Oct. 1961, p. 1110-1113.

Heat transfer from a Cu thermal link into single crystal slabs of chromium potassium alum ($KCr(SO_4)_2 \cdot 12H_2O$) are measured at 0.03-0.15° K. The temperature differences produced by heating are less than 6% of the average temperature and the heat flow rates are proportional to the contact area with the thermal link. (P11h, 2-63; Cu)

730-P. High-Temperature Colorimeter for the Determination of Heats of Formation of Refractory Compounds. C. E. Lowell and Wendell S. Williams. Review of Scientific Instruments, v. 32, Oct. 1961, p. 1120-1123.

Technique and equipment for measuring heat of formation of Ti with boron and carbon using a high-temperature colorimeter which includes a carbon crucible, pump for evacuation and heating chamber. The experiment is made by direct reaction of the elements at low pressure (1×10^{-5} mm. Hg) and at temperatures in excess of 1000° C. Determination of heat of formation of TiB_2 and TiC. (P11, P12, 1-52)

731-P. (German.) Radioactivation of Steels for Reactor Construction. K. Fink and N. Riehl. Atomwirtschaft, v. 6, July-Aug. 1961, p. 392-398.

Computation of gamma-saturation activities for 17 Mn4, 15 Mo 3, 19 Mn 5 Mo, X 10 CrNiTi 18 9 and X 10 CrNiCb 18 9 steels and experimental measurement of activity for 19 Mn 5 Mo steel specimens to prove significance of estimated results. Computation of radioactivity on external surface of reactor vessels of 19 Mn 5 Mo steel. (P18, T11, 1-59; ST, 17-59)

732-P. Surface Properties of Liquid Sodium and Sodium-Potassium Alloys in Contact With Metal Oxide Surfaces. D. H. Bradhurst and A. S. Buchanan. Australian Journal of Chemistry, v. 14, Aug. 1961, p. 397-408.

Measurement of the surface tension and contact angles of molten Pb and Na-K alloys in contact with oxides of U, Ca, Mg and Ba as determined by modifications of the sessile drop technique. Demonstration of the importance of the O_2 concentration of the wetting liquid. 16 ref. (P13h, 2-60; Na-b, EG-e41, 14-60)

733-P. Surface Properties of Molten Bismuth-Bismuth Chloride in Contact With Uranium Dioxide. D. H. Bradhurst and A. S. Buchanan. Australian Journal of Chemistry, v. 14, Aug. 1961, p. 409-416.

Measurement of the surface tension and contact angles of 0-100% solutions of $BiCl_3$ solutions in molten Bi placed on samples of UO_2. Low concentrations of $BiCl_3$ were found to improve the wettability of UO_2 by Bi. 22 ref. (P13h; U, 14-68, Bi, 14-60)

734-P. Surface Properties of Liquid Metals: Bismuth, Lead-Bismuth, Tin. D. H. Bradhurst and A. S. Buchanan. Australian Journal of Chemistry, v. 14, Aug. 1961, p. 417-419.

Surface activity of O_2, S, Se and Te in molten Bi, Pb-Bi eutectic mixture and Sn as shown by surface tension and contact angle with solid UO_2. Measurements by the sessile drop technique. 5 ref. (P13h, 2-60; Bi-b, Pb-b, O, S, Se, Te, 14-60)

SECTION Q

MECHANICAL PROPERTIES and TEST METHODS; DEFORMATION

1-Q. Weldable Steels for Strength or Abrasion Resistance. Materials in Design Engineering, v. 52, Nov. 1960, p. 9.

Physical and mechanical properties, weldability and workability of two new series of steels, three weldable, high strength grades and two weldable abrasion resistant grades. (K9s, Q-general, P-general; ST)

2-Q. Short-Time, Rapid-Heating Tests for Aerospace Materials. Ward F. Simmons. Materials in Design Engineering, v. 52, Nov. 1960, p. 125-129.

Test methods for determining creep, tensile strength and stress-strain relationships at 2000° F. on stainless steels, Al alloys and Ni alloys. (Q3, Q27, Q25n, 2-62; Al-b, Ni-b, SS)

3-Q. (French.) Tensile Properties of Sintered Aluminum With Iron and Nitrogen Additions. P. Lelong, J. Moisan and J. Herenguel. Memoires Scientifiques de la Revue de Metallurgie, v. 57, Sept. 1960, p. 683-688.

Cylindrical bars are extruded from mixtures of powdered Al, 0-2% Fe and 0-1% Ni (with or without Al_2O_3), rolled at 500° C. and annealed at 460° C. for 1 hr. Effects of composition and rolling on tensile strength are determined at 25 and 350° C. testing temperatures. 9 ref. (Q27, 2-60, 2-64, 3-68; Al-b, Fe, Ni, 6-72)

4-Q. (French.) Deformation of SG Cast Iron and Mild Steel. A. Vetiska. Memoires Scientifiques de la Revue de Metallurgie, v. 57, Sept. 1960, p. 689-698.

SG iron containing 3.24% C, 2.7% Si, 0.75% Mn, 0.099% P, 0.007% S and 0.043% Mg and a ferritic mild steel with traces of pearlite containing 0.08-0.10% C are subjected to static or dynamic compressive deformation. Elastic and plastic deformations as functions of load. Effects of deformation on microhardness, microstructure and crystal structure. 6 ref. (Q24, Q21, Q29q, M27, M26; CI-r, CN)

5-Q. Embrittlement of High Purity Nickel. K. M. Olsen, C. F. Larkin and P. H. Schmitt, Jr. American Society for Metals, Transactions, Preprint no. 203, v. 53, 1961, p. 349-358.

Grain boundary embrittlement by a segregated nickel sulphide phase can be produced in a high purity Ni containing as little as 0.0009% sulphur by weight. The embrittlement can only be produced if the Ni is first cold worked and then heat treated in the 450-600° C. range to induce recrystallization and grain growth. It is postulated that the sulphide phase is precipitated early in the recrystallization stage and is carried along in the grain boundaries with further grain growth. 7 ref. (Q26s, N5, 2-64; Ni-a, S)

6-Q. Metal Wear by Scoring. J. H. Olson and R. D. Chapman. American Society for Metals, Transactions, Preprint no. 204, v. 53, 1961, p. 359-379.

Score loads have been determined for a variety of ferrous-ferrous and ferrous-nonferrous combinations by progressively loading lubricated reciprocating samples until scoring occurs. Higher score loads can be attained and score damage minimized by utilizing an Al base, rather than steel, under hard plated surfaces to enhance the thermal conductivity and prevent loss of the oil film. 25 ref. (Q9)

7-Q. Dynamic Stress-Strain Phenomena and Plastic Wave Propagation in Metals. Ralph Papirno and George Gerard. American Society for Metals, Transactions, Preprint no. 205, v. 53, 1961, p. 381-406.

Experimental results show that the magnitude and velocity of the elastic portion of a mixed elastic-plastic wave were correctly predicted by theory. 25 ref. (Q24j)

8-Q. The Effect of Microstructure on the Fatigue Strength of a High Carbon Steel. F. Borik and R. D. Chapman. American Society for Metals, Transactions, Preprint no. 209, v. 53, 1961, p. 447-463.

Endurance limits in reversed bending were determined for austempered and quenched and tempered microstructures of SAE 51100 steel within a hardness range to 36 to 61 Rc. The fatigue specimens were prepared in such a way as to minimize the influence of residual surface stresses. The influence of residual surface stresses. The influence of microstrains existing in the matrix of bainite and tempered martensite and the effect of carbide morphology on the fatigue strength of the high carbon steel were evaluated. 22 ref. (Q7a, M27; CN-r)

9-Q. Hydrogen Embrittlement in Vanadium-Columbium Alloys. A. L. Eustice and O. N. Carlson. American Society for Metals, Transactions, Preprint no. 212, v. 53, 1961, p. 501-510.

Hydrogen embrittlement investigated as a function of alloy composition and hydrogen content. Bend and tension tests were carried out in the temperature range of -196 to 52° C. 4 ref. (Q26s; V-b, Cb, H)

10-Q. A New Series of Nickel-Base Alloys for Advanced-Temperature Applications. John C. Freche, William J. Waters and Thomas J. Riley. American Society for Metals, Transactions, Preprint no. 214, v. 53, 1961, p. 523-537.

Series of Ni-base alloys that do not require vacuum melting techniques and that provide good stress-rupture and impact properties. One alloy provided rupture lives (as-cast) of 380 and 107 hr. at 15,000 psi. and temperatures of 1800 and 1850° F. The strongest alloy demonstrated lives of 768, 301 and 101 hr. under the same stress at 1800, 1850 and 1900° F., respectively. 6 ref. (Q3q, 2-62; Ni-b)

11-Q. Precipitation of Phosphorus From Alpha Iron and Its Effect on Plastic Deformation. E. Hornbogen. American Society for Metals, Transactions, Preprint no. 217, v. 53, 1961, p. 569-589.

Phosphorus is in substitutional solution in alpha Fe. High phosphorus contents cause grain boundary brittleness, probably by segregation of phosphorus to the alpha Fe grain boundaries. Precipitation is found in alloys with more than 1% phosphorus and at temperatures higher than 400° C. Precipitation hardening occurs on aging at temperatures up to 700° C. 18 ref. (Q24; Fe)

12-Q. The Tensile Properties of Type 410 Stainless Steel Deformed Before and After Martensite Transformation. Yuzo Hosoi and Kenneth E. Pennow. American Society for Metals, Transactions, Preprint no. 218, v. 53, 1961, p. 591-602.

Significant improvements in tensile strength were realized with some sacrifice of ductility. Deformation of the metastable austenite to the extent of 57% reduction of area by swaging at 800° F. increased the yield strength from 178,000 to 206,000 psi. and the tensile strength from 212,000 to 245,000 psi. in the untempered condition without producing a marked decrease in elongation. (Q27a, N8p, 3-68; SS)

13-Q. Yield Point Phenomena in a Number of Commercial Copper Alloys and One Nickel Base Alloy. R. B. Jones and V. A. Phillips. American Society for Metals, Transactions, v. 53, Preprint no. 219, 1961, p. 603-620.

Tensile tests to survey the occurrence of yield point phenomena in phosphor bronze, manganic nickel, chromium copper and beryllium copper. Yield points can be produced by suitable strain-aging treatments in all the alloys. The large initial yield points are attributed to equilibrium segregation of solute to grain boundaries. (Q24c; Cu-b, Ni-b)

14-Q. High-Strength Martensitic Steels for Elevated-Temperature Use. A. Kasak, V. K. Chandhok and E. J. Dulis. American Society for Metals, Transactions, v. 53, Preprint no. 220, p. 621-636.

Martensitic steels with a nominal base composition of 0.38% C, 7% Cr,

1% V, 5.8% Mo and 5% Co were investigated. Several of the steels exhibited an outstanding combination of room and elevated-temperature mechanical properties; tensile strengths up to 332,000 and 201,000 psi. were obtained at room temperature and 1100° F., respectively. (Q-general, 2-62; SS-c, SGB-a)

15-Q. Low Temperature Flow and Fracture Tension Properties of Heat-Treated SAE 4340 Steel. Frank R. Larson and John Nunes. American Society for Metals, Transactions, Preprint no. 223, v. 53, 1961, p. 663-682.

A variety of microstructures, martensite, bainite and pearlite were studied at several strength levels. The flow stress, strain hardening, fracture stress and fracture strain were determined. The flow stress at a constant true strain is closely described by a reciprocal absolute temperature function. 35 ref. (Q23, Q25, 2-63; AY)

16-Q. Improvement of the Ductility of Vanadium by Alloying. C. E. Lundin, Jr., and D. T. Klodt. American Society for Metals, Transactions, Preprint no. 227, v. 53, 1961, p. 735-742.

Commercial-grade vanadium was alloyed with yttrium metal and a series of representative rare-earth metals. The yttrium and rare-earth metals act as scavenging agents to remove the oxygen, and probably nitrogen, impurity content from the vanadium. Optimum ductility is attained with additions of only 1 wt.% Y or rare-earth metal. 8 ref. (Q23p, 2-60; V, Y, EG-g)

17-Q. The Determination of Hardness in Steels From the Breadth of X-Ray Diffraction Lines. R. E. Marburger and D. P. Koistinen. American Society for Metals, Transactions, Preprint no. 228, v. 53, 1961, p. 743-752.

The broad asymmetrical nature of martensite diffraction lines has in the past been the source of great difficulty in X-ray diffraction studies of hardened steel. By utilizing the increase of martensite line breadth with hardness, it is possible to make rapid nondestructive surface hardness measurements by X-ray methods. 5 ref. (Q29, M22g; ST)

18-Q. Effect of Induction on 500° Embrittlement. A. Nakashima and J. F. Libsch. American Society for Metals, Transactions, Preprint no. 229, v. 53, 1961, p. 753-764.

Influence of rapid heating upon 500° F. embrittlement of 3140 steel in an effort to find a means to minimize the loss of notch toughness and obtain further information for an understanding of the embrittling mechanism. 14 ref. (Q26s; AY)

19-Q. Yield Point and Order-Hardening Phenomena in Some Commercial "Nickel Silver" Alloys. Victor A. Phillips and R. B. Jones. American Society for Metals, Transactions, Preprint no. 231, v. 53, 1961, p. 775-791.

The nature of the initial yield point, which is known to give rise to stretcher-strain markings in the fine grained annealed alpha Cu-Ni-Zn alloys, has been investigated by tensile tests. An alloy close to the Cu_2Zn Ni composition was found to show a new hardening phenomenon interpreted as order-hardening. 20 ref. (Q24c, N7e; Cu-b)

20-Q. Mechanical Properties of Tantalum-Base Alloys. F. F. Schmidt, F. C. Holden, H. R. Ogden and R. I. Jaffee. American Society for Metals, Transactions, Preprint no. 233, v. 53, 1961, p. 805-816.

Effects of alloying on the mechanical properties of Ta were studied at room temperature and at 1200° C. Hf, Mo, W, V and Zr were found to be effective strengtheners. Several binary and ternary alloys with excellent fabricability and strengths at elevated temperatures have been evaluated. (Q-general, 2-60; Ta-b, Hf, Mo, W, V, Zr)

21-Q. The Effect of Cold Work and Temperature on Strength and Structure of Steel. P. Shahinian, M. R. Achter and W. A. Pennington. American Society for Metals, Transactions, Preprint no. 234, v. 53, 1960, p. 817-836.

Influence of cold work determined by measurements of hardness, tensile and creep-rupture properties and its effect on microstructure. 12 ref. (Q-general, 3-68; AY)

22-Q. Temperature and Microstructure Dependence of Size Effects in Notched Bend Tests of Some Alloy Steels. S. Yukawa. American Society for Metals, Transactions, Preprint no. 238, v. 53, 1961, p. 871-881.

Increasing the specimen size in notched bend tests of alloy steels results in increased propensity to sudden, brittle

fracturing and in decreased nominal strength; the first effect occurs at higher temperatures relative to the second. The V-notch Charpy 50% fibrous transition temperature appears to be a useful index to the size effect sensitivity of the steels investigated. 16 ref. (Q26s, 3-73; ST)

23-Q. (German.) Inspection of Wire Ropes Used in Lifting and Haulage Equipment. Ernst Franke. Industrie-Anzeiger, v. 82, Oct. 18, 1960, p. 23-25.

Soft Pb strips are pressed around wire rope and the resulting replica formed on the metal surface is studied microscopically to determine rope wear. (Q9; 4-61)

24-Q. (Russian.) Fatigue Strength of Chemically Heat Treated Machine Parts. D. S. Elenevskii and L. M. Shneerson. Vestnik Mashinostoroeniya, Oct. 1960, p. 17-22.

Bend and torsion tests with asymmetric cyclic loading of 40KhNMA and 12Kh2H4A steel samples that have been subjected to cementation or nitriding. Distribution of stresses in the surface layer and core. Electropolishing increases fatigue strength of cemented parts. 5 ref. (Q7, 2-64, T7; ST)

25-Q. (German.) Properties of Cold Drawn Wire. E. Forstner. Industrie-Anzeiger, v. 82, Nov. 1, 1960, p. 1475-1477.

Stress-strain curves of wire and wire rope composed of ferritic, martensitic, austenitic and heat resistant alloy steels. Corrosion protection by galvanizing. (Q25n, L16; AY, SS, SGA-h, 4-61)

26-Q. Tool Failures. Pt. 9. Toughness. Atlas Steel News, v. 14, Oct. 1960, p. 7-8.

Composition and mechanical properties of toolsteels. Relation of ductility, bend strength and carbide size and distribution to toughness. Tool applications. (Q23r, Q-general, 2-60; TS)

27-Q. (Italian.) Properties of Aluminum-Base Bearing Alloys. E. Di Russo and L. Mori. Alluminio, v. 29, Sept. 1960, p. 393-402.

Brinell hardness, tensile and compressive strength, wear resistance and microstructure of Al alloys containing 6% Si-5% Sn, 20% Sn-1% Cu, 6.5% Sn-1% Cu or 6.5% Sn and 1% Cu-0.5% Ni-2.5% Si in the as-cast and hardened and tempered contitions. 7 ref. (Q-general, M27, 2-64; Al-b, Si, Sn, Cu, Ni)

28-Q. Research Digs Deeper Into Annealed Nodular Iron. R. C. Bates. Iron Age, v. 186, Nov. 17, 1960, p. 144-145.

Hardness of annealed and as-cast nodular iron after quenching, tempering and normalizing heat treatments. Effect of austenitizing time prior to quenching on microstructure and hardness. (Q29n, M27, 2-64; CI-r)

29-Q. Some Properties of Chromium and Chromium-Tungsten Alloys. Pt. 2. Fabrication and Ductility. S. T. M. Johnstone, F. Henderson and H. L. Wain. Institute of Metals, Journal, v. 89, Nov. 1960, p. 101-104.

Arc-melted ingots (1 1/2 in. in diameter) of Cr-W alloys containing up to 10% tungsten are fabricated to strip by extrusion and rolling to investigate the effect of tungsten on the workability and ductility of Cr. 16 ref. (Q23p, Q23q, F-general, 2-60; Cr-b, W)

30-Q. The Effects of Creep Testing on the Hydrogen Embrittlement of a Titanium Alloy Containing 2% Aluminum and 2% Manganese. A. I. Smith, M. F. Day, M. F. Grimwade and L. M. T. Hopkins. Institute of Metals, Journal, v. 89, Nov. 1960, p. 105-110.

Alloy samples are impregnated with various amounts of hydrogen and a study is made of the effects of creep deformation on brittle behavior in tensile and notched bar impact tests. 7 ref. (Q26s, Q3, 3-68; Ti-b, Al, Mg)

31-Q. The Effect of Composition on the Intercrystalline Cracking of Sand-Cast, Complex Beta-Brasses Under Constant Tensile Load. A. R. Bailey. Institute of Metals, Journal, v. 89, Nov. 1960, p. 110-111.

Effects of alloying elements Al, Fe and Mn and of Ni and Co additions on cracking in ordinary atmosphere, provided that moisture is present and in sea water or 3% NaCl solution under sustained tensile stress. 5 ref. (Q26q, R1h, 2-60, 3-66; Cu-n)

32-Q. The Fatigue Curves of Copper. J. Porter and J. C. Levy. Institute of

Metals, Journal, v. 89, Nov. 1960, p. 86-89.

Fatigue tests using a rotating cantilever machine on specimens of electrolytic tough-pitch Cu, annealed for 1 hr. at 500° C. in vacuum. The S/N curve shows a hitherto unsuspected discontinuity at a stress amplitude of 21,500 psi. 13 ref. (Q7b, Q7c; Cu)

33-Q. Some Properties of Chromium and Chromium-Tungsten Alloys. Pt. 1. Compression Creep Tests. A. R. Edwards, C. S. Landau and H. T. Greenaway. Institute of Metals, Journal, v. 89, Nov. 1960, p. 97-101.

Compression creep curves determined at 750-950° C. on pure Cr and at 900-1000° C. on Cr-W alloys. For pure Cr, the logarithm of the minimum creep rate shows an approximately linear relationship with the applied stress at a given temperature and there is evidence that the onset of tertiary creep is associated with recrystallization. 13 ref. (Q3, Q28, 2-62, N5; Cr-b, W)

34-Q. Resistance to Deformation of Super-Pure Aluminum at High Temperatures and Strain Rates. Determination From High-Temperature Torsion Data. H. Ormerod and W. J. McG. Tegart. Institute of Metals, Journal, v. 89, Nov. 1960, p. 94-96.

Super-pure Al is deformed in torsion at 195-55° C. and shear strain rates from 0.86 to 7.1 per sec. The data are used to calculate true-stress, true-strain curves. 12 ref. (Q1e, 2-62, 3-68; Al-a)

35-Q. These Forgeable Refractories Have Micrograin Structure. Metalworking Production, v. 104, Oct. 26, 1960, p. 79-81.

Improved ductility and workability of 90% Ta-10% W alloys as a result of electron seam processing and critical composition control. (Q23p, Q23q; Ta-b, W)

36-Q. Heat-Affected Zone of Arc-Welded Ductile Iron. E. F. Nippes, W. F. Savage and W. A. Owczarski. Welding Journal, v. 39, Nov. 1960, p. 465s-472s.

Use of synthetic specimen technique to duplicate weld thermal cycles and determine their effect on metallographic structure and hardness of ductile iron specimens. (Q7j, Q29n, M27; CI-r, 7-51)

37-Q. Comparison and Analysis of Notch-Toughness Tests for Welded Steel. H. H. Johnson and R. D. Stout. Welding Journal, v. 39, Nov. 1960, p. 492s-501s.

Survey of literature on notch toughness. Influence of chemical composition, steelmaking practice, welding, plate thickness and heat treatment on brittle fracture. 33 ref. (Q23s, Q26s, 2-60, 2-64, 3-73; ST, 7-51)

38-Q. Metallurgy of 13% Chromium Steel Castings. J. Beech. Foundry Trade Journal, v. 109, Nov. 3, 1960, p. 569-575.

Phase relationships in the Fe-C-Cr system. Effect of steelmaking and casting conditions, ferrite distribution, heat treatment, gas content and nonmetallic inclusions on mechanical properties, weldability and corrosion resistance of castings. (Q-general, 2-64, 3-69, M24c, R-general; ST, Cr, 5)

39-Q. (German.) Tensile Strength Measurements on Copper Whiskers. F. X. Eder and V. Meyer. Naturwissenschaften, v. 47, no. 15, 1960, p. 352-353.

Mechanical force and microscopic strain measurements with photographic registration correlating tensile strength data and whisker diameter. (Q27, 3-73; Cu, 14-61)

40-Q. Hydrogen Embrittlement of Cadmium Plated Spring Steel. J. A. Gurklis, L. D. McGraw and C. L. Faust. Plating, v. 47, Oct. 1960, p. 1146-1154.

Effects of etching, pickling, aging, baking and plating variables on the ductility of Cd-plated SAE 1095 spring steel. Recommendations for avoiding or relieving hydrogen embrittlement. (Q26s, Q23p, L17; ST, Cd)

41-Q. Low-Temperature Metals: a Roundup. George H. Zenner. Chemical Engineering, v. 67, Oct. 31, 1960, p. 117-120.

Low temperature mechanical properties of carbon steel, alloy steel, stainless steel, Ni alloys, Al and Cu. Design of cryogenic insulation systems, piping, storage and shipping vessels and high-pressure pumps. (Q-general, 2-63, 1-52; Al, Cu, Ni-b, AY, CN, SS)

42-Q. For a Stronger Metal Surface. A. J. Schwarzkoff. Product Engineering, v. 47, Nov. 14, 1960, p. 70-74.

Improvement of wear resistance of steel by carburizing, nitriding, flame spraying and hardfacing. (Q9n, J28g, J28k, L23, L24; ST)

43-Q. 55% Thread Depth Will Make Beryllium Bolts Practical. Nicholas P. Chironis. Product Engineering, v. 31, Nov. 14, 1960, p. 75-77.

Use of a new thread form, with a large root radius and a thread depth only 55% of the theoretical, to increase fatigue strength of Be bolts. Tensile, shear and fatigue strength of Be, Ti, and steel bolts. (Q-general, T7f; Be, Ti, ST)

44-Q. (French.) Theoretical Study of Work Hardening Using a Dislocation Model. Pt. 2. G. Saada. Metaux, Corrosion, Industries, v. 35, Sept. 1960, p. 317-335.

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45-Q. Properties of Chromium-Steel Weld Metal. J. Heuschkel. Welding Journal, v. 39, Nov. 1960, p. 502s-508s.

Effect of temperatures from -320 to 2000° F. on tensile properties, hardness and microstructure of 0-25% Cr steel welds. 5 ref. (Q27a, Q29n, M27, 2-61; ST, Cr, 7-51)

46-Q. The Dynamic Frictional Characteristics of Molded Friction Materials. M. J. Rabins. American Society of Mechanical Engineers, Paper no. 60-WA-35, 1960, 8 p. $1.

Frictional behavior of steel, cast iron and Al drums determined under various conditions of loading and slipping velocity. Normal load, relative velocity, temperature and surface conditions are controlled. 17 ref. (Q9p, 3-74; ST, CI, Al)

47-Q. (German.) Creep Strength of Wrought Copper-Nickel Alloys--Literature Review. H. Vosskuhler. Metall, v. 14, Nov. 1960, p. 1081-1084.

Creep testing of alloys with 5-70% Ni for 1000 hr. at 149-663° C. Creep strength and velocity as a function of temperature and composition. 9 ref. (Q3, 2-60, 2-61; Cu-b, Ni-b)

48-Q. (Czech.) Standards for New Boron Steels. K. Novak. Strojirenstvi, v. 10, Sept. 1960, p. 688-689.

Hardening depth, tensile strength, yield strength, elongation, impact strength and reduction of area of CSN 12042, 13240, 14230 and 14240 steels, two of which contain boron and are used as materials for high-strength screws and automotive parts. (Q-general, S22; ST, B)

49-Q. (Italian.) Stainless Steel Marine Screw Propellers. Acciaio Inossidabile, v. 27, July-Aug. 1960, p. 481-483.

Corrosion fatigue resistance and general fatigue properties of propellers composed of Avesta 739S, 832 and 832H steels. Repair of damaged propellers by welding. (Q7, K-general, T22h; SS, 17-57)

50-Q. Structures and Materials. George Gerard. Astronautics, v. 5, Nov. 1960, p. 47.

Tensile and creep strength and temperature resistance of space vehicle structures composed of Cb, V, W, Mo, Pb and Ti alloys, high strength steels and pyrolytic graphic. 15 ref. (Q-general, T24e; Cb-b, Mo-b, Pb-b, Ti-b, V-b, W-b, ST, NM-h36, 17-57)

51-Q. Cu-Zr Alloy for High Temperature Devices. Electronics, Sept. 9, 1960, p. 96-98.

Mechanical and electrical properties of a Cu-Zr alloy, "Amzirc", at prolonged temperatures to 750° F. (Q-general, P15, 2-62, Cu-b, Zr)

52-Q. (Japanese.) Impact Properties of Induction-Hardened Steels. Miyato Miyairi and Tadashi Matsumoto. Railway Engineering Research, Journal, v. 17, Aug. 1960, p. 320-324.

Impact strength, strain, hardness and fatigue limit of prestressed or notched steel specimens. (Q6, Q7, J2g, N7e; ST)

53-Q. (German.) Electron Microscope Studies on Temperature Dependent Transition From Ductile to Cleavage Fracture of Notched Impact Test Specimens. Wolfgang Dienst. Materialprufung, v. 2, Oct. 20, 1960, p. 382-392.

Notched impact testing of aged and unaged unalloyed 0.05-0.23% carbon

structural steel at low temperature and electron microscopic investigation of fracture surface by carbon replica. Influence of aging and shape of specimen. 10 ref. (Q26n, Q6, M21e, 2-63, 2-65; ST, SGB-s)

54-Q. (German.) Effect of Testing Temperature on Notch-Toughness of Unalloyed Steels. Karl Wellinger and Hans-Joachim Wittwer. Materialprufung, v. 2, Oct. 20, 1960, p. 373-381.

Notch toughness of heat treated 0.09-1.32% carbon steels of given microstructure and mechanical properties measured at -196 to 20° C. Influence of heat treatment and carbon content on transition temperature. 8 ref. (Q23s, 2-60, 2-61, 2-64; CN)

55-Q. Testing Elevated Temperature Structures. S. L. Shaw and C. H. Stevenson. SAE Journal, v. 68, Dec. 1960, p. 56-58.

High temperature testing of airframes to determine thermal properties at 3000° F. by heating with electrical resistance elements or quartz heat lamps. (Q3, Q25p, T24a)

56-Q. Wear Tests Spot Best Mating Materials. L. E. Fuller. SAE Journal, v. 68, Dec. 1960, p. 60-65.

Unlubricated, high-load low-speed wear tests on coated stainless steel and Ni alloys to determine wear rates and friction coefficients. (Q9; Ni-b, SS)

57-Q. (German.) Total Intensity of X-Ray Interferences for Deformed and Recovered Aluminum Specimens. Manfred V. Heimendahl and Hermann Weyerer. Zeitschrift fur Metallkunde, v. 51, Oct. 1960, p. 573-579.

Sheets of cold rolled 99.00% Al (90% deformed) are heat treated at 80-300° C. to study recovery and recrystallization. Influence of cold working on line intensities of the X-ray interferences measured in the as-deformed state and after heat treatment. (Q22n, 2-64, M22g; Al, 4-53)

58-Q. The Effect of Surface Preparation on the Tensile Strength, Hardness and Adhesion of Electrodeposited Nickel. P. A. Brook. Plating, v. 47, Nov. 1960, p. 1269-1273.

Tensile testing of Ni deposits on degreased and scratch brushed, etched or polished Cu to determine effect of surface preparation on adhesion and mechanical properties. 32 ref. (Q27, L10, L12, L17; Cu, Ni, 8-62)

59-Q. Tensile and Short-Time Creep Properties of N-155 Alloy Sheet. Eugene C. Bernett. Journal of Engineering for Industry, Series B (American Society of Mechanical Engineers, Transactions), v. 82, Nov. 1960, p. 283-302.

Evaluation of the tensile, yield and ultimate strengths, tensile elongation, Young's Modulus, creep rates and plastic deformation of annealed Haynes N-155 alloy sheet (20% Cr, 20% Ni, 20% Co, 40% Fe) at 75-2100° F. 4 ref. (Q27, Q3; Fe-b, Cr, Ni, Co)

60-Q. Correlation of Bendability of Materials With Their Tensile Properties. J. Datsko and C. T. Yang. Journal of Engineering for Industry, Series B (American Society of Mechanical Engineers, Transactions), v. 82, Nov. 1960, p. 309-314.

Flat tensile specimens cut from Mg, Al, brass, 1018 steel, Ti, cast iron and plastic bar stock polystyrene are tested for bendability. Round tensile specimens of the same materials are tested for per cent reduction of area, the data being correlated with minimum bend radius. (Q5g, Q27; Mg, Al, Cu-n, ST, Ti, CI)

61-Q. Comparisons Between the Shearing Properties of Alpha-Brass as Derived From the Cutting Process and From Static and Impact Torsion Tests. S. S. Chang and W. B. Heginbotham. Journal of Engineering for Industry, Series B (American Society of Mechanical Engineers, Transactions), v. 82, Nov. 1960, p. 315-323.

Orthogonal cutting tests on tubular specimens with direct comparisons of results of static compression and impact torsion tests. Shearing strains are produced from both the static and the dynamic Tests. 11 ref. (Q2, G17, Q1; Cu-n)

62-Q. Hardness Test Shows Decarburization. Steel, v. 147, Nov. 28, 1960, p. 118-120.

Measurement of decarburization depth in steel using a nondestructive test method and a standard Rockwell hardness tester. Accuracy is compared with results obtained from destructive microhardness traverse examination. (Q29; ST)

63-Q. Cracking in Welded Joints of Austenitic Steel in C. E. G. B. Power Stations. F. E. Asbury, B. Mitchell and H. L. Toft. British Welding Journal, v. 7, Nov. 1960, p. 667-678.

Cracking in the heat affected zones of austenitic steel welds (18% Cr, 12% Ni, 1% Cb). Effect of columbium carbide precipitation on weld ductility. (Q26q, Q23p, N8r; SS-e, 7-51)

64-Q. "Operation Cryogenics". Inco, v. 27, Fall 1960, p. 2-4.

Destruction impact testing at -452° F. of 9% Ni steel vessels for storage and transportation of low temperature liquids under high pressure. (Q6, T26q, 2-63; ST, Ni, 17-57)

65-Q. (Russian.) Scale Factor in Cyclic Loading. I. A. Oding. Zavodskaya Laboratoriya, v. 26, Sept. 1960, p. 1106-1107.

Effect of sample dimensions, heat treatment, grain size and stress heterogeneity on the strength of specimens during impact, tensile and bend testing under cyclic loading. (Q5, Q6, Q27, 2-59, 2-64, 3-66)

66-Q. (Russian.) General Theory on the Scale Effect in Cyclic Loading. P. D. Vagapov. Zavodskaya Laboratoriya, v. 26, Sept. 1960, p. 1108-1116.

Effect of size and shape of steel samples on the uniformity of surface loading, stress distribution and rate of crack propagation during bend, tensile and compression tests under cyclic loading. (Q-general, 3-66, 3-73; ST)

67-Q. (Russian.) Size Factors in Creep Rupture Testing. N. D. Sobolev. Zavodskaya Laboratoriya, v. 26, Sept. 1960, p. 1118-1122.

Effect of sample size on corrosion and fatigue cracking and rupture of metals subjected to long-time static loading. 17 ref. (Q3q, R1e, 3-73)

68-Q. Cause and Effect of Work Hardening in Austenitic Stainless Steels. Howard E. Tomlinson, Jr. Paper presented at Philadelphia Regional Technical Meeting of American Iron and Steel Institute, Oct. 13, 1960, 9 p.

Plastic deformation of 18-8 Cr-Ni austenitic stainless steel and the AISI 300 series. Effect of temperature on work hardening and effect of work hardening on magnetic permeability and Brinell hardness. Mechanical properties of a 304 stainless steel flanged and dished head. (Q-general, Q23a; SS)

69-Q. Current Nickel-Base High-Temperature Alloys. C. H. Lund. Defense Metals Information Center, Battelle Memorial Institute, DMIC Memo. 73, Nov. 17, 1960, 10 p. (Available as PB 161223 from U. S. Office of Technical Services, Washington 25, D. C.)

Composition, ultimate tensile strength and rupture strength of representative British, Soviet and United States Ni-base superalloys. 12 ref. (Q27a, Q3m) Ni-b, SGA-h, SGB-a)

70-Q. Creep, Mechanical and Metallurgical Properties of an Experimental Molybdenum-Vanadium Steel Rotor Forging. A. I. Smith, E. A. Jenkinson, D. J. Armstrong and L. M. T. Hopkin. Iron and Steel Institute, Journal, v. 196, pt. 2, Oct. 1960, p. 117-130.

Effect of air cooling and tempering and oil quenching and tempering treatment on creep, tensile and impact properties and the microstructure of 1/2% Mo, 1/4% V steel rotor forgings. 10 ref. (Q3, Q-general, M27, 2-64; AY, 4-51)

71-Q. Mechanical Properties of Some Tempered Alloy Martensites. J. M. Capus and G. Mayer. Iron and Steel Institute, Journal, v. 196, pt. 2, Oct. 1960, p. 149-158.

Tensile, impact, notched tensile, fatigue and notched fatigue properties of high purity martensitic Ni-Cr-Mo-V steels heat treated to high strength levels. Comparison with properties of similarly treated steels of commercial purity. 17 ref. (Q-general, 2-64; SS-c)

72-Q. Effect of Heat-Treatment and Microstructure on the High-Temperature Ductility of 18% Cr-12% Ni-1% Nb Steel. K. J. Irvin, J. D. Murray and F. B. Pickering. Iron and Steel Institute, Journal, v. 196, pt. 2, Oct. 1960, p. 166-179.

Effect of heat treatment and strain on the carbide precipitation processes of austenitic stainless steel containing Cb. Correlation of microstructure with high temperature ductility. 7 ref. (Q23p, M27, N8r, 2-62, 2-64, 3-68; SS-e)

73-Q. Some Ductility Aspects of 18-12-1 Nb Steel. R. J. R. Truman and H. W. Kirkby. Iron and Steel Institute, Journal, v. 196, pt. 2, Oct. 1960, p. 180-188.

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74-Q. Heat-Affected Zone Cracking in Welded High-Temperature Austenitic Steels. R. N. Younger and R. G. Baker. Iron and Steel Institute, Journal, v. 196, pt. 2, Oct. 1960, p. 188-194.

Heat affected zone cracking during welding and post-weld heat treatment in 18% Cr-12% Ni-1% Cb, 18% Cr-10% Ni-3% Mo and 18% Cr-3% Ni type steels. Metallurgical investigation by electron microscopy and electron diffraction. Cracking mechanisms. 19 ref. (Q26, K-general, M-general, 2-62, 2-64; SS-e, 7-51)

75-Q. High-Strength Steel Sheet (300 M). J. C. Chang, F. J. Herr and J. W. Sweet. Metal Progress, v. 78, Dec. 1960, p. 101-104.

Heat treated to 270,000 psi. tensile strength, it retains 7% elongation at subzero temperatures and 230,000 psi. ultimate at 600° F. Proper welding techniques are necessary to achieve these properties in the joints of missile cases. (Q-general, 3-70; AY, 4-53)

76-Q. (German.) Wear of Cast Materials. R. Weber. Industrie-Anzeiger, v. 82, Nov. 15, 1960, p. 1585-1587.

Samples of cast steels are wear tested by rotating in a mixture of quartz sand, drilling emulsion and water with subsequent weighing for metal loss. Relative wear as a function of composition. (Q9, 2-60; ST, 5)

77-Q. (Russian.) Irreversible Temper Brittleness. V. I. Sarrak and R. I. Entin. Metallovedenie i Termicheskaya Obrabotka Metallov, Oct. 1960, p. 14-19.

Low temperature tempering of 20KHG, 35S2G3, 50KHG and 37KHN4SV steels to produce irreversible temper brittleness by decomposition of martensite. Effect of alloying with Al and boron and tempering at higher temperatures on irreversible brittleness. 16 ref. (Q26s, J29, 1-67, N8p; ST)

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Effect of fine crystalline structure, degree of cold plastic deformation, heat treatment, lattice distortion and microstress on the toughness of carbon steel. (Q23r, 2-59, 2-64, 3-66, 3-68; CN)

79-Q. (Russian.) Effect of Electroplating on the Mechanical Properties of Steels. N. T. Kudryavtsev and I. I. Moroz. Metallovedenie i Termicheskaya Obrabotka Metallov, Oct. 1960, p. 36-40.

Mechanical properties of 30KHGSA and U9 steels coated with Zn, Cu, Cr, Pb and Sn platings deposited from cyanide and noncyanide electrolytes. Measurement of hydrogen absorption by steel during electroplating. 4 ref. (Q-general; ST, Cr, Cu, Pb, Sn, Zn, 8-62)

80-Q. (Russian.) Notch Sensitivity of High Strength Steels. M. P. Markovets. Metallovedenie i Termicheskaya Obrabotka Metallov, Oct. 1960, p. 41-46.

Relationship between notch sensitivity, hardness and tensile strength of high and medium strength steels under cyclic loading in the bent condition. Effect of residual austenite content on notch sensitivity. 5 ref. (Q23s, Q29n, Q27a; ST, SGB-a)

81-Q. A Model for Repeated Residual Deformation Under Repeated Loading of Equal Direction. A. Zaslavsky. Research Council of Israel, Bulletin, Section C, Technology, v. 8C, June 1960, p. 59-62.

Residual stresses in steel structures under a critical collapse load more than double the maximum elastic load are predicted from a triangular structural model. (Q21, Q25h; ST, 4-57)

82-Q. Tensile Straining and Deformation Bands of Single Crystal of Pure Iron. Shoso Dohi. Hiroshima University, Journal of Science, Series A, v. 24, July 1960, p. 97-106.

The shear stress-strain curve obtained from the crystal deformed by the single

slip differs from that obtained from deformation by double slip up to about 0.5 of shear strain. Deformation bands appear only when the crystal is deformed by the mechanism of single slip. (Q24a; Fe-a, 14-61)

83-Q. (Spanish.) Bainitic Cast Irons With Cu, Mo and Cr Additions. Mario Pujol Roig. Instituto del Hierro y del Acero, v. 13, July-Sept. 1960, p. 745-759.

Microstructure, tensile strength and Brinell hardness of as-cast, tempered, hardened, normalized or bainitized cast iron alloys. (Q27a, Q29n, M27, 2-64; CI, Cr, Cu, Mo)

84-Q. (Spanish.) Statistical Study of the Influence of the Casting Method on the Tensile Properties of Individually Cast Test Pieces in Copper Alloys. Z. Gorny and A. Fijal. Instituto del Hierro y del Acero, v. 13, July-Sept. 1960, p. 729-744.

Tensile strength, elongation at rupture, Brinell hardness and contraction of cast Cu alloys as affected by casting method and pouring temperature. (Q27a, Q23p, Q29n, P10d; Cu-b, 5)

85-Q. (Spanish.) Influence of Sulphur on the Mechanical Properties of High-Grade Gray Iron. Jeronimo Vazquez White. Instituto del Hierro y del Acero, v. 13, July-Sept. 1960, p. 760-768.

Tensile strength, Brinell hardness, machinability and microstructure of integrally cast test bars containing GG 26 iron in which sulphur content is only variable in an extensive series. Measurement of optimum sulphur content. 7 ref. (Q27a, Q29n, G17k, M27, 2-60; CI-n, S)

86-Q. (Spanish.) Hardness of Metals. Francisco Sole Puig. Instituto del Hierro y del Acero, v. 13, July-Sept. 1960, p. 769-777.

Brinell, Rockwell, Vickers and Shore hardness testing procedures; factors affecting accuracy of tests; equivalences between hardness number systems. (Q29)

87-Q. (English.) An Investigation Into Sliding Bearings Suitable for a CO_2 Cooled Nuclear Reactor. H. H. Heath and K. F. Phillips. Wear, v. 3, Sept-Oct. 1960, p. 358-373.

Friction and wear behavior of nitrided, stainless, mild and toolsteels, Fe and Ti at 400° C. under intense radiation fluxes. Suitability of these materials for use in sliding bearings in reactors. 5 ref. (Q9, 2-62, 2-67, T7d; CN, Fe, SS, Ti, TS, 17-57)

88-Q. (French.) Problem of Quality in Large Steel Forgings. Paul Bastien. Revue de Metallurgie, v. 57, Sept. 1960, p. 815-826.

Heterogeneity and discontinuities in large steel ingots are correlated with the susceptibility of the metal to failure by embrittlement. Ultrasonic detection of flaws in large steel parts by combining systematic photographic recording of ultrasonic sounding with results of destructive tests on rejects and used parts. 21 ref. (Q26s, S13e; ST, 4-51)

89-Q. (French.) Actual Deformation During Wire Drawing. J. Buffet and B. Jaoul. Revue de Metallurgie, v. 57, Sept. 1960, p. 827-833.

Effect of lubrication on deformation due to tool friction during extrusion of mild steel and stainless steel wire. (Q21, Q24, F24; CN, SS, 4-61, 18-73)

90-Q. (German.) Results and Conclusions From Comparative Testing of Structural Steel Specimens for Brittle Fracture and Notch Toughness. Walter Dick. Stahl und Eisen, v. 80, Oct. 27, 1960, p. 1588-1602.

Evaluation of toughness-temperature curves for test bars of aged and nonaged, killed and unkilled, hearth and air refined plates of varying thickness. Bead bend and notched-bar tensile-bend tests at -20 to 100° C. Effect of killing and deoxidizing on brittle fracture. (Q5, Q26s, Q23s, 2-61, 3-70; ST)

91-Q. How Can We Prevent Brittle Fracture? Harry H. Thomasson. Canadian Metalworking, v. 23, Nov. 1960, p. 38-39, 64.

Effect of residual stress, notch or weld defects or temperatures below the brittle transition range on the brittle fracture of steel. (Q26s, 2-61, 3-66; ST)

92-Q. 300,000 Psi. Case Yield Strength May Be Practical. A. T. Letsinger. Missiles and Rockets, v. 7, Nov. 28, 1960, p. 40-41.

Techniques for increasing tensile strength of steel parts for rocket motors through control of composition and heat treatment; joining and forming of high strength materials. (Q27a, K-general, G-general, 2-60, 2-64, T2p; ST, SGB-a, 17-57)

93-Q. Dyna-Soar Demands Exotic Materials. M. A. Nelson. Missiles and Rockets, v. 7, Nov. 28, 1960, p. 50, 54.

High temperature mechanical properties of superalloys, refractory metals, cermets, ceramics and composites for missile applications. (Q-general, 2-62, T24e; SGA-h, EG-d37)

94-Q. (Japanese.) The Influence of Bainite on the Ductility of Alloy-Structural Steels. Kazuo Tsuya. Japan Institute of Metals, Journal, v. 24, July 1960, p. 440-444.

Charpy impact, Jominy hardness and Vickers microhardness tests at -80 to 98° C. on Cr-Mo and Ni-Cr-Mo steel specimens with bainitic structures transformed isothermally during slack and full quenching at 350-500° C. Data are given for ductility, toughness, hardness and transition curves. 5 ref. (Q23p, Q-general, N8m, 2-64; AY)

95-Q. (Japanese.) Internal Friction in Martensite and Tempered Martensite. Tadashi Ichiyama, Masayuki Kawasaki and Kikuo Takashina. Japan Institute of Metals, Journal, v. 24, July 1960, p. 456-460.

Internal friction in quench-hardened plain carbon steels containing 0.68-1.14% carbon measured by torsion pendulum at 2 cps. Effect of stress-induced ordering of carbon atoms, dislocation interaction, ferrite formation and temperature on relaxation peaks. 13 ref. (Q22, N-general, 2-64; CN)

96-Q. (French-German.) Zirconium Alloyed Copper. H. Bovet. Pro-Metal, v. 13, Oct. 1960, p. 375-380.

Alloys with 0.05-0.15% Zr are solution treated at 980° C., quenched and artificially aged at 400° C. Effect of Zr content on tensile strength, electrical conductivity and fusion point. Effect of tempering at 100-600° C. on mechanical properties. (Q27a, P12n, P15g, Q-general, 2-60, 2-64; Cu-b, Zr)

97-Q. Creep-Stress Analysis of Thin-Walled Structures. S. A. Patel, K. A. V. Pandalai and B. Venkatraman. Royal Aeronautical Society, Journal, v. 64, Nov. 1960, p. 673-682.

Stress analysis of thin-walled aircraft and missile components subject to creep. Derivation of equations for determining creep strain values, shear flow distribution, shear stress distribution, dimensionless shear and bending stress, assuming that the structures are at a uniform temperature and are composed of nonlinear elastic materials. 11 ref. (Q3, Q25, T24; 4-57)

98-Q. Study of Mechanical and Magnetic Characteristics of Ferromagnetic Materials by Ultrasonic Technique. W. J. Bratina and D. Mills. Canadian Mining and Metallurgical Bulletin, v. 53, Oct. 1960, p. 788-791.

Effect of elastic stress, plastic deformation, relaxation, aging and varying ultrasonic test frequencies on the attenuation of annealed and cold worked Armco iron, 1020 steel, 4340 steel and 420 stainless steel. 12 ref. (Q-general, P16, 1-74, 2-65, 3-66, 3-68; Fe-a, SS, ST)

99-Q. (Czech.) Testing of Patented Spring Wire. A. Klimes. Strojirenstvi, Oct. 1960, p. 755-759.

Steel wire of various diameters containing 0.81-0.85% C, 0.23-0.37% Mn, 0.21-0.30% Si, 0.007-0.021% P, 0.01-0.033% S and 0.11-0.13% Cr is tested for mechanical properties by tension, alternate bending, torsion, winding about cores of varying diameter and subsequent expanding and by the knot test. 9 ref. (Q-general; ST, SGA-b, 4-61)

100-Q. Joint Effect of Sulphur and Rare Earth Metals on Mechanical Properties of Cast Complex Low-Alloy Electric Furnace Steel. R. D. Engquist. Paper from "Electric Furnace Proceedings, 1959", v. 17. American Institute of Mining, Metallurgical and Petroleum Engineers, Inc., New York, 1960, p. 125-147.

Tensile and impact testing of induction furnace heats composed of ultra high-strength cast steel containing 0.005-0.045% sulphur to determine the effect of sulphur and rare earth content on elongation, yield strength, impact strength and hardness. (Q-general, 2-60; AY, Si, 5)

101-Q. Effects of Inhibitors on H_2 Embrittlement. Carl Meyer. Iron & Steel, v. 33, Nov. 1960, p. 536-539.

Protection against hydrogen embrittlement during pickling of iron and steel by addition of various inhibitors to the pickling bath. Effect of temperature, steel composition, bath contamination and inhibitor composition on embrittlement. 7 ref. (Q26s, L12g, 2-60, 2-61; Fe, ST)

102-Q. Heat Treatment Discovery. Iron & Steel, v. 33, Nov. 1960, p. 560.

Effect of uniformity of crystal distribution and grain rearrangement during heat treatment on mechanical properties and oxidation/corrosion resistance of stainless steels and Ti. (Q-general, R-general, 2-64; SS, Ti)

103-Q. (Russian.) Physico-Chemical Properties of Ti-V-Cb Ternary Alloys. I. I. Kornilov and V. S. Vlasov. Zhurnal Neorganicheskoi Khimii, v. 5, Sept. 1960, p. 2017-2024.

Sintered samples are tested for hardness and thermal expansion during rapid vacuum cooling and after various heat treatments. Electic resistivity is measured at 20-100° C. Effect of phase chemical composition on the above properties. 10 ref. (Q29n, P11g, P15g, 2-60, 2-61, 2-64; Ti-b, V, Cb)

104-Q. Effect of Neutron Irradiation on the Relaxation of Elastic Stresses. S. T. Konebeevsky. Atomnaya Energiya, v. 9, March 1960, p. 194-200.

U-Mo alloy springs are annealed at 570° C. in the bent state, then exposed to neutron irradiation for 19-48 min. Creep resistance and bend strength as influenced by neutron irradiation. Relaxation as a function of vacancy concentration. 7 ref. (Q3, Q5g, 2-67, T7c; Mo-b, U-b)

105-Q. (Japanese.) Stainless Steel Containing Boron Manufactured on Trial. Eiji Miyoshi and Tesuo Yakitoshi. Sumitomo Metals, v. 12, Apr. 1960, p. 415-427.

Stainless steels containing 0.78-6.10% boron are melted, forged and rolled to determine influence of boron content on forgeability, deformation resistance, toughness and brittleness. Specimens containing up to 2% boron are tested for weldability, radiation damage, corrosion resistance, mechanical properties and metallurgical characteristics. Test fabrications are made in bar, plate, sheet, tube and rod form. 11 ref. (Q-general, F-general, G-general, K-general; SS, B)

106-Q. (Japanese.) Tensile Properties of Austenitic Stainless Steels at Elevated Temperature. Shoji Terai and Takashi Abe. Sumitomo Metals, v. 12, Apr. 1960, p. 428-437.

Tensile properties at 0-800° C. and hot shortness at above 650° C. are investigated for 18-8, 18-8 Ti, 18-8 Cb, 16-13 Mo and extra low carbon 18-8 stainless steels by tests and microfractography. 4 ref. (Q27, 2-62; SS-e)

107-Q. (Russian.) Characteristics of Brittle Fracture in Metallic Crystals. E. D. Shchukin, L. A. Kochanova and V. I. Likhtman. Doklady Akademii Nauk SSSR, Fizika, v. 133, May 1960, p. 1064-1066.

Microscopic study of tensile rupture in Zn amalgam single crystals produced at 20-70° C. Kinetics of the edge and screw dislocations in relation to the temperature and deformation rate. 11 ref. (Q26s, 2-61, 3-68, M21; Zn, 14-61)

108-Q. Fatigue Damage Under Varying Stress Amplitudes. H. W. Liu and H. T. Corten. NASA Technical Note D-647, Nov. 1960. 68p. (Available from National Aeronautics and Space Administration, Washington, D. C.) $1.75.

Influence of various fluctuating stress-amplitude histories on the fatigue life of 5000 wires composed of 7075-T6 and 2024-T4 Al alloy, hard-drawn-steel and high strength steel using statistical analysis to determine mean fatigue life and scatter. 8 ref. (Q7b, 3-66; Al-b, ST, SGB-a)

109-Q. (Italian.) High Velocity Impact Testing. A. Bartocci. Metallurgia Italiana, v. 52, Sept. 1960, p. 587-600.

Notched samples of carbon and alloy steel are impact tested by shooting a spherical bullet of ball bearing steel against the smooth surface behind the notch. Impact energy can be modified by varying the powder charge. (Q6q; AY, CN)

110-Q. (German.) Toughness at Low Temperatures of Low-Alloy Chromium-Molybdenum, Chromium-Nickel and Chromium-Nickel-Molybdenum Cast Steel After Various Heat Treatments.

Hans Zeuner and Karl-Eugen Horner. Giesserei, v. 47, Nov. 3, 1960, p. 623-633.

Dilatometric investigation during heating and cooling comprising water and oil hardening (920-1100° C.) and subsequent annealing (520-930° C.) microstructure investigation and notch impact tests at -180 to 20° C. on GS-25 CrMo4, GS-27 NiCr73, GS-27 $NiCrMo_{64}$ and GS-30 NiCrMo 87 cast steel. (Q23r, Q23s, M-general; AY)

111-Q. (German.) Strength Properties of Cast Iron With Nodular Graphite. Horst Muhlberger. Giesserei, v. 47, Nov. 3, 1960, p. 614-622.

Analysis of mechanical properties of nodular cast iron by various melting processes including basic arc furnace, cold and hot blast cupola furnace and induction furnace. Comparison between ferritic and pearlitic nodular cast iron. Influence of mode of melting and composition. (Q27, Q-general, 2-60, E10; CI-r)

112-Q. (German.) Influence of Mode of Melting and of Overheating on Some Defects and on Mechanical Properties of Cast Iron. Kurt Orths. Giesserei, v. 47, Nov. 3, 1960, p. 595-608.

Statistical evaluation of production tests in melting of cast iron in acid reverberatory and cupola furnaces. Measurement of tapping temperature, reflection coefficient (ratio of true and black temperature), and degree of carbon saturation to assess quality of cast iron. (Q-general, E10, 9-68; CI)

113-Q. (Italian.) Ultrasonics and Fatigue Failures. Spartaco Cardona. Rivista di Meccanica, v. 11, Sept. 26, 1960, p. 19-23.

Causes of crack formation in steel crank, drive and railroad car axles. Ultrasonic methods of crack detection before failure. (Q7, S13q, 9-72, T23; ST)

114-Q. A Method for Analyzing Primary Creep Data. K. R. Merckx. 3rd. U. S. National Congress of Applied Mechanics, Proceedings, 1958, p. 605-610.

A general method for analyzing the strain rate during primary creep as a function of creep stress, testing temperature and strain is presented in a form suitable for a graphical analysis. Analysis of uranium creep data between 100-600° C. Material model is generalized for use in problems where the stress condition is triaxial and stresses vary with time. 7 ref. (Q3, 2-61, 3-66, 3-68; U)

115-Q. Determination of the Plastic Stress-Strain Relations in Tension of Nittany No. 2 Brass Under Hydrostatic Pressure. L. W. Hu. 3rd. U. S. National Congress of Applied Mechanics, 1958, p. 557-562.

Effects of hydrostatic compression on strain-hardening coefficient, strength coefficient, average true stress at rupture and reduction in cross sectional area at rupture are measured using a new triaxial stress testing method for studying plastic behavior of metals. (Q25n, Q-general, N7e; Cu-n)

116-Q. (Japanese.) Extrusion Properties of Lead Alloys With Antimony and Silicon Additions. Masao Terazawa and Hideji Yoshida. Japan Institute of Metals, Journal, v. 24, Aug. 1960, p. 487-490.

Age-hardening and age-softening effects, tensile strength and extrusion pressure of Pb alloy rods containing 0.3-5.0% Si and 0.014% Sb after extrusion at 20-300° C. and subsequent aging. Effect of composition and process temperature. 8 ref. (Q-general, N7a, 65, a-60, 2-64; Pb-b, Si, Sb)

117-Q. (Japanese.) Influence of Carbon Concentration on the Torsion Creep of Hardened Steels. Hiroshi-Muro. Japan Institute of Metals, Journal, v. 24, Aug. 1960, p. 490-493.

Torsion creep tests on carbon steel specimens containing 0.23-1.05% carbon at 20-300° C. after annealing, tempering and various quenching treatments. Influence of carbon content of quenched martensite on strain increment. 6 ref. (Q3b, 2-60, 2-64; CN)

118-Q. (Japanese.) Studies of Cr-Be Copper. Masataka Sugiyama, Noboru Makino and Hitoshi Shidara. Japan Institute of Metals, Journal, v. 24, Aug. 1960, p. 496-500.

Effect of Be on the hardness, tensile strength and electrical conductivity of Cu-Cr alloys is studied for ternary Cu-Cr-Be alloys containing 0.05-0.1% Be, 0.6-0.9% Cr, with various additions of Ni, Ti, Ag, Al and P. Effect of heat treatment at 300-1000° C. and cold working. 4 ref. (Q29n, Q27, P15g, 2-60, 2-64, 3-68; Cu-b, Be, Cr)

119-Q. (Japanese.) Properties of Nitrided Titanium. Koichi Nakano, Shunji Yamamoto, Hiroshi Kobayashi and Akira Takamura. Japan Institute of Metals, Journal, v. 24, Aug. 1960, p. 500-504.

Wear and corrosion resistance and mechanical properties of Ti nitrided in a nitrogen stream at 850° C. for 16-80 hr. 4 ref. (Q9n, Q-general, J28K, R-general; Ti)

120-Q. (Pamphlet.) Adaptaloy. Bulletin no. 201, 1960, 2 p. American Smelting and Refining Co., 120 Broadway, New York 5, N. Y.

Performance of a highly ductile Al alloy for use in castings which must be bent or cold formed during processing, assembly or installation. Data for mechanical properties, workability, weldability and foundry characteristics. (Q-general, E-general, K9s; Al-b, 5)

121-Q. (Pamphlet.) Tradenames "Thermotem-13" and "Thermoneal-13" Heppenstall Grade H720. Data Sheet No. 7, 4 p., Heppenstall Co., Pittsburgh, Pa.

Chemical composition, tensile properties at elevated temperatures and hardness of a 5% Cr hot work toolsteel containing V. Forging, annealing, hardening, tempering and surface protection of the steel. (Q27a, Q29n, 2-62, J-general; TS)

122-Q. (Translation-PERA.) Effect of Residual Stresses on the Dynamic Strength of Steel Bushes. D. D. Papshev. Machines and Tooling, v. 31, Apr. 1960, p. 32-34.

Bend tests are made on medium carbon steel workpieces to measure the effect of cutting speed, feed depth and cutting tool angle on the residual stress developed during turning. 3 ref. (Q25h, G17a; CN-p)

123-Q. (Translation-Brutcher no. 4854.) Effect of Low Temperatures Upon Fracture and Toughness of Medium Alloy Steel. M. P. Braun. Izvestiya Akademii Nauk SSSR, OTN, Metallurgiya i Toplivo, Feb. 1960, p. 104-109.

Changes in notch toughness and appearance of fracture of medium-alloy Ni-Cr-Mn steels in the initially "tough" and "brittle" conditions within 100 and -100° C. range, with special reference to effect of high quenching temperatures and various fourth alloying elements. (Q23s, Q26s, 2-63; AY)

124-Q. (Translation-Brutcher no. 4445.) Residual Stresses Set Up in Surface Hardening. V. V. Abramov. Metallovedenie i Obrabotka Metallov, Dec. 1958, p. 21-28.

Method of approximate calculation of quenching stresses in plates with allowance for transformations and plastic deformations. Effect of original stress state before quenching on the ultimate residual stress state. Importance of temperature of interior of components during the quench; improved theory of formation of stresses in surface-quenched steel. (Q25h, J26; ST)

125-Q. (Translation-Brutcher no. 4922.) An Electromagnetic Method of Testing Hardened Surfaces for Quality. B. A. Kuznetsov. Stanki i Instrument, v. 29, Dec. 1958, p. 27-29.

Method of nondestructive testing of surface hardened components for quality (structure and depth of the hardened surface layer). Combination of variable-field (eddy-current) and constant-field (residual magnetic) methods. (Q29, J28)

126-Q. (German.) Influence of Distance Between Supports on Bend Test Results for Cast Iron. St. Nadasan and E. Iovitiu. Freiberger Forschungshefte, B 45, 1960, p. 80-85.

Results of bending tests on round Ge 12, Ge 14, Ge 18, Ge 21, Ge 24, Ge 28 and Ge 32 cast iron bars with 600 and 300 mm. distance between supports. Influence of amount and structure of graphite in Fe on bending strength. (Q5, 2-60; CI, 4-55)

127-Q. Loads and Deformations of Buckled Rectangular Plates. Manuel Stein. National Aeronautics and Space Administration, NASA TR R-40, 1959, 27 p.

The postbuckling behavior of simply supported rectangular plates composed of 2024-T3 Al alloy and subjected to longitudinal compression and a uniform temperature rise is studied on a hydraulic testing machine. 17 ref. (Q28; Al-b, 4-53)

128-Q. Predicted Behavior of Rapidly Heated Metals in Compression. Elbridge Z. Stowell and George J. Heimerl, National Aeronautics and Space Administration, NASA TR R-59, 1960, 7 p.

A phenomenological relation developed for metals in tension at elevated temperatures is applied to compression under

rapid-heating conditions. Solutions are presented for cases in which the metal is unrestrained and the stress is constant and in which the metal is completely restrained and thermal stresses develop. The behavior of 7075-T6 Al alloy in compression is predicted for these cases at 0.1-100° F. per sec. 8 ref. (Q-28, 2-62, Q25p; Al-b)

129-Q. (German.) Use of Welded Joints in Construction. Hans H. Reinsch. Schweisstechnik, v. 14, Oct. 1960, p. 115-117.

Changes in mechanical properties of joints caused by temperature influences during welding (strain hardening, aging). Spot welding techniques for steel and nonferrous metals. Examples of proper and improper design for welding joints. (Q-general, 2-61, 2-65, 3-68; ST, 4-57, 7-51)

130-Q. (Italian.) The Fatigue Strength of Metals. Cornelio Gianola. Rivista di Meccanica, v. 11, Aug. 29, 1960, p. 55-63.

Fatigue strength under rotary bending of carbon, structural, stainless and alloy steels and of Cu, Ni, Mg and Al alloys in a variety of heat treat conditions as reported in the literature. 4 ref. (Q7, 10-54; ST, Al-b, Cu-b, Ni-b, Mg-b)

131-Q. (German.) Wear Tests Under Sliding and Sandblasting Conditions on Surface Weldings. K. Wellinger and H. Uetz. Schweissen und Schneiden, v. 12, Nov. 1960, p. 465.

Surface welds composed of low-alloyed (2% Mn, 1% Cr + Ti) and high-alloyed (3.5-3.8% Cr) materials are tested at 0-600° C. using quartz sand and gas coke to evaluate wear resistance to gliding and blasting. (Q9n, 2-61, L10c; AY, SS, 7-51)

132-Q. Analytical Investigation of Residual Stresses and Distortions Due to Welding. Koichi Masubuchi. Welding Journal, v. 39, Dec. 1960, p. 525-s to 537-s.

Mathematical expressions are developed to describe the distribution of residual stress and distortions. Analytical investigation of the following: transverse shrinkage and residual stress in a butt joint, distortion of a structure caused by angular change occurring in a butt joint, distortion of a structure caused by angular change occurring in a fillet joint and longitudinal distortion of a welded beam. 33 ref. (Q25h; 7-51, 9-74)

133-Q. A Reversed-Bend Test to Study Ductile and Brittle Transition. J. H. Ludley and D. C. Drucker. Welding Journal, v. 39, Dec. 1960, p. 543-s to 546-s.

A sharply bent beam is used to study the influence of temperature, tensile stress and surface conditions on the borderline between ductile and brittle behavior of structural steel. Results are given for project E, A-7 and T-1 steels. 6 ref. (Q23r, Q5, 2-61, 3-66; ST, 4-57)

134-Q. Spheroidal Graphite Cast Iron. G. Fitzgerald-Lee. Mine and Quarry Engineering, v. 26, Nov. 1960, p. 487-491.

Mechanical properties and microstructure of pearlitic ductile cast iron. Heat treatments and their effects. Casting requirements. Applications in mining equipment. (Q-general, M27, 2-64, T28; CI, 17-57)

135-Q. Accelerated Fatigue Testing of Steel. Research & Industry, v. 4, June 1959, p. 133-134.

Design and operation of an attachment for a fatigue testing machine which shortens the testing time for carbon and high-tensile steels to 24 hr. attachment provides continuous recording of the stress-deflection curve; the load which causes sudden rise in deflection is taken as the fatigue limit. (Q7, 1-52; ST)

136-Q. The Influence of Bismuth, Iron, Arsenic and Antimony in Sand-Cast Gunmetals. J. E. Stolarczyk, D. A. Hudson and D. Ashbolt. British Foundryman, v. 53, pt. 2, Nov. 1960, p. 482-499.

Influence of up to 0.1% Bi, 0.3% Fe, 0.6% As and 0.6% Sb on the tensile properties, porosity, pressure-tightness, hot tearing resistance, castability and fluidity of 85-5-5-5 and 88-10-2 gunmetals. None of these impurities has any effect on casting characteristics except that iron over 0.15% gives rise to small oxide inclusions. (Q-general, 2-60; Cu-s, Fe, As, Bi, Sb)

137-Q. (Russian.) Nickel Base Alloys for Stationary Gas Turbines. E. E. Levin, E. M. Pivnik, V. S. Kultygin and B. E. Lynbinskii. Energo-Mashinostronie, Aug. 1960, p. 30-35.

Effect of various alloying elements on the high temperature creep strength of materials used in gas turbine parts for operation at 700-750° C. for 10,000-100,000 hr. Data for linear expansion coefficient, heat resistance, creep

strength, flow limit, heat conductivity, elasticity modulus and other mechanical properties. 5 ref. (Q3m, Q-general, P-general, 2-60, 2-61, W11m; Ni-b, 17-57)

138-Q. (Russian.) Fatigue Strength of Austenitic Steel Pipe Welds. I. V. Kudryautsev and T. V. Naumova. Energo-Mashinostronie, Aug. 1960, p. 35-42.

Effect of welding conditions and heat treatment on crack formation in Ei257 steel pipe welds. Fatigue strength of welds during cyclic loading at 20 and 580° C. 4 ref. (Q7, Q26, 2-64; SS-e, 4-60, 7-51)

139-Q. (Russian.) Long Time Aging and Tensile Testing of Ei 481 Steel. L. B. Getsov and M. G. Taubina. Energo-Mashinostronie, April 1960, p. 32-35.

Mechanical properties of gas turbine parts composed of heat resistant Ni alloy steel during aging at 550-700° C. for 100-10,000 hr. Data for hardness, plasticity, creep and corrosion resistance, structure and flow limit. (Q-general, Q27, R-general, 2-65, W11m; AY, Ni, SGA-h)

140-Q. (German.) Influence of Pre-Heat Treatments on Torsional Creep of Aluminum Containing Traces of Iron. F. Erdmann-Jesnitzer, W. Bernhardt, W. Steinmuller and G. Muller. Aluminium, v. 36, Dec. 1960, p. 709-714.

Creep tests on Al with Fe content between 0.001 and 0.058% after various preliminary heat treatments using an analytical balance and a "torsion coil". Coil is attached by one end to the bare board of the balance and other end is fastened to balance arm. Extension is calculated by deflection of beam of the balance. (Q3b, 2-60, 2-64; Al-a, Fe)

141-Q. (German.) Influence of Material and Form of Joint on Static and Dynamic Tensile Strength of Bonded Joints in Sheet Metal. E. A. Cornelius and W. Mehl. Aluminium, v. 36, Dec. 1960, p. 699-708.

Influence of Araldite IN and Redux resins; Al alloy AlZnMgCu 1.5 and special deep drawn steel sheet; simple lap joint, single and double strap joints, scarfed joint and various types of preformed joints. Results indicate that for high strength sheet materials the bonded joint is superior to all other types of nondetachable joints. 7 ref. (Q27, 2-60; Al-b, ST, 7-58, 17-51)

142-Q. (German.) Impact Tests on Aluminum. W. Spath. Aluminium, v. 36, Dec. 1960, p. 715-719.

Impact apparatus allows simultaneous measurement of impact energy and maximum force during test. Tests with G-AlSi12CuNi alloy to demonstrate insignificance of impact energy measurements for evaluation of toughness of Al. (Q6, 1-53; Al-b)

143-Q. (Japanese.) Abrasion Tests on Electrolytically Hardened SKS-7 Steel. Toshinori Kuroda and Haruki Kondo. Japan Institute of Metals, Journal, v. 24, Sept. 1960, p. 553-555.

Comparison of hacksaw blades of SKS-7 and SK-3 steel for cutting ability after electrolytic and high frequency induction hardening with quenching. Effect of heat treatment on microstructure and hardness distribution. 2 ref. (Q9, Q29, J2g, M27, T6p; TS)

144-Q. (Japanese.) High Temperature Properties of the Ni-Base Ni-Cr-Co Austenitic Alloys. Katsuro Suenaga. Japan Institute of Metals, Journal, v. 24, Sept. 1960, p. 578-580.

Alloys containing 0-4% Co and 20% Cr examined at temperatures to 1200° C. after various heat treatment and cold rolling. Data are given for hardness, recrystallization temperature, oxidation resistance, ductility, creep rupture strength and age hardening as a function of Co content and temperature. 4 ref. (Q-general, N-general, R1h, 2-60, 2-62; Ni-b, Cr, Co)

145-Q. (Japanese.) Studies of Load-Time Relations by Charpy Impact Tests. Pt. 2. Seita Sakui, Tadahisa Nakamura and Masanobu Ohmori. Tetsu-to-Hagane (Iron and Steel Institute of Japan, Journal), v. 46, Nov. 1960, p. 1538-1543.

Transition temperatures and fracture modes of specimens of low carbon killed steel containing 0.17% carbon, after vacuum annealing at 920° C. and strain aging at 20, 100 and 200° C. are investigated using a miniature Charpy impact test at -100 to 100° C. Local measurements using piezoelectric crystal and oscillograph. (Q6, Q23r, Q26s, 2-63, 2-64; CN)

146-Q. (Japanese.) Function of Nitrogen as an Alloying Element in Heat Resisting Material. Pt. 8. Masazo Okamoto, Ryohei

Tanaka, Akira Sato and Shigeru Aoki. Tetsu-to-Hagane (Iron and Steel Institute of Japan, Journal), v. 46, Nov. 1960, p. 1559-1563.

Effect of cold working and "hot-cold" working on thermal stability of 316 L 17 Cr-12Ni-2Mo steels and low-Ni Timken 16Cr-15Ni-6Mo alloys containing 0.2-0.3% N studied at 20-950° C. Data for microstructure and mechanical properties. 3 ref. (Q-general, M27, 2-62, 3-68; SS, N)

147-Q. (Russian.) Study of Creep in Ei 696 Steel. B. M. Rakhman, A. Ya. Madorskii and V. V. Obukhovskii. Fizika Metallov i Metallovednie, v. 10, Apr. 1960, p. 617-621.

Creep test of alloy steel samples at 400-750° C. for 20-100 hr. Creep curves and lattice parameters at various temperatures. Factors influencing electrical resistivity, brittle fracture, creep strength and reduction in area upon deformation at high temperature. (Q3, 2-61, 3-67, P15g, Q26s, Q23p, 3-68; AY)

148-Q. (Russian.) Damping Properties of Two Phase Materials. M. A. Krivoglaz. Fizika Metallov i Metallovedenie, v. 10, Apr. 1960, p. 497-512.

Theory of damping of elastic vibrations in metal systems in connection with phase equilibrium. Derivation of formulas showing values for the rate and absorption coefficient of the sound wave, scattering energy and internal friction in relation to composition, temperature and phase transformation kinetics. 10 ref. (Q8)

149-Q. (German.) Radiographic Elasticity Constants for Tensile Lattice Deformation in the (400) Plane of Pure Copper. Carl-Otto Leiber and Eckard Macherarich. Zeitschrift fur Metallkunde, v. 51, Nov. 1960, p. 621-625.

Samples of 99.98% purity Cu are electrolytically polished and stress relieved by vacuum heating for 4 hr. at 400° C. and for 2 hr. at 450° C. with subsequent furnace cooling. X-ray testing with simultaneous tensile loading. 11 ref. (Q21, J1a, L13p; Cu-a)

150-Q. (German.) Recovery of Spectroscopically Pure Silver. Eva Bode. Zeitschrift fur Metallkunde, v. 51, Nov. 1960, p. 632-636.

A wire of 0.7 mm. diameter is heat treated to obtain an average grain size equal to this diameter. Recovery of elongation and internal friction is measured by making the wire a component of a torsional pendulum suspended in a vacuum and measuring its amplitudes and velocities. 15 ref. (Q22n, Q23p, 1-73; Ag-a, 4-60)

151-Q. (German.) Effect of Sound Waves on the Plastic Behavior of Metals. Friedrich Blaha, Bertwin Langenecker, Dietrich Oelschlagel. Zeitschrift fur Metallkunde, v. 51, Nov. 1960, p. 636-638.

Effect of an ultrasonic field of 800 kc./s. frequency and 2 W./sq.cm. intensity on the stress-strain ratio, yield strength, slip and shearing stress of Zn single crystals. 9 ref. (Q23, Q24, Q25n; Zn, 14-61)

152-Q. Creep in Steel. J. D. Murray. Metal Treatment and Drop Forging, v. 27, Nov. 1960, p. 461-467.

Technological, engineering and metallurgical aspects of creep in various steels. Stress-to-rupture data. Influence of structure and various alloying elements. (Q3, 3-71, 2-60; ST)

153-Q. (Dutch.) Cast Light Metals. L. J. G. Van Ewijk. Ingenieur, v. 72, Sept. 30, 1960, p. 197-205.

Al alloys containing 0-12% Si, 0-12% Mg, 0-0.5% Mn, 0-10% Cu, 0-2.5% Ni and 0-1.1% Fe and Mg alloys containing 0-9.5% Al, 0-5.5% Zn, 0-0.3% Mn, 0-0.7% Zr and 0-3% Th are cast in sand or permanent molds. Tensile yield, compression fatigue, impact strength, hardness and elongation from -100 to 100° C. (Q-general, 2-61, E-general; Al-b, EG-a39)

154-Q. Study of Mold-Iron Compositions. J. R. Kattus. American Iron and Steel Institute. Paper presented at Birmingham Technical Meeting, Nov. 30, 1960, 36 p.

Testing of various gray irons and Mg treated ductile irons used in ingot molds to determine thermal fatigue and service life. 29 ref. (Q7k; CI)

155-Q. (German.) Magnesium-Base Casting Alloys. E. F. Emley. Giesserei, v. 47, Nov. 17, 1960, p. 663-671.

Samples of alloys containing 0-9.5% Al, 0.3-5.5% Zn, 0-0.3% Mn, 0-0.7% Zr, 0-3% rare earth and 0-3% Th are cast and mechanically tested from 20-400° C. to determine creep strength, tensile strength and elongation as functions of composition and testing temperature and effect of rare earths on microporosity and cracking tendency. 51 ref. (Q-general, 2-60, 2-61; Mg-b, 5)

156-Q. Notch Sensitivity in Steel. Erik Agerman. ASEA Research, no. 4, 1960, p. 5-46.

Theories for determining notch effect for cast iron, cast steel, austenitic steel, spring steel and hardened and nonhardened steel. Notch sensitivity as influenced by the shaping of a part and its surface finish. (Q23s, 3-73; CI, SS-e, ST)

157-Q. New Steels Are Developed Which Save on Weight, Maintain Strength. Steel Facts, Dec. 1960, p. 7.

Use of low-alloy steels with minimum yield points of 45,000-50,000 psi. and heat treated constructional alloy steels with minimum yield points of 65,000-110,000 psi. in products subjected to hard wear. Comparison of strength-weight ratio, formability, toughness and corrosion resistance with conventional carbon steel. (Q23, Q9, T-general; AY-n, 17-57)

158-Q. Fatigue Problems Associated With Structural Materials for Current and Future Aircraft. J. Y. Mann. Australian Defence Scientific Service, Dept. of Supply, Report ARL/SM. 270, Sept. 1959, 54 p.

Fatigue properties of Al, Mg and Ti alloys and plastics with reference to stress concentrations, subzero temperatures and corrosive conditions. (Q7; Al-b, Mg-b, Ti-b)

159-Q. Nickel-Free High Temperature Alloy. D. J. Schmatz. Materials in Design Engineering, v. 51, Dec. 1960, p. 18.

Tests at room temperature and 1200° F. on a new group of austentic Fe-base alloys containing 9% Al, 30% Mn, 1% Si and 1% C. Mechanical properties are considerably higher than those of 304 stainless steel. (Q-general; Ni-b, SGA-h)

160-Q. Automatic Horizontal Continuous-Casting Machine. Castings, v. 6, Oct. 1960, p. 36-37.

Effect of the continuous casting process using a water-cooled mold on the mechanical properties, quality and machinability of cast iron bars. Comparison with properties of sand cast bars. (Q-general, G17k; CI, 5)

161-Q. (Russian.) Use of Antimony Cast Iron in Place of Bronze in Production of Ball Bearings. A. I. Smirnov and B. V. Chellanov. Stanki i Instrument, v. 31, Oct. 1960, p. 29-31.

Optimum composition of antifriction cast iron is obtained by introducing 0.3-0.65% Sb to the liquid metal jet in the ladle. Hardness, frictional wear resistance and corrosion resistance in sea water, acids and alkali media of Sb cast iron bearings. (Q29n, Q9n, R-general, T7d; CI, Sb, 17-57)

162-Q. (Italian.) Influence of Extended Aging at Ordinary Temperature on the Mechanical Properties of Some Light Alloys. L. Mori. Alluminio, v. 29, July-Aug. 1960, p. 351-357.

Specimens of cold worked and annealed commercial Al and a number of Al alloys are held at 20° C. for periods to 40,000 hr. (about 4 1/2 years) before tensile testing. Al-Mg alloys exhibit a decrease in tensile strength and yield point and an increase in elongation comparable to changes produced by a 5 hr. anneal at 90-100° C. and proportional to Mg content and degree of cold work. Lesser variations occur in 99-99.99% Al; in a 1.21% Mn-Al alloy, tensile strength increases and yield point decreases. X-ray analysis of Mg-Al alloys show evidence of recovery. 12 ref. (Q-general, 2-65; Al-b, Mg, Mn)

163-Q. (French.) Contribution to the Study of Ferro-Aluminum Alloys. E. Hugony and C. Garino. Alluminio, v. 29, July-Aug. 1960, p. 339-350.

Pearlitic (to 4% Al) and ferritic (4-22% Al) Fe alloys are prepared in the laboratory and tested for mechanical properties and corrosion and oxidation resistance at temperatures to 920° C. to find suitable material for use as retorts in the distillation of sulphur. Experimental melts are also made of an electric furnace steel with additions of Al to 6%. 43 ref. (Q-general, R-general; Fe-b, ST, Al)

164-Q. A Study of Some Peculiarities in the Shape of Hardness Curves of End-Quenched and Tempered Steels. H. R. S. Rao and V. G. Paranipe. Indian Institute of Metals, Transactions, v. 13, Sept. 1960, p. 205-240.

An anomalous dip is observed in the hardness curve even when the hardenability curve is smooth. The influence of austenitizing conditions and the time and temperature of tempering were determined to clarify the principles involved in the formation of the dip. (Q29n, J29; ST)

165-Q. Mechanics of Plastic Deformation in Polycrystalline Metals. R. C. Deshpande. Indian Institute of Metals, Transactions, v. 13, Sept. 1960, p. 241-248.

Effects of grain boundaries with special reference to the constraints imposed on the flow of the grain by neighboring grains. The interaction of the adjacent grains is evidenced in slip interference and "forced slip" on some unusual slip system near the grain boundary. 35 ref. (Q24)

166-Q. (German.) Use of Cast Iron in Machine Construction. G. Quapil. Technik, v. 15, Nov. 1960, p. 757-762.

Effect of graphite shapes on tensile strength. Damping properties of cast iron as compared with steel. Mechanical properties as a function of wall thickness. Wear resistance, machinability, corrosion resistance of highly alloyed corrosion and heat resistant irons. 9 ref. (Q-general, R-general, G17k; CI, SGA-h)

167-Q. (German.) Overrated Importance of the Notch Impact Strength. St. Kronmarck. Technik, v. 15, Nov. 1960, p. 751-756.

Structural steel containing 0.09-0.21% C, 0.01-0.63% Si, 0.39-1.35% Mn, 0.007-0.058% P, 0.017-0.093% S, 0.003-0.016% N, 0-0.083% Al and 0-0.21% Ti is notch impact tested at 0-90° C. after a 10% deformation followed by holding at 250° C. for 30 min. Strength behavior as a function of residual stress, deformation velocity and temperature. 25 ref. (Q6, 2-61, 3-66, 3-68; ST, SGB-s)

168-Q. (Japanese.) Wear of Titanium Cast Iron With Eutectic Graphite Structure. Eiichi Takeuchi. Imono (Japan Foundrymen's Society, Journal), v. 32, Sept. 1960, p. 635-641.

Resistance of cast iron containing 0.23% Ti and 3.36-3.85% C to sliding friction wear under lubrication is studied by electron microscopy. Effect of contact pressure, frictional velocity and eutectic graphite structure on wear phenomena. 5 ref. (Q9, 2-60, 3-71, 18-73; CI, C, Ti)

169-Q. Temperature Dependence of Flow Stress in Quenched Aluminum Crystals. L. E. Tanner. Acta Metallurgica, v. 8, Oct. 1960, p. 730-732.

Cyclic strain and tensile tests on specimen at 78-293° K. Relation of temperature dependence of work softening phenomenon and flow stress ratio to dislocation configuration as affected by quenching (in comparison to previous findings in annealed specimens.) 9 ref. (Q24, Q25, M26b, 2-61, 2-64; Al, 14-61)

170-Q. Mechanical Twinning in Thin Evaporated Gold Films. A. Catlin, W. P. Walker and K. R. Lawless. Acta Metallurgica, v. 8, Oct. 1960, p. 734-735.

Single crystal Au thin films, vacuum deposited onto NaCl substrates, are subjected to bulging and stretching tests at 20-200° C. Mechanical twinning as a result of shear stress is observed by optical and electron microscopy and X-ray diffraction and transmission techniques. (Q24b, M-general, 3-66; Au, 14-62)

171-Q. The Low Temperature Tensile Properties of Niobium. A. A. Johnson. Acta Metallurgica, v. 8, Oct. 1960, p. 737-740.

The grain size dependence of tensile properties of vacuum annealed specimens studied at 20-293° K. to determine the temperature dependence of the lattice friction stress and dislocation unlocking stress as factors determining the brittle transition temperature. 5 ref. (Q27, Q23r, M26, 2-59, 2-63; Cb)

172-Q. Observations on the Work-Hardening of Zinc Crystals in Alternating Tension and Compression. D. S. Kemsley. Acta Metallurgica, v. 8, Oct. 1960, p. 740-743.

Hardening behavior of Zn single crystals at varying strain amplitudes in tension and compression at room temperature for comparison with similar studies on Cu. Workhardening curves, slip mechanisms and orientation as a function of stress. 6 ref. (Q23a, Q24, 3-66; Zn, 14-61)

173-Q. Creep in Steel: Technological Aspects of the Subject. J. D. Murray. Iron & Coal Trades Review, v. 181, Nov. 4, 1960, p. 1007-1013.

Metallurgical investigation of high temperature (above 350° C.) steels for gas turbine applications to determine factors in creep deformation. Stress to rupture data and ductility are given for carbon steels, boron-containing steels and Cu alloys. (Q3, Q23p; CN, Cu-b, ST, B, SGA-h)

174-Q. High-Speed Impact. A. C. Charters. Scientific American, v. 203, Oct. 1960, p. 128-140.

Effect of high velocity on the process of impact when steel, tungsten carbide or nylon projectiles are fired into Pb, Cu, Al, duralumin, granite or epoxy resin target blocks at velocities up to 20,000 ft. per sec. Measurement of depth of penetration, impact crater characteristics and velocity at which the projectile and the target impact zone become fluid. (Q6; Al, Cu, Pb, NM-d)

175-Q. Composite Construction Using High Tensile Steel H-Beams. Engineer, v. 210, Dec. 2, 1960, p. 944.

Stress is induced in high tensile steel H beams by subjecting a broad flanged beam to a bending moment then casting a concrete casing around the tension flange of the beam. (Q25; ST, 4-57)

176-Q. Analytical Study of Creep Deflection of Structural Beams. Leonard Mordfin. NASA Technical Note D-661, Dec. 1960, 31 p.

Methods of analyzing creep deflection in I-beams of aircraft structures using Popov's elastic followup technique, time hardening principles, elementary beam theory and tensile and compressive creep curves. Derivation of equations for stress and strain distribution in beams having unequal creep properties in tension and compression, for deflection and pure and nonuniform bending. Development of corrections required by riveted connections for creep and transverse shear. Application to 2024-T4 Al alloy. 28 ref. (Q3, T24a; Al-b, 4-57)

177-Q. Experimental Investigation of Creep Deflection of Extruded and Riveted I-Beams. Leonard Mordfin and Nixon Halsey. NASA Technical Note D-662, Dec. 1960, 26 p.

Creep testing of riveted and extruded I beams of 2024-T4 Al alloy during bending at 450° F. Comparison of experimental creep deflections with calculated theoretical values. Effect of rivet creep on stress distribution and deflection. 5 ref. (Q3; Al-b, 4-57)

178-Q. Fatigue Properties of Zinc Single Crystals and Polycrystals. Mikio Yamamoto and Jiro Watanabe. Physical Society of Japan, Journal, v. 15, Nov. 1960, p. 2099.

Zn crystals are subjected to cantilever rotating fatigue tests at 20° C. to determine alternating bending stress as a function of number of cycles to fracture. (Q7; Zn, 14-61)

179-Q. (Japanese.) Chromium Base Heat Resisting Alloys. Pt. 1. Effect of the Addition of Ti and Al on the High Temperature Properties of 60% Cr-25% Fe-15% Mo Type Alloys. Tetsutaro Mitsuhashi, Renpei Yoda and Masao Yokushiyi. Japan Institute of Metals, Journal, v. 24, Oct. 1960, p. 615-618.

Creep, oxidation and deformation resistance, microstructure and hardness at 1150-1250° C. after various heat treatments for specimens containing to 2% Al and Ti. (Q-general, M27, 2-60, 2-62; Cr-b, Mo, Fe, Al, Ti)

180-Q. (Japanese.) Brittleness of Recrystallized Molybdenum. Kazuo Tsuya and Hideyuki Sasaki. Japan Institute of Metals, Journal, v. 24, Oct. 1960, p. 629-633.

The recrystallization brittleness of arc-cast and sintered Mo studied by metallographic and microfractographic techniques after annealing at 800-1300° C. Ductility is evaluated by bend testing at -70 to 0° C. 4 ref. (Q26s, Q23, N5, 2-61; Mo)

181-Q. (Japanese.) Fatigue Strength of Austenitic Stainless Steel at Elevated Temperatures. Gunji Shinoda, Tadakazu Sakurai, Tadao Sano, Tadashi Kawasaki and Hisashi Izumi. Japan Institute of Metals, Journal, v. 24, Oct. 1960, p. 645-649.

Rotating beam fatigue tests on plain and notched austenitic stainless steel specimens, including 304, 316, 347 and 321 stainless at 460-700° C. Fatigue strength at high temperatures is determined as a function of endurance limit and enhancement by carbon content and carbide precipitation. 15 ref. (Q7, N7, N8r, 2-60, 2-62; SS-e)

182-Q. (Japanese.) Tensile Strength Characteristics of Austenitic Stainless Steel at Elevated Temperature. Sunji Shinoda, Tadao Saro, Tadakeza Sakurai, Tadashi Kawasaki and Hisashi Izumi. Japan Institute of Metals, Journal, v. 24, Oct. 1960, p. 650-654.

Tensile tests on 304, 321 and another austenitic stainless notched specimen at -68 to 800° C. after various heat treatments and deformation. High temperature tensile properties are determined in terms of structural change, carbide precipitation and prior deformation. 8 ref. (Q27a, N8r, 2-61, 3-68; SS-e)

183-Q. (Dutch.) Testing of Weldments. Lastechniek, v. 26, Nov. 1960, p. 215-224.

The shear strength of welded assemblies is determined by testing a series of specially prepared samples under different welding conditions. Effects of material, electrode type, weld design and welding process. (Q2g, 4-57, 7-51)

184-Q. Cooperative Study of Brittle Fracture in Service. Lastechniek, v. 26, Nov. 1960, p. 228-230.

Facts to be considered when investigating the brittle fracture of steel during service are type of construction, temperature and weather conditions, appearance and character of fracture, material, design of assemblies and welding procedures. (Q26s; ST, 4-57)

185-Q. Rupture of Silicon-Iron Sheets and Related Creep Phenomena. C. W. Chen. Iron and Steel Institute, Journal, v. 196, Dec. 1960, p. 385-389.

Stress rupture tests at 550-875° C. revealing three modes of rupture associated with necking, void formation and the development of edge cracks paired at opposite sides. Structural changes occurring during creep, including migration and serration of grain boundaries, polygonization, recrystallization and grain coarsening, according to temperature. Effect of MgO surface coating on creep resistance and void formation susceptibility. 15 ref. (Q3, Q26, M27, N-general, 2-61; Fe-b, Si)

186-Q. Estimation of Hydrogen in Pickled Steel by Vacuum Extraction at 700° C. K. Sachs and M. Odgers. Iron and Steel Institute, Journal, v. 196, Dec. 1960, p. 406-414.

Mild steel, EN 1a, cyanided and silver steel are tested at various temperatures for ductility and hydrogen content, after pickling in cold HCl. Effects of sulphide inclusions, moisture adsorption, plastic deformation and storage temperature on results of analysis. 34 ref. (Q26s, S11f, 1-73; ST)

187-Q. The Bearing Properties of 1% C-Cr Steel as Influenced by Steelmaking. R. F. Johnson and J. F. Sewell. Iron and Steel Institute, Journal, v. 196, Dec. 1960, p. 414-444.

Use of a fatigue testing rig to examine bearings made from various kinds of 1% C-Cr steel. Effects of basic electric arc openhearth and vacuum melting and nonmetallic inclusions on bearing endurance. 13 ref. (Q7, D-general, 9-69; SGA-c, AY)

188-Q. Magnesium Cladding. Metal Industry, v. 97, Nov. 18, 1960, p. 422-424.

Creep ductility and fatigue behavior of Magnox A12, an Mg alloy used in fuel element cans. Data obtained from creep rupture and constant strain rate, tensile tests and by cyclic stressing. 4 ref. (Q3, Q7, Q27, T11q; Mg-b)

189-Q. Determining Decarburization Depth Nondestructively. Frank Phillips. Tool and Manufacturing Engineer, v. 45, Oct. 1960, p. 119-120.

Surface and core hardness values for steel parts, determined by an intolerance Rockwell tester, are converted to decarburization depth readings by a nomograph. Method permits consistent and nondestructive measurements which can be made by a Rockwell operator. (Q29; ST)

190-Q. (Russian.) Hardness of Deformed Steel as a Criterion of Strain Hardening During Secondary Loading. M. S. Orozd. Zavodskaya Laboratoriya, v. 26, Oct. 1960, p. 1139-1143.

Computation of relationship between hardness and degree of tensile, torsion and compression deformation. Effectiveness of strain hardening is evaluated by comparison of hardness before and after preliminary plastic deformation. Hardness value determines elastic limit during secondary loading. 9 ref. (Q29, 3-68, Q21; ST)

191-Q. (Russian.) Hardness Measurements by Spherical Indentor (Meyer's Method). S. S. Stepanov. Zavodskaya Laboratoriya, v. 26, Oct. 1960, p. 1144-1145.

New method for hardness measurement based on determination of the specific work of plastic deformation. Method requires not more than one indentation and does not depend on the load or ball diameter. Device is used to determine the hardness of U8 steel. (Q29; ST)

192-Q. (Russian.) Comparison of Brinell and Meyer Hardness Measurement Methods.

B. I. Pilipchuk. Zavodskaya Laboratoriya, v. 26, Oct. 1960, p. 1145-1147.

Principle difference between both methods is revealed by comparing measurement results obtained using same degree of loading and same indenter point diameter on Fe and Ni alloys, gray cast iron and Cu. Brinell and Meyer hardness. 3 ref. (Q29; CI-n, Cu, Fe-b, Ni-b)

193-Q. (Russian.) Evaluation of Gripping Friction Wear. G. A. Preis. Zavodskaya Laboratoriya, v. 26, Oct. 1960, p. 1148-1149.

Wear testing of bronze, steel and high strength cast iron samples in pure Ar under dry sliding friction conditions. Determination of friction gripping coefficients for various metal pairs. (Q9; CI, Cu-s, ST, SGB-a)

194-Q. (Russian.) Application of Varnish Coating to Study of Strain Conditions in Structures. A. G. Panasyants and V. N. Zaritov. Zavodskaya Laboratoriya, v. 26, Oct. 1960, p. 1150-1151.

Distribution and direction of deformation may be determined by coating the part with amylacetate varnish and tar powder. Results are varified by electrotensometric methods. 3 ref. (Q25; 4-57)

195-Q. Feasibility Studies of Stresses in Ligaments. M. M. Lemcoe. Welding Research Council, Bulletin Series, no. 65, Nov. 1960, 27 p.

Exploratory study of experimental techniques, including Photostress, bonded electric strain gages, photoelasticity (three-dimensional) and Stresscoat, for feasibility, accuracy and economy in measuring thick Al specimen and results compared with classical theoretical solutions. (Q25, F2, G25, S13k; Al, 4-53)

196-Q. (German.) Plastic Versus Metals. W. Heinrich. Maschinenbau, v. 9, Oct. 1960, p. 292-293.

Comparison of physical, chemical and mechanical properties of metals including Cu alloys, Al, cast iron, alloyed and unalloyed steel with plastics such as glass fiber reinforced polyester resin, polyvinylchloride and polyethylene, glass, asbestos or polyamid fiber reinforced phenol resins. Use of plastics in structures (tubes and sheets), for household goods, in missile construction and for machine parts (gear wheels). (Q-general, P-general; Al, Cu-b, CI, ST, NM-d)

197-Q. Modified Charpy V-Notch Impact Test for Alloy Steels. D. L. Newhouse and B. M. Wundt. Iron & Coal Trades Review, v. 181, Dec. 9, 1960, p. 1265.

Standard Charpy-V impact specimens of Ni-Mo-V steel are nitrided at 525° C. and then tested at 24° C. for brittle fracture and energy absorption. Brittle-boundary impact energy data are used for evaluation of fracture toughness and temperature of fracture and for selection of fracture-resistant alloys. (Q26, J28k; AY)

198-Q. (German.) Deformation Stresses in Drawn Material Leaving the Drawing Die. A. Peiter. Draht, v. 11, Nov. 1960, p. 695-702.

Investigation of deformation mechanisms in steel wire by applying a grid to surface, by macro-etching of sections to evaluate course of segregation lines, by measurement of hardness and by average grain size and by stress analysis. Selection of dies. (Q24; ST, 4-61)

199-Q. Problems Involved in the Development of Programmed Fatigue Testing. T. R. G. Williams. Engineer, v. 210, Oct. 28, 1960, p. 703-705.

Comparison of the relationship between random fatigue loading and recommended program loading patterns to show that, for Al alloys, the program test is a conservative estimation of fatigue life in variable loading. Results are compared with those for mild steel. (Q7; Al-b, CN)

200-Q. Effect of Roll Wear on Spalling. J. D. Keller. Iron and Steel Engineer, v. 37, Dec. 1960, p. 171-178.

Nonuniform wear of working and backup rolls in hot strip mills produces pressure up to and exceeding the shearing stress of the roll due to radial deformation. Fatigue cracking caused by stress produces spalling. 6 ref. (Q9, W23k)

201-Q. Properties of Some Copper Alloys at Elevated Temperatures. C. H. Crowe. ASTM Bulletin, Dec. 1960, p. 30-31.

Tensile and yield strength and electrical resistivity of various Cu alloy

bars at temperatures to 500° C. after annealing at 550° C. for 1 hr. (Q27, Q23b, P15g, 2-61, 2-64; Cu-b, 4-55)

202-Q. A Relation Between the Critical Alternating Propagation Stress and Crack Length for Mild Steel. N. E. Frost. Institution of Mechanical Engineers, Proceedings, v. 173, no. 35, 1959, p. 811-836.

Fatigue tests on mild steel specimens containing edge cracks of various lengths to determine the alternating stress necessary to cause crack growth. Relation between stress and crack length is used to correlate notch fatigue data. 25 ref. (Q7, Q26q, 3-66; CN)

203-Q. (Book.) 1960 Supplement to Book of ASTM Standards Including Tentatives. Pt. 3. Methods of Testing Metals. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa.

Methods of testing for cast iron, notch toughness of steel forgings, torque rate of thermostat metal and conductivity, resistivity and permeability of magnetic and electrical conductor materials. Methods of liquid penetrant inspection, radiographic inspection of Al and Mg castings, ultrasonic contact inspection of weldments and sampling of metal powders. (Q-general, S-general, 1-54; Al, CI, Mg, ST)

204-Q. (Japanese.) True Stress Strain Curves for Various Tube Metals. Shigehiko Yazawa. Journal of Mechanical Laboratory (Japan), v. 14, Sept. 1960, p. 141-145.

Stress strain curves obtained from tension tests on tubular specimens are used to determine work hardening characteristics. 4 ref. (Q25n, Q27, Q23a; 4-60)

205-Q. Some Experiments on the Effect of Time at Temperature on the Room Temperature Reversed Bending Fatigue Characteristics and on the Tensile Strength of 24S-T Al-Clad Aluminum Alloy. J. A. Dunsby. National Research Council of Canada, Mechanical Engineering Report MS-102, Aug. 8, 1960 (NRC no. 5927), 24 p.

Alloy is held at 300-400° F. from 1 1/2-100 hr. prior to conducting room temperature reversed bending fatigue or tensile tests. Physical properties change radically with such treatments; these changes can be correlated for varying times and temperatures by the use of the Larson-Miller parameter. (Q7, Q27a; Al-b)

206-Q. (Japanese.) Study of High Strength Low-Alloy Steel. Effect of Boron and Boron Plus Molybdenum Additions in Manganese-Silicon Steel. University of Tokyo, Engineering Research Institute, Annual Report, v. 19, Sept. 1960, p. 96-101.

Addition of B and B with 0.5% Mo improves tensile and yield strength as well as hardness. Addition of both B and Mo improves hardenability whereas B alone has no effect. (Q27a, Q29n; AY, B, AD-q40)

207-Q. The Work Hardening of Metals. N. F. Molt. Metallurgical Society of AIME, Transactions, v. 218, Dec. 1960, p. 962-968.

Survey of the theory of work hardening with attention to face centered cubic metals. Evaluation of mechanisms responsible for stopping the movement of dislocations and causing hardening, including slip, dislocation network, jog and forest formation and annihilation; vacancy formation; and source locking and unlocking. 28 ref. (Q23a, M26b)

208-Q. The Effect of Phosphorus on the Deformation and Fracture Characteristics of Iron From 1600-2200° F. Rolf Nordheim, Thomas B. King and Nicholas J. Grant. Metallurgical Society of AIME, Transactions, v. 218, Dec. 1960, p. 1029-1032.

Constant-load creep-rupture tests conducted in an argon atmosphere at 1600-2200° F. on two heats of Fe containing about 0.06 and 0.09% P in solid solution in the As-cast condition. Stresses are selected to give strain rates approaching those encountered in the hot working of steel. 6 ref. (Q3, Q23, Q26, 2-62, 3-66; Fe-b, P)

209-Q. (French.) Practical Interest of the Great Oscillation Damping Capacity of Irons. Elizabeth Plenard. Fonderie, Oct. 1960, p. 419-431.

Principles of the property of amortisment and test methods for measurement. Influence of physical factors such as temperature, frequency, amplitude of constraint, nature of vibrations and

number of cycles. Correlation between amortisement and certain mechanical properties such as fatigue limit, shock resistance, shearing sensitivity and static strength. Discussion of oscillation systems. (Q8, Q-general; Fe)

210-Q. The Effect of Sulphur on the Notch Toughness of Heat Treated Steels. J. M. Hodge, R. H. Frazier and F. W. Boulger. Metal Treating, v. 11, Dec-Jan. 1961, p. 14-15.

Effect of sulphur content on V notch Charpy impact resistance in wrought, heat treated alloy steels at hardness levels of Rc. 25-40. Testing conducted at -40 to 300° F. (Q6, 2-60, 2-61; AY)

211-Q. Fractures Caused by Explosions and Impacts. John S. Rinehart. Colorado School of Mines, Quarterly, v. 55, Oct. 1960, 155 p.

A discussion of fracture occurring under impulsive loads such as explosions or impacts and of propogation of transient disturbances through metals such as 4130 steel, Cu, brass and 1020 steel. Effect of changes in physical properties on transient disturbance movement. (Q26; Cu-b, ST)

212-Q. Temperature Effects on Tensile Modulus of Elasticity. Magnesium Products, Nov. 1960, Insert.

Tensile modulus of elasticity of HM21A-T8, HM31A-F, HK31A-T6, HK31A-H24, AZ31B-0 and AZ31B-H24 Mg alloys, 2024-T4 and 7075-T6 Al alloys, 155A and 140A Ti alloys, Inconel X, AISI 301 steel, 17-7pH steel, Ti 13V-11Cr-3Al aged, Ti 6Al-4V and Ti 8Mn alloys. (Q21b, 2-61; Al-b, Mg-b, Ni-b, ST, SS, Ti-b)

213-Q. The Metallurgical Aspects of Hydrogen Embrittlement in Metal Finishing. Harold J. Read. Paper from "American Electroplaters' Society, Technical Proceedings", 1960, p. 110-115.

Stress and strain relationships in flow and fracture and the manner in which occluded hydrogen can affect the normal relationship. Problems of removing or avoiding hydrogen embrittlement during finishing; solid solubility and diffusion phenomena. 5 ref. (Q26s, L-general)

214-Q. The Behavior of Hydrogen in Iron and Steel. M. L. Hill. Paper from "American Electroplaters' Society, Technical Proceedings", 1960, p. 124-134.

Extensive review of the mechanism of hydrogen embrittlement. Comparison of the several theories advanced to explain embrittlement phenomena. 58 ref. (Q26s)

215-Q. Measurements Pertaining to Hydrogen Embrittlement. Cloyd A. Snavely. Paper from "American Electroplaters' Society, Technical Proceedings", 1960, p. 138-142.

Hydrogen charging methods, stressing techniques, analytical problems, surface effects and related phenomena. Feasibility of a standard embrittlement test. 24 ref. (Q26s)

216-Q. A New Look at the Hydrogen Embrittlement of Cadmium Coated High Strength Steels. Norman M. Geyer, G. William Lawless and Bennie Cohen. Paper from "American Electroplaters' Society, Technical Proceedings", 1960, p. 143-151.

Cd electroplating processes for coating high strength steel, 280,000 psi. UTS, without detrimental hydrogen embrittlement. Detrimental embrittlement is dependent on the steel alloy, the current efficiency of the Cd plating bath and the physical structure of the Cd coating obtained. A reliable and sensitive test procedure is outlined for ascertaining detrimental embrittlement as a result of Cd plating. 12 ref. (Q26s, L17; AY, Cd, SGB-a)

217-Q. The Effectiveness of Metallic Undercoats in Minimizing Plating Embrittlement of Ultra High Strength Steel. Walter Beck and Edward J. Jankowsky. Paper from "American Electroplaters' Society, Technical Proceedings", 1960, p. 152-159.

Embrittlement caused by Cr and cyanide Cd electroplating is substantially reduced by using undercoats of pyrophosphate Cu and Watts type Ni or by replacement of the cyanide Cd plating solution with the fluoborate bath. 25 ref. (Q26s; AY, Cr, Cd)

218-Q. Control of Hydrogen Embrittlement by Plating From Cadmium Cyanide Baths Containing Nitrate. William F. Hamilton and Myron Levine. Paper from "American Electroplaters' Society, Technical Proceedings", 1960, p. 160-165.

Addition of sodium nitrate and a throwing power additive to a high Cd, low free-cyanide electrolyte produces satisfactory operating characteristics without visible cathodic gassing. The need for post plate baking is eliminated. (Q26s, L17; Cd)

219-Q. Fatigue Breakdowns in Carbon Steels. Mirko Klesnil. Metal Treatment and Drop Forging, v. 27, Dec. 1960, p. 503-510.

Use of tensometers to measure the amplitude of deformation and stress. Changes in structure are studied by X-ray diffractography. In the elastically plastic zone hardening is pronounced; in the phenomenologically elastic zone, which covers almost the whole course of the Wohler cruve, no hardening is established. 10 ref. (Q7; CN)

220-Q. (Russian.) Effect of Elastic Vibrations on Internal Friction in Aluminum Alloy With 2% Manganese at Low Temperatures. V. P. Ketova and V. A. Pavlov. Fizika Metallov i Metallovedenie, v. 10, Mar. 1960, p. 445-452.

Temperature and internal friction relations studied in samples exposed to transverse vibrations of 10^{-5} amplitude between 200-300° K. Internal friction peak observed at 250° K. is in direct proportion with the number of vibrations and is thought to be caused by crystalline lattice defects, such as vacancy coagulations, formed during vibrations. (Q22, Q8, M26s, 2-63; Al-b, Mg)

221-Q. (Russian.) Effect of Additions in Metals on Tensile Strength in Relation to Time and Temperature. V. I. Betekhtin, S. N. Zhurrov and A. V. Savitskii. Fizika Metallov i Metallovedenie, v. 10, Mar. 1960, p. 481-486.

Al, Ag and solid solutions of Al with Cu, Mg and Ag are exposed to monoaxial tensile stress at 18-450° C. It is shown that the structure dependent coefficient (lattice parameters) in the equation determining the time elapsing between the start of loading and rupture depends on the concentration of alloying additions. 10 ref. (Q27, 2-60; Al-b, Ag-b)

222-Q. (Russian.) Effect of Composition on the Slip Traces of Magnesium Alpha-Solid Solution in Aluminum. V. I. Syutkina and E. S. Yakovleva. Fizika Metallov i Metallovedenie, v. 10, Mar. 1960, p. 481-486.

Electron-microscopic observation of slip trace distribution in 4-14% tensile deformed samples (0.01-0.92% Mg) showing marked influence by Mg. The phenomenon is explained by the interaction between Mg atoms and dislocations in the beginning of deformation when strain hardening takes place and during softening at high deformation degree. 9 ref. (Q24a, M21e, M26, N7a, 2-60; Al-b, Mg)

223-Q. Toughness of Tempered Martensite. D. Hardwick and K. R. Pirt. Iron and Steel Institute, Journal, v. 196, Nov. 1960, p. 301-308.

Influence of tensile strength on the transition temperature of three low-alloy steels. En. 21, En. 25 and En. 40 B in the tempered martensitic condition and at a constant prior austenitic grain size. Results are rationalized in terms of the tempering characteristics of martensite. (Q23r, Q27, N8a; N8p, 2-59; AY)

224-Q. Research on the Mechanical Properties of Metals. Australian Machinery and Production Engineering, v. 13, Oct. 1960, p. 23-27.

Use of X-ray diffraction and electron microscopy to determine the relation of metallurgical structure to fatigue cracking and the effect of the notch geometry on tensile strength and ductility of Al, low alloy steels, high strength steels and Ti and its alloys. Effect of temperatures of -196 and 1200° F. on tensile strength. (Q7, Q27a, Q23p, M22g, M21e; Al, AY, Ti-b, SGB-a)

225-Q. How Arvo Beat a Metal Fatigue Problem. Richard Smallman-Tew. Canadian Metalworking, v. 24, Jan. 1961, p. 31-35.

Stress relief of Alcoa X7079 alloy hand forgings by compressive deformation. Causes of residual stress in high strength Al alloys; measurements of stress pattern and magnitude. (Q7; Al, 4-51)

226-Q. Availability and Mechanical Properties of High Strength Steel Extrusions. Defense Metals Information Center, Battelle Memorial Institute, DMIC Report 138, Oct. 26, 1960, 60 p. (Available as PB 151097

from U. S. Office of Technical Services, Washington 25, D. C.)

Ultimate tensile strength, elongation, yield strength and area reduction are given for high strength steel extrusions such as low alloy hardenable, martensitic, martensitic precipitation hardenable, austenitic and semiaustenitic precipitation hardenable steels. (Q27a, Q23; AY, SS, 4-58)

227-Q. (French.) Comparison of the Values of the Modulus of Elasticity of Gray Irons Obtained by a Static Method and a Dynamic Method. J. Dilewijns. Fonderie Belge, v. 30, Nov. 1960, p. 293-297.

Methods of determining modulus of elasticity, including dynamic method using Forster Elastomat, with statistical analysis of results. Dispersion of results on gray irons as reported in the literature and of tests on 20 mm. diameter cylinders of lamellar graphite iron by means of the Elastomat and by flexure tests on conventional tensile testing machine. 7 ref. (Q21a, Q21b, 1-54; CI-n)

228-Q. (Translation-AIP.) Physics of the Strength of Crystalline Materials. R. I. Garber and I. A. Gindin. Soviet Physics, v. 3, July-Aug. 1960, p. 41-77.

Effect of microscopic cracks, strength and size of fiber crystals, temperature, stress, brittleness and structure on strength of crystalline materials including high strength alloys. Fatigue and rupture mechanisms. 223 ref. (Q-general, M26; SGB-a)

229-Q. (Book.) Determination of the Mechanical and Technological Properties of Metals. B. M. Gliner. 158 p. 1960. Pergamon Press, 122 E. 55th St., New York 22, N. Y.

Covers all types of tests used in the Soviet Union. In all cases the principal terms are accurately defined, the testing variables such as specimen dimensions, loading rate and time, testing temperature are laid down in accordance with Soviet specifications. Brief descriptions are given of the principal types of testing equipment. (Q-general)

230-Q. Checking Tensile Strength of Bolts. Mill and Factory, v. 68, Jan. 1961, p. 93.

Measurement of torsion tensile strength of bolts by portable testers to determine the torque giving maximum holding power without exceeding the bolt's tensile strength. Applications in aircraft wheels. (Q27, Q1, T7f, T24)

231-Q. (French.) Study of Steels With and Without Vanadium for Forgings. G. Delbart, M. Jaspart, A. Clerc and A. Constant. Revue de Metallurgie, v. 57, Oct. 1960, p. 885-909.

Influence of addition of 0.03-0.29% vanadium on mechanical properties of 50-200 mm. diameter bars of carbon steel and a group of Cr-Mo and Cr-Ni-Mo steels. Marked improvement of tensile and impact properties obtained by addition of vanadium in some cases permits substitution of a normalizing treatment for quenching and raising of tempering temperatures. 3 ref. (Q-general, 2-60, 2-64; AY, V)

232-Q. (Slovakian.) Effect of Hydrogen on Welded Cast and Formed Steel. Paul Bastien. Zvaracsky Sbornik, v. 9, Mar. 1960, p. 345-366.

Literature review. Effect of hydrogen on the flaking of forged or rolled steel. Brittleness of welds containing hydrogen. Internal friction, elastic and plastic deformation and tensile properties as functions of the hydrogen present and its distribution in the metal in the form of protones, atoms or molecules. 36 ref. (Q26s, 9-70, Q-general; ST, 4-51, 4-53)

233-Q. A Basic Guide to Specifying Heat Treatment of Steels. Lester F. Spencer. Machine Design, v. 32, Dec. 22, 1960, p. 120-125.

Mechanical properties of carbon and alloy steels as a function of type of heat treatment, chemical composition and grain size. (Q-general, 2-59, 2-60, 2-64; AY, CN)

234-Q. Zircaloy Cladding Performs Well in PWR. B. Lustman, M. L. Bleiberg, E. S. Byron, J. N. Chirigos, J. G. Goodwin and G. J. Salvaggio. Nucleonics, v. 19, Jan. 1961, p. 58-63.

Effect of exposure to an integrated neutron flux of $5.5\text{-}6.0 \times 10^{21}$ NVT on dimensions, mechanical properties, microstructure and hydrogen content of Zircaloy fuel element cladding. Mechanisms of cladding failure due to hydriding and water logging. (Q-general, M27, 2-67, T11; Zr-b)

235-Q. Glass Helps Metals to Raise High Temperature Barriers. Iron Age, v. 187, Jan. 12, 1961, p. 57-59.

Effect of glass additions on the high temperature strength, elastic moduli and stress rupture and creep properties of low melting point metals such as Al, Pb and Zn alloys. (Q-general, 2-60; Al, Pb, Zn, SGA-d, NM-f42)

236-Q. Effect of Radiation on Ductile-Brittle Transition Temperature. Power Reactor Technology, v. 3, Sept. 1960, p. 38-57.

Effect of fast neutron irradiation on the mechanical properties and ductile-brittle transition temperatures of various ferritic steels of varying grain size, impurity content and composition. (Q-general, Q23r, 2-67; SS-d)

237-Q. Nickel Coatings--Adherence on Aluminium and Alloys. Corrosion Technology, v. 7, Nov. 1960, p. 369.

A quantitative determination of the strength of adhesion of a Ni coating to Al and its alloys based on the force required to strip the coating from the surface. Optimum pretreatment conditions can also be determined from this test. (Q10c; Al-b, Ni, 8)

238-Q. Steel Tubing. Its Weight? Its Annular Area? F. Kaplan. Product Engineering, v. 31, Dec. 26, 1960, p. 59.

Calculation of tubing weight per foot, annular area and shear strength from a nomograph. (Q2g; ST, 4-53)

239-Q. (German.) Observations Concerning Radiation Hardening in Copper and Nickel. I. G. Greenfield and H. G. F. Wilsdorf. Naturwissenschaften, v. 47, no. 17, 1960, p. 395-396.

Neutron irradiation of Cu single crystals (99.999%, 2.5 x 2.5 x 60 mm. in size) in a pile to a dose of 2×10^{19} nvt. (integrated flux) at 70° C. and subsequent deformation by various amounts in tension. Electron microscopic examination after electrolytical polishing of crystals to a thickness of 1000 Å. The reaction mechanism of radiation hardening is compared with the behavior of Ni. (Q29n, M-general, 2-67; Cu, Ni, 14-61)

240-Q. Movement of Point Defects During Fatigue of Aluminum Crystals. E. Roberts and R. W. K. Honeycombe. Philosophical Magazine, v. 5, Nov. 1960, p. 1147-1149.

Dynamic stress-strain behavior of Al crystals fatigued in a push-pull machine at 13 CPS. Room temperature interruptions to test at -196 and -78° C. result in a transitory hardening which is attributed to the movement of point defects to dislocations. (Q7, Q25n, M26b; Al, 14-61)

241-Q. (French.) Austenitic Grain Size of Cast Steel. M. Pierre Detrez. Fonderie, Sept. 1960, p. 383-391.

Influences of austenitic grain size on workability, impact resistance and tensile strength of martensitic tempered steels. Comparison of results obtained by vacuum thermal and picric acid methods. (Q23q, Q6, Q27, 2-59; SS-c)

242-Q. (Russian.) Deformation and Stresses During Elongation. I. Ya. Tarnovskiy, A. A. Pozdeev and S. H. Puchkov. Kuznechno Shtampovochnoe Proizvodstvo, June 1960, p. 6-10.

Distribution of tensile and compression stresses in a Pb blank of rectangular and cylindrical shape during elongation by drop-forging with round, rhombic and rectangular dies. Relationship between degree of reduction and emergence of cracks and pores. Influence of contact-surface of the die on stress distribution in the blank. 7 ref. (Q28k, Q27, F22n; Pb)

243-Q. (Russian.) Determination of the Plasticity of Steel Sheet by Hydrostatic Device. L. A. Rubenkova. Kuznechno Shtampovochnoe Proizvodstvo, June 1960, p. 12-13.

Determination of tensile strength of cold rolled steel sheets under various degrees of plastic deformation by a special hydraulic punching device which simultaneously measures the pressure developed in cylinder and the height and diameter of the reduced and elongated sample. 5 ref. (Q27a, 3-68; ST, 4-53)

244-Q. (German.) Theoretical Buckling Stresses of Aluminum Structural Elements. Karl Sutter. VDI-Zeitschrift, v. 102, Dec. 11, 1960, p. 1715-1729.

Classification of Al alloys into three strength categories in terms of their 0.1 and 0.2 yield strength ratio. Computation of theoretical buckling strength under

compression and shear stress as dependent on yield strength and slenderness ratio. (Q28, Q23b; Al-b)

245-Q. (German.) Joints in Aluminum Constructions for Structural Engineering Applications. Otto Steinhardt. VDI-Zeitschrift, v. 102, Dec. 11, 1960, p. 1729-1742.

Tensile, shear and fatigue testing of as-cast and warm aged specimens of AlMg5, AlMgSi1, AlZnMg1 and AlZnMg3 having riveted and welded joints. (Q27, Q2, Q7; Al-b, Mg, 7-51, 7-53)

246-Q. (Russian.) Theory for Experimentation With Sheet Metal at High Rate of Deformation. A. D. Tomlenov. Kuznecho Shtampovochnoe Proizvodstvo, July 1960, p. 5-6.

Determination of resistance to deformation of sheet metal at various deformation rates by a high-speed hydraulic punching machine. Results are calculated from data on the amount of liquid in the hydraulic cylinder, its density and compression modulus on the velocity of the impact wave. 8 ref. (Q23q; 4-53)

247-Q. (Italian.) Fatigue Strength of Metals. Pt. 3. Cornelio Gianola. Rivista di Meccanica, v. 11, Oct. 1960, p. 27-33.

Form and notch factors and notch sensitivity in ferrous and nonferrous metals under static or dynamic tensile, flexural and torsional stress. (Q7, Q23s)

248-Q. (Japanese.) Study of Al-Mg-Si-Cu Strong Alloy Sheets for Bright Anodizing. First Report. Influence of Si and Cu on Brightness and Mechanical Properties. Namio Kawashima and Noboru Fukuchi. Light Metals, v. 10, Sept. 1960, p. 337-340.

Corrosion hardness and tensile test data for specimens tempered in the T6 condition. (Q-general, L19, 2-64; Al-b, Cu, Si)

249-Q. (Japanese.) Relation of Cold Work to Aging Characteristics of High Strength Aluminum Alloys for Aircraft. Eici Ikono. Light Metals, v. 10, Sept. 1960, p. 341-347.

Electrical conductivity measurement and tensile and corrosion tests on 2024, 7075 and 6061 Al clad Al alloy sheet after natural and artificial aging at 20-190° C. for various times, solution treatment and cold working. Response of mechanical properties to heat treatment and deformation as a function of composition. 8 ref. (Q-general, P16g, R-general, 2-60, 2-65, 3-68; Al-b)

250-Q. Studies of Hot Cracking in High-Strength Weld Metals. H. W. Mishler, R. E. Monroe and P. J. Rieppel. Welding Journal, v. 40, Jan. 1961, p. 1s-7s.

Effect of sulphur and phosphorus content on the hot tensile properties and hot ductility of 4340 weld metals is determined using a freezing cycle hot tension machine. 5 ref. (Q27, Q23p, 2-60, 9-72; ST, 7-51)

251-Q. Application of 2219 Aluminum Alloy to Missile Pressure-Vessel Fabrication. Clayton H. Crane and Whitney G. Smith. Welding Journal, v. 40, Jan. 1961, p. 33s-40s.

Corrosion resistance, heat treatment characteristics, mechanical properties as affected by temperature and weldability of 2014, 2219 and 6061 Al alloys are compared to determine the feasibility of using Cu-bearing alloys in fusion welded and heat treated pressure vessels. (Q-general, 2-61, R-general, K9s, T26q; Al-b, Cu, 17-57)

252-Q. Brittle Fracture Characteristics of a Reactor Pressure-Vessel Steel. E. T. Wessel and W. H. Pryle. Welding Journal, v. 40, Jan. 1961, p. 41s-48s.

Notch sensitivity, yield strength, transition temperature and impact strength are measured for A302B steel plates in the as received normalized condition or after a heat treatment similar to that encountered during fabrication into reactor pressure vessels. (Q26s, Q23, Q23b, 2-64, T26q; ST, 4-53, 17-57)

253-Q. (Russian.) Effect of Aging on Tensile Strength of V95 Type Alloys at Low and Elevated Temperatures. K. M. Pogooina-Alekseeva and E. I. Timofeev. Tsvetnye Metally, Oct. 1960, p. 68-71.

Aging of Al alloy samples at 20-150° C. for 2-128 hr. with subsequent tensile testing at -40 to 150° C. Increase in tensile strength as a function of aging at higher temperatures than the service temperature. (Q27, 2-61, 2-65; Al-b)

254-Q. (Russian.) Drawing Die Wear is Studied by Radioactive Isotopes. P. F.

Groshev. Tsvetnye Metally, Oct. 1960, p. 71-76.

Cu wire is drawn using a hard alloy die containing W-C and made radioactive by slow neutron irradiation to produce W^{187} isotope. Determination of die wear as a function of drawing velocity by testing and recording the resulting W^{187} irradiation. 3 ref. (Q9, 1-59, T6r)

255-Q. Creep Testing Machine Meets British Emergency. H. Robson. Metal Progress, v. 79, Jan. 1961, p. 76-78.

Faced with the urgent task of checking the creep properties of numerous forgings of doubtful quality, engineers at D. Napier & Son, Ltd., in London, designed and built a creep tester in only five weeks rather than cut jet engine production and wait for replacements. Simple in design and fabrication, the tester can handle up to six creep specimens at one time. (Q3, 1-53)

256-Q. (Japanese.) Properties of 2S Slabs Made by Continuous Casting. Takashi Ikeno, Shigeo Zoima and Kizo Shibata. Light Metals, v. 10, Nov. 1960, p. 397-404.

Comparison of structure and mechanical properties of specimens taken from different sections of an Al alloy casting. Data are given for tensile and shear strength, elongation, hardness, Knoop ratio, earing and micro and macrostructure. 5 ref. (Q-general, M-general; Al-b, 5)

257-Q. (French.) Problems Connected With Creep Tests. W. Siegfried. Metallurgia Italiana, v. 52, Oct. 1960, p. 640-646.

Determination of the Larson-Miller constant from the stress applied, temperature and time elapsed until rupture. Stress strain curves for creep are given for a steel containing 0.5% Mn, pure Ni, Ni with 0.05% Ti and an austenitic steel. Range of testing temperatures: 550-750° C.; range of load: 0.5-35 kg. per sq. mm. 9 ref. (Q3, 2-61, 3-66; Ni-b, Ti, SS-e, ST, Mn)

258-Q. (Italian.) Creep Properties of Various Steels Loaded at Higher Temperature. G. Paravicini. Metallurgia Italiana, v. 52, Oct. 1960, p. 647-650.

Literature review on evaluating creep test results. Testing of alloy steels 131D containing Mo and 223D containing Cr and Mo, 227D, 235D and 234D at 500-600° C. while loaded with 3.5-18 kg. per sq. mm. (Q3, 2-61; AY)

259-Q. (Italian.) Effect of Temperature and Load Variations in Creep Testing. M. Alberghina. Metallurgia Italiana, v. 52, Oct. 1960, p. 651-655.

Heat resistant AISI 310 steel containing 19.8% Ni, 25.8% Cr, 0.14% C, 0.76% Mn and 1.09% Si is loaded with 15-22.5 kg. per sq. mm. at 600-650° C. and creep tested. Evaluation of accuracy of results. (Q3, 2-61, 3-66; ST, SGA-h)

260-Q. (Italian.) Short Time Creep Tests. A. Erra. Metallurgia Italiana, v. 52, Oct. 1960, p. 656-658.

Ag 42 steel is loaded with 2-33 kg. per sq. mm. at 370-450° C. for 45 hr. to determine creep strength as a function of temperature. 5 ref. (Q3, 2-61; ST)

261-Q. (Italian.) Extrapolation of Creep Rupture Data. P. Brozzo. Metallurgia Italiana, v. 52, Oct. 1960, p. 659-660.

Discussion of extrapolation methods for creep data in general and according to the theories of Larson-Miller, Dorn and Manson-Haferd. (Q3)

262-Q. (Italian.) Steels Used in High Temperature Tubing Systems. A. Feroci. Metallurgia Italiana, v. 52, Oct. 1960, p. 661-668.

Pressure maxima, sizes, admissible thermal stress, yield strength, creep strength, thermal expansion, modulus of elasticity, thermal conductivity, density and specific heat of tubing manufactured from 33, 35 and 45D carbon steels, austenitic steels 913, 991, 971, 942 and 912D and ferritic or martensitic stainless steels 921, 923, 925 and 927D at -50 to 900° C. (Q-general, P-general, 2-61; AY, CN, SS, 4-60)

263-Q. (Italian.) Effect of Structure and Heat Treatment on the Creep Behavior of Steel. A. Myallonnier. Metallurgia Italiana, v. 52, Oct. 1960, p. 669-673.

Carbon steel containing 0.10-0.22% C and various Cr, Mo and Ni alloy steels are subjected to isothermal heat treatments at 920-1100° C., rapid cooling to 700-720° C. and slow cooling to room

temperature, then creep tested at 475-700° C. Effect of composition and grain size on creep strength. 19 ref. (Q3, 2-59, 2-64; CN)

264-Q. (Czech.) Hard Facing Co-Cr-Mo-W Alloys for Service Temperatures in the 700° C. Range. Karel Löbl. Zvaranie, v. 9, Nov. 1960, p. 320-326.

Alloys containing 26.85-31.62% Cr, 3.79-14.08% Mo, 1.14-13.15% W and 40.98-55.65% Co and used for hard facing of extrusion dies and forging hammers, are tested for mechanical properties at 20-700° C. and for oxidation resistance at 800-1000° C. 8 ref. (Q-general, R1h; Co-b, Cr-b, Mo, W)

265-Q. (German.) Investigation of Anelastic Behavior of Silver in Stattc Torsion Testing. Werner Schilling, Georg Alefeld and Gerd Buschhorn. Zeitschrift fur Metallkunde, v. 51, Dec. 1960, p. 685-693.

Measurements of the torsional elastic after-effect at temperatures from 0-350° C. of pure (99.99%) cold rolled and annealed silver wire. Interpretation of mechanism of after-effect in terms of a dislocation model. (Q22, Q1, M26b, 2-61; Ag, 4-61)

266-Q. (German.) Investigation of Slip in Individual Crystallites of Multicrystallite Copper Specimens. Randolf J. Hartmann and Eckard Macherauch. Zeitschrift fur Metallkunde, v. 51, Dec. 1960, p. 694-699.

Combined X-ray and microscopic investigation of slip planes from slip band direction and crystallite orientation during tensile deformation (up to 7.5%) of annealed and etched 99.98% Cu specimens with crystallites of 0.1-0.4 mm. diameter. (Q24a, M-general, 3-68; Cu)

267-Q. (German.) Work Hardening and Staple Fault Energy of Copper Alloy Crystals. Peter Haasen and Alwyn King. Zeitschrift fur Metallkunde, v. 51, Dec. 1960, p. 722-736.

Plastic deformation of alpha (fcc.) solid solution single crystals of Cu with 2.15-9.66% Ga or 1.47-6.62% Ge between 80 and 500° K. for varying deformation rates to investigate work hardening as a function of concentration, temperature and strain rate. Computation of staple fault energy from stress at beginning of cross slip. Examination of deformation-twinning at temperatures below 200° C. (Q23a, Q24, 3-66; Cu-b, 14-61)

268-Q. Science for Electroplaters. Pt. 62. L. Serota. Metal Finishing, v. 59, Jan. 1961, p. 49-51.

Adhesion of Ni castings on cast iron, nickel brass and extruded and cast brass is determined by the Jacquet method and the nodule test. The first is a method of quantitatively determining the bond strength and the second a method of adhesion testing in which an electroformed projection serves as a grip and the force required to dislodge it from the base metal is measured. (Q10c; CI, Cu-n, Ni, 8)

269-Q. (Japanese.) Study of Al-Mg-Si Alloy Systems. Shigio Muromachi and Yamazaki Hiroshi. Light Metals, July 1960, p. 33-38.

Melting, casting, rolling and heat treatment of Al-Mg-Si alloys as they affect the mechanical properties. Data for optimum casting temperature, cooling speed and quenching and tempering temperature. 6 ref. (Q-general, 2-64, 3-68, C5; Al-b, Mg-b, Si)

270-Q. The Effects of "As Forged" Surfaces and Notches on the Fatigue Strength of S.A.E. 4140 Steel (U.T.S. 140,000 Psi.) J. Y. Mann. Australian Defense Scientific Service, Aeronautical Research Laboratories, Structures and Materials Note no. 256. 15 p.

Rotating cantilever fatigue tests are conducted on S.A.E. 4140 steel specimens (U.T.S. 140,000 psi.) with "as forged" surfaces and with V-notches. Graphs show effect of "as forged" or decarburized surface on the fatigue limit and fatigue strength reduction factor. 16 ref. (Q7c, 2-64; ST)

271-Q. (English.) Hot Workability of Carbon Steels. T. Koinumaru, S. Sasaki and T. Ichikawa. Railway Technical Research Institute (Japan), Quarterly Report, v. 1, June 1960, p. 32-33.

Torsion tests at temperature above 950° C. on Swedish carbon steel (0.04-1.29% C) and Japanese carbon steel (0.10-0.89% C) to determine hot workability for application in railway forging. Hot deformability as a function

of C, O and Cu content and temperature with test failures occurring because of hot shortness. (Q23q, Q26s, 2-62; CN)

272-Q. Stress Analysis of Aluminum V-8 Diesel Cylinder Block. H. W. Van Camp. Preprint no. 255A, Society of Automotive Engineers, 485 Lexington Ave., New York 17, N. Y. 1960, 12 p.

Role of experimental stress analysis in product design. Criteria for evaluating Al alloy 355 castings for fatigue is described in the case history of a cast Al wet line type cylinder block for which stress measurements are correlated with fatigue fracture. (Q23b, Q7k, T3n; Al)

273-Q. Wrought Titanium Alloy Has Better Creep Resistance. Materials in Design Engineering, v. 53, Jan. 1961, p. 17.

Data given for creep resistance, forgeability and tensile properties of a new 8Al-1Mo-1V-Ti alloy as compared with 6Al-4V-Ti alloy. Duplex annealing is suggested as a method of increasing rupture life. (Q3m, F22, 17-52, Q27a, J23; Ti-b, Al, Mo, V)

274-Q. Heat Treatable Copper Alloys. Materials in Design Engineering, v. 53, Jan. 1961, p. 84-88.

Effect of thermal and mechanical treatments on the mechanical properties and electrical conductivity of beryllium copper, chromium copper, zirconium copper, nickel tin bronze and aluminum bronze. (Q-general, P15g, 2-64, 3-68; Cu-b)

275-Q. What You Should Know About Creep Rupture. F. J. Clauss. Materials in Design Engineering, v. 53, Jan. 1961, p. 89-100.

Effect of stress, temperature and time on the creep rupture of ferritic, martensitic and austenitic steels, 1100 Al alloy, W, Ta, Mo, Li, Fe, Pt, Au, Ag, Cu, Al, Mg, Zn, Cd, Pb and Sn with emphasis on experimental techniques. Effect of structure on the creep rupture of solid solution, precipitation hardened and dispersion hardened alloys. (Q3, 2-61, 3-66, 3-71)

276-Q. How to Make Simple Bend Tests. Iron Age, v. 187, Jan. 26, 1961, p. 82.

Ductility of sheet metal is determined without the aid of testing devices by a practical method in which the metal is bent 180°, a piece of the same metal is inserted between bent sections and compound bends are made. The appearance of the metal in the folding zone is indicative of its properties. (Q5; 4-53)

277-Q. The Effect of Lubricants on the Growth of Surface-Contact Area During Plastic Deformation of Metals. L. H. Butler. Institute of Metals, Journal, v. 89, Dec. 1960, p. 116-122.

Compression tests on small annealed Al sheet specimens with a flat, highly polished contact die, the interfaces being either unlubricated or lubricated with pure paraffinic-base lubricants of varying viscosity, with deformation to approximately 40% compression. Correlation with surface-contact conditions in metal-forming processes to explain the low value of coefficient of friction and the surface texture changes in cold rolling and wire drawing. (Q9, Q28, M26c, S15, 3-68, 18-73; Al, 4-53)

278-Q. A Low-Temperature Inflection in the Temperature-Dependence of Hardness of Pure Metals. E. R. Petty. Institute of Metals, Journal, v. 89, Dec. 1960, p. 123-124.

Hardness, temperature relationships for Al, Ag, Au, Cr, Fe, Mo, Ni, Pb, Pt, Ta, V, W, Zr, alpha brass and steel at -183 to 800° C. Relation to low temperature deformation and creep mechanism is examined by tensile and compression tests, correlated with test data from the literature. 13 ref. (Q29n, Q-general, 2-63, 3-68)

279-Q. The Microhardness of Copper Bombarded With Alpha Particles. T. K. Ghosh, C. J. Beevers and R. S. Barnes. Institute of Metals, Journal, v. 89, Dec. 1960, p. 125-127.

The hardness induced in Cu after bombardment with 38-MeV alpha particles at 150° C. is investigated together with its annealing characteristics after vacuum treatments at 200-1000° C. The hardening is separated into two parts: that caused by atomic displacements, produced by the passage of the energetic alpha particles and that at the end of the alpha particles track caused by the deposition of the He atoms. 4 ref. (Q29q, 2-64, 2-67; Cu)

280-Q. (Japanese.) Fatigue Bauschinger Effect. Minoru Kawamoto, Hiromi Takai and Hidehiro Kisimato. Japan Society of Mechanical Engineers, Transactions, v. 26, Oct. 1960, p. 1333-1339.

Deformation behavior of 0.34% carbon steel under cyclic loading pulsating torsional stress applied in one direction and successively in the reverse direction. A "Fatigue Bauschinger Effect" is observed at stress slightly below the yield stress, corresponding to the conventional Bauschinger Effect observed in static loading. (Q7h, Q24k; CN)

281-Q. (Japanese.) Plain Bending Fatigue Strength of Welded Joints. Comparison of High Tension Steel With Mild Steel in Joint-Models of Rolling Stock. Pt. 2. Hiroshi Nakamura and Shiro Veda. Japan Society of Mechanical Engineers, Transactions, v. 26, Oct. 1960, p. 1361-1368.

Bending fatigue tests on model weldments used in the design and manufacture of truck frames, axles and wheels. Effect of postweld operations such as shot-peening, grinding and annealing on fatigue strength and crack propagation. Relation of notch sensitivity to weldment surface defects. 6 ref. (Q7, Q5m, Q26, K9q; CN-g, 7-51, 9-71)

282-Q. (Japanese.) The Prediction of Fatigue Fracture Under Combined Stresses at Stress Concentration. George Sines. Japan Society of Mechanical Engineers, Transactions, v. 26, Oct. 1960, p. 1340-1347.

Fatigue failure criteria for unnotched specimens under a combination of alternating and static stress are proposed and examined in fatigue tests to obtain a general failure criterion, especially applicable to notched specimens with stress concentations. Data are reviewed for various carbon and alloy steels, malleable iron and Cu and Al alloys, after heat treatment and working. 24 ref. (Q7f, Q25k; Al-b, CI-s, Cu-b, ST)

283-Q. (Japanese.) Dynamic Creep and Fatigue of 13 Cr Steel at Elevated Temperature. Shiyi Taira and Ryoichi Koterazawa. Japan Society of Mechanical Engineers, Transactions, v. 20, Oct. 1960, p. 1356-1360.

Data for dynamic creep and fatigue tests at 450° C. are correlated with static creep rupture and reversed stress fatigue test data to predict high temperature strength. 8 ref. (Q3m, Q7, 2-62; AY, Cr)

284-Q. (Japanese.) Strain Ratio Relationship in Plastic Deformation. Fujio Nakanishi and Yosuo Sato. Japan Society of Mechanical Engineers, Transactions, v. 26, Oct. 1960, p. 1327-1332.

A theory on plasticity is advanced in terms of strain ratio relationships accounting for relation between plastic stresses, forms of hysteresis curves, anisotropic deformation mechanisms and yielding as a function of plastic deformation. 5 ref. (Q24g, Q24h; CN, Cu-n)

285-Q. (Japanese.) Analysis of Ball-Indentation Hardness. Koshino Kuroki. Japan Society of Mechanical Engineers, Transactions, v. 26, Oct. 1960, p. 1435-1443.

Spherical indentation hardness is evaluated in terms of balance between indenting load and stresses at the contact surface, assuming constant contact pressures. Theoretical relations between the indenting load, ball diameter, specimen yield stress and depth or diameter of the indentation are checked for specimens of different hardness. Conversions are made for Vickers, Rockwell and Brinell hardness, with some attention to Meyer's analysis. 11 ref. (Q29b, Q29e, Q29s)

286-Q. (Japanese.) Fatigue Tests of Metals at Ultrasonic Frequency. John Awatani. Japan Society of Mechanical Engineers, Transactions, v. 26, Oct. 1960, p. 1382-1386.

S-N curves are obtained for bearing steel and Cu specimens as a function of ultrasonically induced stress concentration at the midportion, which is contracted. Analysis is made of the vibration of the contracted test piece at resonance conditions. (Q7f, Q25k, 1-74; Cu-b, AY)

287-Q. (Swedish.) Blue Brittleness. A. Josefsson. Jernkontorets Annaler, v. 144, Nov. 1960, p. 834-846.

Effect of plastic deformation at 200-300° C. as compared to deformation at room temperature on the mechanical properties of low carbon steels with varying nitrogen content. (Q26s, Q-general, 2-60, 3-68; CN-g)

288-Q. Why You Should Braze Small Diameter Piping. Alden W. Swift. Welding Engineer, Jan. 1961, p. 44-46.

Tensile, compression and crush testing of brazed and threaded joints to compare shear strength, soundness and weight. (Q27, Q28; 4-60, 7-52, 7-55)

289-Q. An Approximate Method of Calculating Shear and Bending in Free-Beam Structures Subjected to Suddenly Applied Forces. M. S. Smith. Machine Design, v. 33, Jan. 19, 1961, p. 127-131.

Calculation of the dynamic response of beam structures subjected to sudden loads by a mode acceleration method applied in steps to find the components of local accelerations, which are then summed according to the principles of superposition. (Q2, Q5; 4-57)

290-Q. Fracture Specimen of Notched Tensile Specimens of Titanium and a Titanium Alloy. G. W. Geil and N. I. Carwile. Materials Research and Standards, v. 1, Jan. 1961, p. 16-21.

Effects of notch geometry, temperature and prior strain-temperature history on the initiation and propagation of fracture in tensile specimens tested at -196 to 100° C. Initiation of fracture is correlated with embrittlement factors associated with the notch geometry. (Q26q, Q26s, Q23s; Ti-b)

291-Q. (Italian.) Manganese Bronzes. A. Azzolini and G. Cogito. Fonderia Italiana, Oct. 1960, p. 407-413.

Preparation of bronzes containing 57-70% Cu, various amounts of Zn, 0.5-6.5% Al, 0.5-3% Fe, 0.5-5% Mn and 0-0.50 Pb, Sn or Ni. Constitutional diagrams. Effects of Al, Sn, Fe, Mn and Ni on mechanical properties. 3 ref. (Q-general, M24d, 2-60; Cu-s)

292-Q. Testing of Wire Rope. E. Franke. Wire, Dec. 1960, p. 242-244.

Importance of fatigue testing of wire rope. Design of fatigue testing equipment capable of subjecting wire rope and individual wires in the rope to tensile, bending, wear and vibration stresses. (Q7; 4-61)

293-Q. The Application of Steel Extrusions. R. D. Jones. Welding and Metal Fabrication, v. 28, Dec. 1960, p. 495-498.

Extrusion of high tensile alloy and stainless steels in complicated rollable bar, unrollable solid and hollow sections. Data are given for tensile strength and elongation of the extrusions as a function of carbon content and for tolerances and surface finishes. (Q27a, Q23p, 2-60; AY, SS, 4-58)

294-Q. Piping Failures. Mechanical World and Engineering Record, v. 141, Jan. 1961, p. 17-18.

Failure in carbon, alloy and stainless steel boiler tubes under high pressure as caused by corrosion, erosion, scaling, creep and temper embrittlement as a function of stress and temperature. (Q26, Q3, R1d, 2-62, 3-66; ST, 4-60)

295-Q. Radiation Hardening of Copper Single Crystals. T. H. Blewitt, R. R. Coltman, R. E. Jamison and J. K. Redman. Journal of Nuclear Materials, v. 2, Dec. 1960, p. 277-298.

Effect of nuclear radiation on the mechanical properties of Cu. Annealing kinetics of the radiation hardness are studied in the temperature range from 25-700° K. Little or no annealing is observed in the region below 80° K. From 80-300° K., approximately 20% of the yield stress is recovered with the remainder annealing in the range from 600-700° K. Data support a dislocation locking mechanism. 23 ref. (Q-general, 2-67; Cu, 14-61)

296-Q. The Plastic Deformation of Monoclinic Alpha Plutonium. S. E. Bronisz and A. E. Gorum. Journal of Nuclear Materials, v. 2, Dec. 1960, p. 353-355.

Evidence shows that alpha Pu deforms primarily by slip, but that twinning and possibly grain boundary sliding contribute to the deformation. Grain boundary sliding at room temperature and an increase in the ease of twinning with an increase of temperature are contradictory to the observed behavior of other materials. 3 ref. (Q24; Pu)

297-Q. (Russian.) Determination of Notch Sensitivity in Plastic Metals. O. A. Timoshenko. Zavodskaya Laboratoriya, Nov. 1960, p. 1293-1297.

Armco iron and 10, 20, 45, U8 and Yait steel samples are heat treated, notched and exposed to tensile loading. Axial and radial deformation distribution in the minimum cross section area and effect of carbon content on the notch sensitivity are determined. 4 ref. (Q23s; Fe, ST)

298-Q. Bi-Metallic Interlock Bonds Cast Iron Inserts to Die Cast Parts. A. F. Bauer and J. S. Mikus. Current Engineering Practice, v. 3, Oct. 1960, p. 18-21.

High tensile and shear strength and stress resistance of mechanical bond formed between centrifugally cast gray iron and die cast Al. Application in light weight, wear resistant engine blocks and brake drums with good heat transfer properties. (Q-general, T21b, 17-57; Al-b, 5-61, CI-n, 8-66)

299-Q. "Operation Cyrogenics" Demonstrates Toughness of 9% Nickel Steel. Inco Nickel Topics, v. 14, Jan. 1961, p. 2-3.

Rectangular and cylindrical pressure vessels of quenched and tempered or double-normalized and tempered 9% Ni steel are subjected to drop impact and burst tests at -320° F. and at 100 and 2160 psi. without stress relieving to investigate low temperature strength. (Q23r, Q6p, Q10, 2-63, T26q; SS, Ni, 17-57)

300-Q. How to Select the Right Superalloy Spring. Steel, v. 148, Jan. 30, 1961, p. 96-98.

Suggested temperature ranges for 17-7 PH, NS-A286, Inconel X, NS-25, Rene 41 and S816 superalloys. Correlation of the temperature at which the alloy is precipitation hardened with the stability of high temperature properties. (Q-general, J27, 2-61, T7c; SGA-h)

301-Q. Spalling Causes Are Sought by Mill Rollmakers, Users. J. D. Keller. Steel, v. 148, Jan. 30, 1960, p. 104, 108, 111.

Measurement of wear and its distribution along the roll length, work rolls and backup rolls and of contour changes caused by thermal expansion. Results are used to determine load distribution and stress along the roll length. (Q9, W23p)

302-Q. (French.) Proof of a Peak of Internal Friction Due to the Interactions Between the Carbon and Molybdenum Atoms in Several Fe-Mo-C Alloys. Gaston Collette. Comptes Rendus, v. 251, Nov. 7, 1960, p. 2017-2019.

Curves representing coefficient of internal friction as a function of temperature in Fe-Mo-C alloys containing 1.02-3.53 wt.% Mo reveal a normal peak of internal friction of carbon in Fe and a second peak at lower temperatures, which is attributed to interactions between carbon and Mo atoms. Temperatures at which these peaks appear are 26 and 18° C., respectively. (Q22; Fe-b, Mo, C)

303-Q. The Elastic Modulus and Internal Friction of Electrodeposited Copper. Harold J. Read and Arthur H. Graham. Electrochemical Society, Journal, v. 108, Jan. 1961, p. 73-78.

Determination of elastic modulus and internal friction from sonic measurements on thin-walled Cu tubes prepared by electrodeposition. Effect of plating variables on microstructure and elastic properties. 10 ref. (Q21, Q22, N12d; Cu, 4-60)

304-Q. (Swedish.) Use of Castings in Machine Construction. Bertil Thyberg. Teknisk Tidskrift, v. 90, Nov. 18, 1960, p. 1149-1154.

Tensile strength, yield strength and area reduction of gray cast iron, steel containing 0.15-0.45% carbon, malleable iron and cast steel. Comparison of torsion and bend strengths of gray iron and malleable iron. Machinability. Cast parts used include crankshafts, cylinder blocks and sewing machine arms. 12 ref. (Q-general, G17k, T21; CI, CN, 5)

305-Q. Effect of Sodium Exposure on the Mechanical Properties of Zirconium. J. C. Bokros. Corrosion, v. 17, Jan. 1961, p. 103-106.

Surface oxide developing on Zr in impure sodium significantly lowers the fatigue life at elevated temperatures. Hydrogen absorption, on the other hand, has little effect on fatigue life at elevated temperatures but lowers it at room temperature. Tensile properties are not affected. (Q7b; Zr)

306-Q. (Dutch.) Working Processes With Stainless Steel. Th. J. M. van der Pas. Ingenieur, v. 72, Oct. 28, 1960, p. 227-234.

Cold and hot deformation, mechanical properties, machinability and structure after various heat treatments of austenitic, ferritic and martensitic stainless steels. (Q-general, G17k, M27, 2-64; SS)

307-Q. Metallurgy in Large Turbo-Generator Design. J. M. Robertson. Electrical Review, v. 167, Oct. 14, 1960, p. 649-657.

Mechanical properties of high temperature steels and alloys for application in steam turbo-generators. Review of metallurgical developments which have contributed to increases in size and steam temperatures and pressures of turbo-generators from 1949 to 1960. (Q-general, 2-62, W11k; ST)

308-Q. Strength and Rigidity Requirements for the Automobile Structure. M. Yamamoto. Preprint no. 298B, Society of Automotive Engineers, 485 Lexington Ave., New York 17, N. Y. Jan. 1961, 17 p.

Calculation of the fatigue strength of automobile structural components using the frequency distribution curve of acceleration or stress which may be either anticipated or obtained in actual run of the vehicle. Recommended fatigue, rupture and yield safety factors for various load distributions. 19 ref. (Q7a, T21a)

309-Q. Some Aspects of Steel Testing Prior to Enamelling. D. Moul. Canadian Ceramic Society, Journal, v. 29, 1960, p. 35-38.

Industrial testing of sheet steel with hardness tester, ductility and sag test equipment. Tests are designed to reduce rejects due to distortion, stress relief and strain occurring in the drawing and porcelaining processes. (Q29, Q23p, L26n; ST, 4-53)

310-Q. Wear and Friction Under Rolling With Slip. B. N. Das, R. Choubey and K. C. Goswami. NML Technical Journal (National Metallurgical Laboratory, India), v. 2, Nov. 1960, p. 15-21.

Rail and tire steel containing C, Mn, Si, S and P are tested for the effects of wear fragments and relative slip upon metallic luster, subsurface flow, wear rate and frictional torque. (Q9, F23; ST)

311-Q. Continuously Cast Aluminum-Tin Bearings. D. A. Robins. Tin and Its Uses, no. 50, 1960, p. 3-6.

Use of 80% Al-20% Sn and 91% Al-6% Sn, 3% Cu alloys in bearings. Data are given for fatigue loading at 4000 rpm. up to 3 tsi. for over 100 hr. (Q7, T7d; Al-b, Sn, Cu, 17-57)

312-Q. Titanium-Alloy Forgings. H. J. Henning and P. D. Frost. Defense Metals Information Center, Battelle Memorial Institute, DMIC Rept. 141, Dec. 19, 1960, 90 p. (Available as PB 151100 from U. S. Office of Technical Services, Washington 25, D. C.)

Forging of alpha-beta alloys, all-alpha alloys and all-beta alloys at 1000-1830° F. for 1-4 hr. Determination of yield strength, ultimate tensile strength, area reduction, elongation and forgeability of Ti-alloy forgings. (Q27a, Q23, F22, 17-52; Ti-b)

313-Q. Preliminary Design Information on Recrystallized Mo-0.5 Ti Alloy for Aircraft and Missiles. W. P. Achbach and R. J. Favor. Defense Metals Information Center, Battelle Memorial Institute, DMIC Memo. 79, Jan. 16, 1961, 11 p. (Available as PB 161229 from U. S. Office of Technical Services, Washington 25, D. C.)

Effect of temperature on the ultimate tensile strength, tensile yield strength, compressive yield strength, tensile modulus and compressive modulus of W-2 coated and uncoated Mo-0.5 Ti alloys after recrystallization at 2450° F. for 1 hr. (Q27, Q28, 2-61, N5f; Mo-b, Ti)

314-Q. Study of Mold-Iron Compositions. J. R. Kattus. Blast Furnace and Steel Plant, v. 49, Jan. 1961, p. 66-67, 72-73, 80-84.

Thermal fatigue tensile tests are conducted with thermal cycling at 300-1500° F. on standard ingot mold Fe, high phosphorus ingot mold Fe, C1018 steel bar stock, low alloy gray Fe, pearlite ductile Fe and ferritic ductile Fe to determine effect of composition on service life of the resulting molds. (Q7j, Q27, 2-60, W19c; Fe, ST, 17-57)

315-Q. (Dutch.) Effect of Zirconium Additions on the Quality of Iron Castings. Gieterij-Centrum Berichten, v. 8, Nov-Dec. 1960, p. 70-71.

Manufacture of castings from Fe melts containing 5-7% Zr. Effect of Zr on graphitization, machinability, casting properties, tensile strength and hardness depth. (Q27a, Q29n, G17k, E25p, 2-60; Fe, Zr, 5)

316-Q. Steels for Reactor Pressure Circuits. G. E. Darwin. Nuclear Power, v. 6, Jan. 1961, p. 93-94.

Review of the high temperature properties of low alloy and carbon steels as

they relate to their application in reactor pressure circuits. Effect of irradiation on the ductile to brittle transition temperature. (Q-general, Q23r, 2-67, T11; AY, CN)

317-Q. Weld Metal Has Excellent Properties! Are You Using Them? Welding Design & Fabrication, v. 34, Jan. 1961, p. 34-35.

Comparison of the tensile strength, yield point, elongation, toughness and ductility of ASTM-ASME A-7 mild steel and commercial steels such as Manten, Corten and Triten, with weld metal deposited by a E-60 XX electrode. (Q23, Q27, Q-general; CN, 7-51)

318-Q. (German.) Wear Testing of Metallic (Blast Cleaning) Shot Materials. Peter Ulrich Schmithals and Hans-Gunter Labisch. Stahl und Eisen, v. 80, Dec. 22, 1960, p. 1939-1944.

Significance of "short-time" test methods in which the number of cycles required to split half the material to a defined mesh size is measured. Comparison with total wear test methods. Measurement of wear resistance in terms of a newly defined splitting value which eliminates screen analyses in wear testing. (Q9n; 6-67)

319-Q. (German.) Wear Testing of Metallic (Blast Cleaning) Shot Materials. Erich Bickel. Stahl und Eisen, v. 80, Dec. 22, 1960, p. 1944-1948.

Apparatus and method for semi-automatic wear testing based on measurement of weight reduction rather than screen analysis. Theoretical and experimental investigation of testing variables such as projection velocity, direction of jet and coefficient of friction. (Q9n; 6-67)

320-Q. (German.) Influence of Testing Conditions on Results in (Blast Cleaning) Shot Wear Testing. H. Krautmacher. Stahl und Eisen, v. 80, Dec. 22, 1960, p. 1949-1952.

Wear testing of shot using rebounding plates with varying shape and direction and a testing machine with differently worn blades. Influence of these variables on wear resistance. (Q9n; 6-67)

321-Q. (Japanese.) Effect of Mo and W on Properties of 18 Cr-12 Ni Stainless Steel. Ryuichi Nakagawa and Yasuo Otogura. Tetsu-to-Hagane (Journal of the Iron & Steel Institute of Japan), v. 46, Dec. 1960, p. 28-34.

Hardness attained during aging, microstructure, precipitation rate, tensile properties at various temperatures and creep rupture strength of stainless steels with varying Mo and W contents. (Q29n, J27d, M27, N7, Q27a, Q3m, 2-60; SS, Mo, W)

322-Q. Effect of P on Properties of 19-9 DL Type Heat Resisting Steel. Naomichi Yamanaka, Kunio Kusaka and Akira Tonooka. Tetsu-to-Hagane (Journal of the Iron & Steel Institute of Japan), v. 46, Dec. 1960, p. 34-41.

Effect of phosphorus content on hardness attained during aging, rupture strength at 700° C., rupture elongation, impact value and ductility of heat resisting steels with or without boron and rare earth element additions. 9 ref. (Q29n, Q3m, J27d, Q23p, Q6n, 2-60; SS, SGA-h)

323-Q. Effect of V on Properties of High C-5 Cr-W-Mo, High C-8 Cr-W-Mo and High C-12 Cr-Mo Steel for Punching Dies. Sadao Koshiba and Asao Inata. Tetsu-to-Hagane (Journal of the Iron & Steel Institute of Japan), v. 46, Dec. 1960, p. 42-46.

Effect of vanadium additions on the ductile-brittle transition temperature, quenching temperature range, dimensional change, toughness and wear resistance of high carbon steels. 5 ref. (Q23r, Q9n, P10d, 2-60, T6r; TS-g)

324-Q. (German.) Steels for Low Temperature Stressing. E. Krainer and K. Posch. Berg- und Huttenmannische Monatshefte, v. 105, Nov. 1960, p. 268-280.

Measurement of mechanical properties between 20 and -180° C. of unalloyed cold tough steels, ferritic heat treatable Ni, Cr and Mo alloyed steel and austenitic Mn, Cr, Ni and Si alloyed steels. Interpretation of results in terms of dislocation theory. (Q-general, 2-61, M26b; SS, ST)

325-Q. London Transports Axle Fatigue Tester. Metalworking Production, v. 105, Jan. 4, 1961, p. 59-60.

Strength of axle steel when subjected to a rotating bending stress is determined on a specially designed resonant machine. (Q7c, Q5, T7j; ST)

326-Q. What Can We Do With Whiskers? George A. Hoffman. New Scientist, v. 9, Jan. 5, 1961, p. 40-42.

Thin crystalline filaments made from C, B4C, Be, SiC, B, Al_2O_3 and others have tensile strengths approaching the theoretical limit when diameter is of the order of one micron. Whiskers may be produced by extrusion, electrolytic deposition, condensation, reduction of salts or precipitation. Behavior at elevated temperatures and weight advantage. (Q27a, F24, L17, N16p; Al, B, Be, 14-61, 14-68)

327-Q. Strength of Thick Cylinders Subjected to Repeated Internal Pressure. J. L. M. Morrison, B. Crossland, and J. S. C. Parry. Institution of Mechanical Engineers, Proceedings, v. 174, Feb. 1960, p. 95-117.

Triaxial stress testing of 3% Cr steel, Ni-Cr-Mo steel, mild and stainless steels, D. T. D. 364 Al alloy and commercially pure Ti cylinders. Static tensile and shear properties, both longitudinal and transverse; fatigue limits in tension, compression and torsion are determined as a function of cycling. Effect of surface treatments, autofrettage and nitriding. 7 ref. (Q-general, 3-74; Al-b, CN, SS, Ti, 4-60)

328-Q. The Strength of Rails With Particular Reference to Rail Joints. S. Wise, D. Lindsay and I. G. T. Duncan. Institution of Mechanical Engineers, Proceedings, v. 174, Sept. 1960, p. 371-407.

Rails are tested by strain gages. Stresses and failure due to fishbolt holes, wheel slip, packing, atmospheric corrosion and fatigue are analyzed graphically. 9 ref. (Q5g, Q7, T23q)

329-Q. (Russian.) Effect of Arsenic, Phosphorus and Carbon on Steel Properties. K. F. Starodubov and V. V. Kalmykov. Stal', Nov. 1960, p. 1034-1037.

Impact and tensile tests on normalized rail steel samples at -60 to 260° C. Flow limit, resilience, embrittlement, tensile strength, hardness, elongation and reduction in area as a function of C, As and P concentrations in steel. (Q-general, 2-60; ST)

330-Q. (Czech.) Effect of Forging Temperature. V. Hasek. Strojirenstvi, v. 10, Nov. 1960, p. 835-837.

Carbon and low alloy steels are forged at 1050-1300° C. Some of the forgings are heat treated at 840-880° C. for 60 sec. Effect of forging temperature and heat treatment on impact strength and hardness. 3 ref. (Q6n, Q29n, 2-61, 2-64; AY, CN)

331-Q. (Czech.) Effect of Sulphur Present in Furnace Fuels on Heat Treated Steels. Frantisek Wiesner and Eva Tichopadova. Hutnicke Listy, v. 15, Dec. 1960, p. 923-929.

A deep drawing steel, transformer steel and Ni-Cr-Mo alloy steel are held for 1-3.5 hr. at 1110-1300° C. in oxidizing and reducing atmospheres of heat treatment furnaces fired with crude oil containing 0.5-3% sulphur. Effect of sulphur on structure and surface after bend testing. 17 ref. (Q5, M27, 2-64; AY, SS)

332-Q. (Czech.) Arsenic and Phosphorus in Chromium Steel and Cr-Ni Low Alloy Steel. Frantisek Benes and Dagmar Tlusta. Hutnicke Listy, v. 15, Dec. 1960, p. 929-936.

A ferritic heat resistant Cr steel with 0.035-0.109% P and 0-0.182% As and an 18/8 stainless steel with 0.020-0.117% P and 0-0.197% As are mechanically tested at -180 to 800° C and corrosion tested in boiling 65% HNO_3, 10% HCl and 10% H_2SO_4 at 20° C. Effect of P and As on tensile strength, yield point, elongation, area reduction, heat and corrosion resistances. 4 ref. (Q-general, R6g, 2-60; AY, SS, As, P)

333-Q. (Czech.) Problems in Aluminum Foil Manufacture. Miroslav Brzobohaty. Hutnicke Listy, v. 15, Dec. 1960, p. 936-945.

Effect of surface cleanliness, dimensional precision and grain size of starting strip, composition of lubricant used in cold rolling and rolling in one or two steps on the quality and mechanical strength of foil. 19 ref. (Q27, 2-59, 3-68; Al, 4-56)

334-Q. (Czech.) Steel and Cast Iron With a High Boron Content. Jaroslav Vrtel. Hutnicke Listy, v. 15, Dec. 1960, p. 945-950.

Various cast irons with 1.86-3.75% C, 0.12-0.19% Mn, 0.22-0.85% Si and 1.16-1.90% B and steels with 0.05-0.20% Cr, 0-2.7% Al and 1.19-5.54% B are mechanically and structurally tested.

Effect of boron and heat treatments at 650-1050° C. on tensile, yield and impact strengths, hardness, phase composition, magnetic properties and microstructure. 16 ref. (Q-general, P16, M27, 2-60, 2-64; CI, ST, B)

335-Q. (Czech.) Steels Containing More Than 1% Boron. Zdenek Eminger. Hutnicke Listy, v. 15, Dec. 1960, p. 955-961.

Various steels containing 0-4.17% boron are manufactured to determine effect of boron on porosity and surface of ingots, casting properties, homogeneity, microstructure, hardness, tensile properties at -10 to 300° C., impact strength, transformation points, thermal expansion, density, weldability and machinability. 14 ref. (Q-general, M27, E25p, K9s, G17k, 2-60; ST, B)

336-Q. (English.) Detection Range of Strain Figures and Their Characteristics. Motoichi Kodama and Masanosuke Sakamoto. Bulletin of JSME, v. 3, Nov. 1960, p. 415-418.

Strain figures caused by mechanical or thermal stress are detected in Fe and steel with carbon content from 0.05-3% by etching and micrography. (Q25; Fe, ST)

337-Q. (English.) Fatigue of Metals Under Repeated Finite Strain. Yukihiko Takenaka. Bulletin of JSME, v. 3, Nov. 1960, p. 419-424.

Measurement of the fatigue characteristics and tensile strength of mild steel and brass tubes subjected to repeated plastic strain in a combined tension-compression and torsion testing machine. Observations on strain hardening, strain softening and the relations between saturated stresses, strain amplitudes and the number of cycles required for fracture. 6 ref. (Q7, Q27a, N7e, Q25; CN, Cu-n, 4-60)

338-Q. (English.) Fatigue Strength Under Multiple Repeated Stress. Minoru Kawamoto, Takno Nakagawa and Hiroyuki Kohama. Bulletin of JSME, v. 3, Nov. 1960, p. 425-431.

Testing of medium carbon steel (0.34% C) for fatigue strength by superimposing higher stress levels on repeated lower ones. Investigation of the influence of the cycle ratios of the primary stress and the secondary (higher) stress level. Interpretation of the results by cycle ratio-damage (D-R) curves. 5 ref. (Q7, 3-66; CN)

339-Q. (English.) Characteristics of Bearing Alloys (4th Report, Properties of the Oilless Cast Iron Bearing.) Tokuzo Matsuyama and Takao Kayabo. Bulletin of JSME, v. 3, Nov. 1960, p. 566-571.

Friction and wear properties for bearings of gray cast iron, expanded by repeated heating and cooling and then oil-saturated. (Q9, T7d; CI-n, 17-57)

340-Q. (Japanese.) Effect of Difference in Grain Structure on the Fatigue Properties of Aluminum Alloys. Seikiti Kukai and Katsuzi Takeuchi. Sumitomo Light Metals, Technical Reports, v. 1, Oct. 1960, p. 235-245.

Notch and unnotched fatigue strengths of coarse and fine grain structures of extruded 61S, 17S and 75S and forged 14S Al alloys are examined through rotating beam tests. Crack initiation under cyclic stressing and static tensile and plastic properties are also studied as a function of grain size, structure and direction. 9 ref. (Q7c, Q26, 2-59; Al-b)

341-Q. (Japanese.) High Temperature Strengths of Ti-2%Al-2% Mn Alloys and Some Commercially Pure Titaniums. Seikiti Hukai, Katsuzi Takeuchi and Eiji Tanaka. Sumitomo Light Metals, Technical Reports, v. 1, Oct. 1960, p. 284-301.

Static tensile properties, hardness and impact values and fatigue and creep strengths of Ti-2% Al-2% Mn alloys and commercially pure Ti at room and high temperatures to 600° C. 24 ref. (Q-general, 2-62; Ti-b)

342-Q. Some Effects of Heat Treatment Upon the Impact-Fatigue Life of Nickel Hard Grinding Balls. R. H. T. Dixon. Iron and Steel Institute, Journal, v. 197, Jan. 1961, p. 40-49.

Effects of heat treatment at -196 to 850° C. on the life to fracture, under conditions of repeated impact, of a white cast iron containing 4.5% Ni and 1.5% Cr. Field tests are made to determine wear resistance of the grinding balls. (Q6, 2-61, 2-64, Q9n; CI-p, Ni, Cr)

343-Q. New Application of a Copper Alloy. Copper, no. 10, Winter 1960, p. 6-8.

Maximum stress, proof stress, elongation and corrosion resistance of an aluminum bronze for marine applications. (Q23p, S21, R-general, T21; Cu-s, Al)

344-Q. Welded Nickel Steel Vessels Withstand Pressure, Impact Without Stress Relief. Welding Engineer, v. 45, Dec. 1960, p. 38-40.

Impact and burst testing of pressure vessels composed of quenched and tempered 9% Ni steel at -320° C. to show that mechanical properties are adequate without stress relieving. (Q6, Q10b, 1-67, T26q; ST, Ni)

345-Q. Mechanical Properties of Solid and Porous Stainless Steel Sheet Metal at Elevated Temperatures. J. B. Lord. College of Aeronautics, Cranfield, Note no. 107, Oct. 1960, p. 1-9.

Tensile tests are performed at 20-1000° C. on three stainless steel sheet materials including a woven porous material called Rigimesh to determine Young's modulus, secant modulus, proof stress, ultimate stress and Poisson's ratio. (Q27, Q-general, 2-61; SS, 4-53, 6-71)

346-Q. The Creep Rupture Properties of 80Ni-20Cr Alloys. Robert Widmer and Nicholas J. Grant. Journal of Basic Engineering (ASME Transactions, Series D), v. 82, Dec. 1960, p. 829-838.

Effect of stress and temperature on the creep and ductility of 80% Ni-20% Cr alloys at 1200-1800° F. 6 ref. (Q3q, Q23p, 2-61, 3-66; Ni-b, Cr)

347-Q. The Extrapolation of Families of Curves by Recurrence Relations, With Application to Creep-Rupture Data. A. Mendelson and S. S. Manson. Journal of Basic Engineering (ASME Transactions, Series D), v. 82, Dec. 1960, p. 839-847.

Determination of creep-rupture properties for 18-8 stainless steel, 422 crucible steel, carbon steel, Nimonic 80-A, S-590 alloy and A-286 alloy at 1000-1500° F. A method using finite difference recurrence relations and direct extrapolation is applied to creep-rupture data to obtain results without using parameter concepts. (Q3q; CN, Ni-b, SS, SGA-h)

348-Q. Some Observations on the Extrapolation of High Temperature Ferritic Steel Data. Robert M. Goldhoff. Journal of Basic Engineering (ASME Transactions, Series D), v. 82, Dec. 1960, p. 848-854.

Determination of the rupture time for forged and cast Cr-Mo-V steel alloys as function of minimum creep rate and stress at 850-2010° F. 10 ref. (Q3q, 3-66; SS-d, 4-51, 5)

349-Q. Survey of Various Special Tests Used to Determine Elastic, Plastic and Rupture Properties of Metal at Elevated Temperature. F. Garofalo. Journal of Basic Engineering (ASME Transactions, Series D), v. 82, Dec. 1960, p. 867-881.

Determination of elastic moduli for 410, 430, 446, 304, 316, 321, 347, 309, 370 and 301 stainless steels and Mg, Ti and Al alloys at 70-1500° F. Review of static and dynamic testing techniques. Effect of high strain rates on plastic and rupture behavior of Cu, Al, Ti, Mg, Ni and Co and variation of hardness with temperature. 39 ref. (Q-general, 2-61; Al-b, Co, Cu, Mg-b, Ni, SS, Ti-b)

350-Q. The Role of Atmosphere in the Creep-Rupture Behavior of 80Ni-20Cr Alloy. Robert Widmer and Nicholas J. Grant. Journal of Basic Engineering (ASME Transactions, Series D), v. 82, Dec. 1960, p. 882-886.

Study of microstructure of 80Ni-20Cr alloys after creep at 1500-1800° F. in argon and air atmospheres. Effect of melting process, Si content and Mn/S ratio on crack propagation. 5 ref. (Q3q, M27, Q26q, 2-60; Ni-b, Cr)

351-Q. (Swedish.) Testing Cast Iron for Steel Ingot Molds With Regard to Crazing Tendency. A. Josefsson and B. Backstron. Jernkontorets Annaler, v. 144, Oct. 1960, p. 739-756.

Development of crazing on inner surface of cast iron molds in simulated teeming conditions for steel ingots by heating rapidly to a surface temperature of 850-900° C. and by accelerated cooling. Microcrack formation is determined as a function of structural heterogeneity. (Q26, W19c; CI)

352-Q. Contribution of Dislocation Line Tension and the Density of the Solute Atmosphere to the Yield Point in Strain Aged Ingot Iron. T. Mura and J. O. Brittain.

Acta Metallurgica, v. 8, Nov. 1960, p. 767-772.

Investigation of the 77° K. yielding behavior of ingot iron specimens after prestraining and aging under stress at 303° K. Effect of aging time, temperature and stress on yield point are discussed in terms of the dislocation line tension and solute atmosphere density along the dislocation. 11 ref. (Q24c, M26b, 2-61, 2-65, 3-66; Fe-a)

353-Q. The Effective Surface Energy Involved in the Brittle Fracture of 70/30 Brass. H. Nichols and W. Rostoker. Acta Metallurgica, v. 8, Nov. 1960, p. 788-790.

Brittle fracture originating at about engineering yield stress at the interface of a 70/30 brass specimen wetted with Hg is shown to be temperature dependent at 20° K. and basically the same as encountered in brittle ductile transitions in body centered cubic metals, with true surface energy as the dominating factor. 6 ref. (Q23, Q26s, P13h, 2-61, Cu-n)

354-Q. Cattrell Locking and the Flow Stress in Iron. H. Conrad and G. Schoeck. Acta Metallurgica, v. 8, Nov. 1960, p. 791-796.

The effect of temperature and grain size on the yield and flow stress of electrolytic iron at a constant structure is investigated at 90-300° K. The equivalence of the temperature and grain size dependence of the lower yield and the flow stress suggests that the lower yield represents the movement of dislocation and does not include a thermally activated locking term while the upper yield stress represents the tearing of dislocations from their Cottrell atmospheres. 24 ref. (Q24c, M26b, 2-59, 2-61; Fe-a)

355-Q. Twinning in Iron. E. Bull Simonsen. Acta Metallurgica, v. 8, Nov. 1960, p. 809-810.

Effect of increased purity or increase in the ease of twinning is investigated in room temperature rolling and 1400° C. annealing of zone melted Fe specimen bars with annealing and mechanical twinning occurring across subgrain boundaries. 10 ref. (Q24b, M27q, 2-64, 3-68, 3-69; Fe-a)

356-Q. The Structure of Slip Band Extrusion Revealed by Transmission Electron Microscopy. P. J. E. Forsyth and C. A. Stubbington. Acta Metallurgica, v. 8, Nov. 1960, p. 811-814.

Electron transmission and diffraction studies, using replica techniques, of slip band extrusion phenomena in solution treated Al-4% Cu alloy fatigued at room temperature. Striation phenomena are observed as a function of stress cycles. 7 ref. (Q24c, 3-66, M21e, M22k, 3-66, 3-69; Al-b, Cu)

357-Q. Thermal Cycling Creep of Alpha-Uranium. A. C. Roberts. Acta Metallurgica, v. 8, Nov. 1960, p. 817-819.

The effect of intergranular stress shakedown or redistribution on the ability of uranium specimens to support thermal strains without giving way plastically is investigated by thermal cycling creep tests at 125-650° C. under 186-1697 psi. loads. 3 ref. (Q3, Q7j, Q24, 3-66; U-a)

358-Q. Physical and Mechanical Properties of Some High-Strength Fine Wires. D. A. Roberts. Defense Metals Information Center, Battelle Memorial Institute, DMIC Memo. 80, Jan. 20, 1961, 20 p. (Available as PB 161230 from U. S. Office of Technical Services, Washington 25, D. C.)

Tensile and physical properties of high strength fine wire produced from various types of high carbon steels, stainless steels, nickel base alloys, tungsten and molybdenum. Effects of wire size, production methods, temperature and aging treatments on these properties. (Q27, P-general, 2-61, 2-65; CN, Mo, Ni-b, SS, W, 4-61)

359-Q. (German.) Mechanical Testing and Fatigue Investigation to Evaluate Dimensions of Flat Sheets in Orthotropic Plates. K. Kloppel and E. Roos. Stahlbau, v. 29, Dec. 1960, p. 361-373.

Tests to evaluate maximum carrying load, deflection and fatigue strength of 4.26 mm. thick ST37 steel plates under varying load distributions and degrees of prestressing. (Q7, 3-66; ST, 4-53)

360-Q. A New High-Temperature Alloy. John Maxson. Metal Progress, v. 79, Feb. 1961, p. 97-99.

Devised for service above 1800° F., this new Ni-base alloy, termed RA-333, contains 25% Cr and 3% each of Mo, Co and W. Its excellent creep-rupture properties, low coefficient of expansion and good oxidation resistance

have made it useful for critical parts in heat treating furnaces. (Q-general, 2-62, W27p; Ni-b, SGA-h)

361-Q. Effect of Thermal Cycling on the Creep of Uranium. W. S. Blackburn, G. Harnby and J. J. Stobo. Journal of Nuclear Energy, Pt. A, v. 12, Aug. 1960, p. 162-171.

Effect of thermal cycles of up to 40° above and below 500° C. on the creep rate of uranium specimens. Development of theory predicting the effect of thermal cycling on creep. Comparison of predictions of theories with experimental results. (Q3n, Q7j; U)

362-Q. The Mystery of the Hollow Ball Bearing. Western Metalworking, v. 19, Jan. 1961, p. 28-29.

Microhardness and microstructural investigations made on 52100 steel ball bearings show high temperatures to be the cause of internal rupture. (Q3, Q29, M27, T7d; ST)

363-Q. The High-Strength Steels--What They Offer. Herbert L. Kee. Product Engineering, v. 32, Jan. 23, 1961, p. 54-61.

Tensile properties, corrosion resistance and workability of high-strength constructional alloy and stainless steels at 70 and 1000° F. (G27, R-general, Q23q; AY, SS, SGB-s)

364-Q. Investigational Techniques. D. A. Ryder. Metal Industry, v. 98, Jan. 20, 1961, p. 43-44, 52.

Investigation of fatigue failures in aircraft structures to determine type and origin of fluctuating stress which has produced failure. Consideration of torsional and fretting fatigue. (Q7, T24a)

365-Q. Improved Niobium Alloys. Metal Industry, v. 98, Jan. 20, 1961, p. 52.

Effect of Ti, W and Mo on the tensile strength and oxidation resistance and fabricability of Cb alloys. (Q27a, R1h, 2-60; Cb, Mo, Ti, W)

366-Q. (Russian.) Influence of the Heat Treating Conditions on Properties of Large Forgings. M. P. Brown, B. B. Vinokur, E. I. Mirovskiy, A. L. Heller and L. H. Maryushkin. Kuznechno-Shatampovochnoe Proizvodstvo, Apr. 1960, p. 8-11.

Effect of heating large steel forgings to 30-40° C. over normal forging temperature of 1230° C. on plasticity and tensile strength. Mechanical properties as affected by soaking time. (Q23p, Q27a, 2-64, F21; ST, 4-51)

367-Q. (Russian.) Influence of the Soaking Time at Forging Temperature on Plasticity of EI-437B Alloy. M. Ya. Dzuhutov and B. F. Bakhtanov. Kuznechno-Shtampovochnoe Proizvodstvo, Apr. 1960, p. 17-19.

Plasticity of EI-437B high speed steel is affected by soaking for 2 hr. after temperature homogenization at 900-1200° C. Effect of increasing grain size on plasticity of a sample soaked at 1050-1200° C. for 2, 10 and 50 hr. (Q23p, 2-59, F21b; TS-m)

368-Q. The Mechanical Properties of Some Tempered Alloy Martensites. J. M. Capus and G. Mayer. Iron & Steel, v. 33, Dec. 19, 1960, p. 665-668.

Ultimate tensile strength, notch sensitivity, Charpy V-notch impact value, notched tensile strength and fatigue properties of high-purity high-strength martensite alloys as affected by heat treatment, porosity and Si content. (Q-general, N8p, 2-60, 2-64; AY)

369-Q. The Toughness of Tempered Martensite. D. Hardwick and K. R. Pirt. Iron & Steel, v. 33, Dec. 19, 1960, p. 668-670.

Transition temperatures of tempered martensite structures as affected by tensile strength and ferrite grain size, which are dependent on prior austenite grain size and steel composition. (Q23r, N8p, 2-59, 2-60; ST)

370-Q. Cryogenic Materials. Space Aeronautics, v. 35, Jan. 1961, p. 72-73.

Tensile strength, elongation, area reduction, impact energy and elasticity modulus of 347 and 301 stainless, 17-4 PH stainless, 6061 Al and Berylco 25 as a function of temperature after annealing, quenching, cold rolling and precipitation hardening. (Q-general, 1-67, 2-64; Al-b, Be-b, SS)

371-Q. Ferritic Alloy Steels for Power Plant. M. G. Gemmill. Alloy Metals Review, v. 9, Dec. 1960, p. 1-8.

Properties of creep strength, ductility, weldability and corrosion resistance as they affect applicability of stainless steels in power plant turbines,

superheaters and generators. (Q3m, Q23p, K9s, R4, W11g; SS, 17-57)

372-Q. (Ukrainian.) Appearance of Recrystallization Centers. V. N. Danilov. Dopovidi Akademii Nauk Ukrains'koi SSR, Sept. 1960, p. 1236-1240.

Experimental attampt to prove that recrystallization centers caused by deformation of Ag and steel samples appear in the areas of screw dislocations and in the areas of heterogeneous tension gradients. 33 ref. (Q24; Ag, ST)

373-Q. (Ukrainian.) Effect of the Galvanic Coatings on the Strength of Press Joints. H. I. Lukashevich. Dopovidi Akademii Nauk Ukrains'koi SSR, Sept. 1960, p. 1198-1201.

Determination of the strength, corrosion resistance and deformation resistance of the surfaces of 45 steel press joints galvanized with a coat of Cr, Ni, Cu, Zn or Sn. Comparison of the friction surface before and after galvanizing. 7 ref. (Q27a, R-general; ST, 7, 8-65)

374-Q. (Japanese.) Ceramic Coating. Yorihiro Murata. Metal Finishing Society of Japan, Journal, v. 11, Oct. 1960, p. 609-612.

Adhesion and chemical heat and weather resistance of ceramic coatings as affected by frit composition, firing temperature and thermal stress. (Q10c, R6, R7, R3, 2-60, 3-66; 8-71)

375-Q. (Japanese.) Physical Properties of Metallic Surfaces. Masahisa Matsunaga. Metal Finishing Society of Japan, Journal, v. 11, Oct. 1960, p. 385-388.

Electron microscopy, electron diffraction, potential and hardness measurements used to determine surface properties of Armco iron, stainless steel, Ni alloys, Au, Al, Mg and other metals. (Q9, Q29, M21e, M22h; Al, Au, Fe-a, Mg, Ni-b, SS)

376-Q. The Nature of the Brittleness of Chromium. N. V. Ageev, V. N. Bykov and V. A. Trapeznikov. Paper from "Contemporary Problems of Metallurgy" Consultants Bureau, Inc., New York, 1960, p. 462-467.

Effect of spin ordering, atomic and crystalline structure, impurities, dislocation interaction and temperatures above and below the Neel point on brittleness. Neutron diffraction and thermal differential analysis data are correlated with brittleness determination for crystal specimens deformed in compression at -43 to 200° C. 15 ref. (Q23r, Q26s, M-general, 2-61, 3-68, 3-71; Cr)

377-Q. The Structural Theory of Creep in Metals. I. A. Oding. Paper from "Contemporary Problems of Metallurgy". Consultants Bureau, Inc., New York, 1960, p. 468-474.

Equations for creep at high temperatures as a two part process involving grain boundary and intergranular creep are derived in terms of dislocation movement and blocking as a function of critical stresses and crystal lattice structural factors such as imperfections, vacancies and Frank-Reed sources. 11 ref. (Q3, M26b)

378-Q. Characterization of the Properties of Structural Steels by the Energy Absorbed Under Maximum Deformation. L. Zhil'mo. Paper from "Contemporary Problems of Metallurgy". Consultants Bureau, Inc., New York, 1960, p. 475-483.

Theoretical and experimental investigation of the energy necessary to rupture an elementary volume of metal in the area of minimum cross section as in a single index characterizing specimen. Tests on carbon, stainless and structural steels after various heat treatment for correlation with conventional indexes and to establish a plasticity index for use in calculating structures. 7 ref. (Q23, Q24, Q-general, 1-54; ST)

379-Q. Raising the Strength and Toughness of Low-Carbon Steel by Heat Treatment. K. F. Starodubov and Yu. Z. Borkovskii. Paper from "Contemporary Problems of Metallurgy". Consultants Bureau, Inc., New York, 1960, p. 491-495.

Changes in mechanical properties of steel 15 (Gost 1050-57) after water quenching from 900° C. and tempering at 100-700° C. are investigated by tensile, impact and bend tests at -196 to 200° C. (Q27, Q26s, Q6, 2-61, 2-64; CN-g)

380-Q. Fatigue Resistance of Rails Containing Arsenic. L. L. Pinkhusovich and Z. G. Fridman. Paper from "Contemporary Problems of Metallurgy". Consultants Bureau, Inc., New York, 1960, p. 496-500.

Effect of 0.123-0.225% As concentration with 0.67-0.81% carbon on fatigue resistance and cracking susceptibility of normalized and nonheat-treated rail steel specimens. 3 ref. (Q7, T23q, 2-60, 2-64; ST)

381-Q. (Pamphlet.) Influence of Hot-Rolling Conditions on Brittle Fracture in Steel Plate. F. de Kazinczy and W. A. Backofen. Ship Structure Committee, Report SSC-126, National Academy of Sciences--National Research Council, Washington, D. C. Nov. 10, 1960, 26 p.

Testing steel plate specimens processed by conventional rolling methods and by controlled rolling to determine the reasons for superior notch toughness in the controlled-rolled product. Effects of grain size and heat treatment on the Charpy V-notch transition temperature. Effects of temperature, flaw structure and grain size on microfissuring and fracturing anisotropy. 28 ref. (Q26, 2-59, 2-61, 2-64, 3-68; ST, 4-53)

382-Q. (Translation.) Rare Elements As Alloying Additives to Heat-Resistant Steels. U. S. Dept. of Commerce, Office of Technical Services, June 2, 1960, 18 p. (From Izvestiya Akademii nauk Latviyskov SSR, no. 11, 1959.) (Available as 60-31,226 from U. S. Office of Technical Services, Washington 25, D. C. $.50)

Investigation of the effect of Ti, V and Cb additives on the structure and mechanical properties of heat resistant 5-15-8 Cr-Ni-Mn steel by phase and X-ray structural analysis. Mechanical properties are determined from steel samples hardened at a temperature of 1200-1300° C. and aged for 20 hr. at a temperature of 680-700° C. (Q-general, M27, J27, 2-60; SS, SGA-h, Cb, Ti, V)

383-Q. (Translation-ConBur.) The Effect of Neutron Irradiation on the Structure and Properties of Ferrito-Pearlitic Steels. V. S. Lyashenko and Sh. Sh. Ibragimov. Soviet Journal of Atomic Energy, v. 6, Nov. 1960, p. 165-169.

Variation in ultimate tensile strength, yield strength, elongation, microhardness and electrical resistivity as a result of fast neutron irradiation are explained on the basis of microstructure. (Q-general, P15g, 2-67; ST)

384-Q. (Translation-ConBur.) The Plasticity of the High Temperature Modifications of Polymorphic Metals. E. M. Savitskii and Ch. V. Kopetskii. Academy of Sciences of the USSR., Proceedings, Physical Chemistry Section, v. 112, Mar-Apr. 1960, p. 353-355.

Discussion of variations in crystal structure of Ca, Sr, Sc, Ti, Fe, Sn, Rh, etc. with temperature to determine possibility of a relationship between the polymorphism and the change in the electronic structure of the metal atoms. (Q23p, M27, 2-61; Ca, Fe, Sc, Sn, Sr, Ti)

385-Q. (Translation-ConBur.) Hydrogen Embrittlement of Steel During Cathodic Polarization in Sulphuric Acid. S. M. Beloglazov and M. I. Polukarov. Journal of Applied Chemistry of the USSR., v. 33, Feb. 1960, p. 385-391.

Effect of hydrogen absorption on the mechanical properties of carbon spring steel wire after hydrogenation in pure H_2SO_4 and H_2SO_4 containing hydrogenation catalysts at different current densities, temperatures and concentrations of the acid. 9 ref. (Q26s, R6g; CN, SGA-b, 4-60)

386-Q. (Translation-ConBur.) Internal Stresses in Electrolytic Deposits of Zinc, Obtained From Sulphate Electrolytes. N. P. Fedot'ev and A. A. Khonikevich. Journal of Applied Chemistry of the USSR., v. 33, Feb. 1960, p. 352-357.

Internal stresses in galvanic Zn deposits are measured on a flexible cathode composed of B-67 brass. Microhardness is determined by the static extrusion method. Data are given for the dependence of the internal stresses, microhardness, cathode potential and cathodic current efficiency or current density. 13 ref. (Q25, Q29n; Cu-n, Zn, 8-62)

387-Q. (Translation.) "Aftereffect" in Metal Specimens Subjected to Diffusion Creep at High Temperatures. B. Ya. Pines and I. G. Ivanov. Soviet Physics--Solid State, v. 2, Nov. 1960, p. 872-877.

Reverse deformation is observed upon removal of applied stress in Cu specimens subjected to diffusion creep at high temperatures. Qualitative interpretation of "aftereffect" laws in terms of appearance during creep of nuclei for new atomic planes. 4 ref. (Q3, 3-66; Cu)

388-Q. (Translation-ConBur.) The Effects of Irradiation on Solids. Yu. N. Sokurskii. Soviet Journal of Atomic Energy, v. 6, Nov. 1960, p. 271-291.

Quantitative estimates of the effect of radiation on the fissionable materials U and Pu and their alloys, the effect of very high burnups on the size and shape of units made of U and its alloys and the effect of temperature and radiation dosage on the mechanical properties of steel, other construction materials and nonmetallic materials such as BeO, UO_2-BeO and UO_2-ThO_2 mixtures and graphite. (Q-general, P10d, 2-67; Pu-b, ST, U-b, SGB-s)

389-Q. Quicker Diagrams Analyze Steel Fatigue. M. D. Creech. Product Engineering, v. 32, Feb. 13, 1961, p. 54-56.

Approximate endurance diagrams, constructed from data on ultimate and yield strength of the steel, may be used to determine endurance limits for ductile steels. (Q7a; ST)

390-Q. Size Effects on Fatigue Crack, Initiation and Propagation in Aluminum Sheet Specimens Subjected to Stresses of Nearly Constant Amplitude. Waloddi Weibull. Aeronautical Research Institute of Sweden, June 1960, p. 5-29.

Effect of specimen width on crack growth rate during fatigue testing of 24S-T and 75S-T Al sheet. (Q26, Q7, 3-73; Al-b, 4-53)

391-Q. Stainless Mild Steel Proves Its Mettle. Machine Design, v. 33, Feb. 16, 1961, p. 32.

Oxidation, corrosion and wear resistance similar to those of stainless steel and magnetic properties similar to those of annealed magnetic ingot iron are imparted to mild steel by alphatizing, a process in which Cr is diffused into the surface to produce a true metallurgical alloy. (Q9n, R-general, P16, N1; CN, Cr)

392-Q. Fatigue--The Problem in Relation to Welded Structures. R. P. Newman. Welder, v. 29, July-Sept. 1960, p. 54-60.

Linear stress-endurance and stress-log endurance curves for mild steel plate under alternating axial stress or axial repeated tension stress are compared with fatigue test results on mild steel butt welds. (Q7d; CN, 4-53, 7-51)

393-Q. (German.) Tests on Steel Joints Made With Adhesives. H. Winter and H. Meckelburg. Stahlbau, v. 30, Jan. 1961, p. 16-23.

Tensile shear tests to evaluate static adhesive strength of overlapped joints of St 00.23 steel, aircraft steel 27 MnCr V4, stainless steel V-2A and X5CrNi 18 9 joined with warm and cold hardening adhesives. Pretreatment and dimensioning of joints. (Q10c, K12; ST)

394-Q. Guard Against Fatigue Failures. J. B. Barriage. Iron Age, v. 187, Feb. 16, 1961, p. 111-113.

Application to maintenance of aircraft of the foil-safe method, in which fatigue cracks are recognized as practically unavoidable but the danger of failure is minimized by redesign and frequent inspection. (Q7, T24)

395-Q. (Russian.) Properties of Two Phase Metal-Ceramic Hard Alloys of TiC-WC-Co Type. G. S. Kreimer, M. P. Vakhovskaya and A. I. Baranov. Fizika Metallov i Metallovedenie, v. 10, May 1960, p. 698-709.

Bend strength, impact strength, porosity and plasticity of samples containing 4-25% Co at 20-1000° C. as affected by Co concentration, temperature and carbide grain size on the properties tested. 15 ref. (Q5, Q6, Q23p, P10m; Co-b, 6-70)

396-Q. (Russian.) Ultrasonic Wave Velocity in Eutectic Binary System Melts. Z. L. Khodov. Fizika Metallov i Metallovedenie, v. 10, May 1960, p. 772-779.

Velocity of ultrasonic waves is determined at 243-386° C. in liquid Sn, Pb, Cd and Bi binary systems by an impulse device. Elasticity modulus and adiabatic coefficient of compression are computed using values for ultrasonic rate. 27 ref. (Q21; Bi, Cd, Pb, Sn, 14-60)

397-Q. Reactor--Materials Properties. Stan J. Paprocki and Ronald F. Dickerson. Nucleonics, v. 18, Nov. 1960, p. 154-161.

Review of mechanical, physical and creep rupture properties of reactor fuel materials and structural materials such as stainless steel, Mg and Ni alloys, Be and Cr. Irradiation parameters for fuel materials. Compatability of fuel materaials with structural materials and of the latter with various coolants.

Suitability of clad fuels for use in various coolants. 157 ref. (Q-general, P-general, Q3, T11q; Be, Cr, Mg-b, Ni-b, SS, 17-57)

398-Q. (French.) Influence of the Distribution and Nature of Small Slag Inclusions on the Strength of Cast Steel. Bernhard Matuschka. Revue de Metallurgie, v. 57, Nov. 1960, p. 999-1001.

Production of cast steel in high frequency furnaces. Effect of material of furnace lining on accumulation of slag inclusions at the primary grain boundaries and indirectly on resistance to elongation. (Q27, D6, M26q, 9-69; ST)

399-Q. The Influence of Water Vapor Upon the Adherence Reactions Between Ground Coat and Sheet Iron. L. Merker. Institute of Vitreous Enamellers Bulletin, v. 11, Jan. 1961, p. 55-58.

Adherence between ground coat enamel and sheet iron as affected by firing in various controlled furnace atmospheres composed of N_2, $H_2O + N_2$, H_2O and dry air. (Q10c, L27; Fe, 4-53)

400-Q. Fatigue Characteristics of EC and 5005 Alloy Aluminum Wire. C. E. Burley. Power Apparatus and Systems, Dec. 1960, p. 789-792.

Fatigue testing of Al-0.8% Mg alloy cable using a rotating buckling machine to determine stress-lifetime curves. Fatigue strength, fatigue limit and ratio of fatigue limit to tensile strength are compared for the two types of wire. (Q7, T7g; Al-b, Mg)

401-Q. Mobile Mauler Launcher Made of High Strength Aluminum. Space Aeronautics, v. 35, Feb. 1961, p. 65-66, 68, 72, 74, 78.

Minimum tensile properties for 5083 and 5456 Al alloy sheet used in missile launching vehicle weighing 9 1/2 tons produced by Mig and Tig welding. Composition of 5083 alloy and 5183 welding wire. (Q27a, K1, T24e; Al, 17-57)

402-Q. (Czech.) Effect of Size on Stresses Developing in Castings. J. Pribyl. Sbornik, v. 6, Mar-Apr. 1960, p. 303-313.

Theory of stresses developing in cast rings of various sizes and cross sections. Internal stress as a function of design and absolute size. (Q25, 3-73; 5)

403-Q. (Czech.) Stress in Castings Caused by Gamma-Alpha Transformations. J. Pribyl. Sbornik, v. 6, Mar-Apr. 1960, p. 315-325.

Development of tensile stresses and compression stresses in small and large cross sections, respectively, of the same casting. Characteristics of transformation cracks. Crack elimination by molding practices providing for an adequate flow of heat and by an appropriate design of castings. (Q25m; 5)

404-Q. The Double-Notched (V-V) Bar Torsion-Bending Test. T. W. Wlodek. Canadian Mining and Metallurgical Bulletin, v. 54, Jan. 1961, p. 72-86.

Effect of surface treatment, surface imperfections, locked-in residual stresses and metallurgical and geometrical notches upon tension-bending characteristics, ductility, fracture resistance and impact sensitivity of various steels, Al and Mg alloys, bronze, brass and Cu. (Q5, Q26, Q6, 3-66; Al-b, Cu-b, Mg-b, ST)

405-Q. Titanium to Slash Weight of Cases in Minuteman 2nd Stage. Missiles and Rockets, v. 8, Feb. 20, 1961, p. 22-23.

Comparison of mechanical and physical properties of Ti alloys containing Al, Cr, Sn and V with D-6AC steel as to applicability for use in rocket motor cases. Outline of spin forging, heat treatment and welding techniques for fabrication of the cases. (Q-general, P-general, T2p; Ti-b, 17-57)

406-Q. Beryllium. M. K. McQuillan and T. W. Farthing. Endeavour, v. 22, Jan. 1961, p. 11-18.

Preparation of Be from beryl. Review of physical, chemical and mechanical properties of Be. Effect of temperature on the ductility of polycrystalline Be at 25-1050° C. (Q-general, Q23p, 2-61, P-general; Be)

407-Q. Light Armor Materials. H. P. George. Journal of Metals, v. 13, Feb. 1961, p. 131-134.

Evaluation of Al, Ti, Mg, steel and plastic as to suitability as armor materials. Data are given for density, elongation, yield and tensile strength and ballistic merit. (Q23, Q27a, P10a, T2; Al, Mg, ST, Ti, NM-d30, NM-d31)

408-Q. Preventing Hydrogen Embrittlement of Tantalum. C. R. Bishop and Milton Stern. Journal of Metals, v. 13, Feb. 1961, p. 144-145.

Influence of contact with noble metals on the hydrogen embrittlement of Ta in concentrated HCl at 190° C. Contact is made by riveting, welding, electrodeposition or merely rubbing. 17 ref. (Q26s; Ta)

409-Q. Effect of Impurities on Mechanical Properties of Electrolytic Titanium. J. D. Ramsdell and D. R. Mathews. U. S. Bureau of Mines, Report of Investigations 5701, 1960, 12 p.

Investigation of effects of the impurities O, N, C and Fe (in low percentages) on strength and hardness of electrolytic Ti. Mechanical properties of binary Ti-O, Ti-N and Ti-C alloys are linear functions of alloy content in the composition range investigated. 11 ref. (Q27a, Q29n, 2-60; Ti)

410-Q. Metals at High Temperature. T. C. Reuther, P. Shahinian and M. R. Achter. Report of N. R. L. (Naval Research Laboratory) Progress, Dec. 1960, p. 25-26. $1.25. (Available as PB 161288 from U. S. Office of Technical Services, Washington 25, D. C.)

Investigation of size effect on oxidation strengthening of smaller section of tapered specimens during creep-rupture testing. Metallographic analysis of crack pattern and character in fractured and interrupted specimens pulled in tension at 1500° F. for 350 hr. in vacuum and in air. (Q3, Q26, R2s, 2-61, 3-73; Ni)

411-Q. Design With High Strength Cold Rolled Austenitic Stainless Sheet. D. B. Roach and A. M. Hall. Materials in Design Engineering, v. 53, Feb. 1961, p. 108-110.

Compressive, stress-rupture and tensile properties of 301, 201, Tenelon and 17-5 MnV stainless sheet. (Q27, Q28, Q3m; SS-e, 4-53)

412-Q. (Japanese.) Embrittlement of Steel in Contact With Molten Copper-Zinc-Tin Alloys and Molten Sulphide. Morio Nakajima. Tetsu-to-Hagane (Iron and Steel Institute of Japan, Journal), v. 47, Jan. 1961, p. 22-27.

Embrittling temperature range of mild steel specimens as a function of Sn and Zn content. Effect of contact with molten iron sulphide. 9 ref. (Q26s, 2-60; ST)

413-Q. (Japanese.) Microscopic Segregation in High-Carbon Chromium Ball-Bearing Steel Tubes. Eiji Miyoshi and Nobuo Matsura. Tetsu-to-Hagane (Iron and Steel Institute of Japan, Journal), v. 47, Jan. 1961, p. 33-38.

Compressive strength and lifetime of ball-bearing steel tubing as affected by carbide segregation. 3 ref. (Q28g, N8r, 9-69; ST, SGA-c, 4-60)

414-Q. (Japanese.) Influence of Phosphorous on Properties of 13 Cr Stainless Steels. Naomichi Yamanaka, Kunio Kusaka and Masanobu Kitahara. Tetsu-to-Hagane (Iron and Steel Institute of Japan, Journal), v. 47, Jan. 1961, p. 38-43.

Transformation temperature, hardness, mechanical properties at room and elevated temperatures and corrosion resistance to nitric and acetic acids of 13% Cr stainless steels with phosphorous additions. 5 ref. (Q23r, Q29n, Q-general, R6g; SS, Cr)

415-Q. The Penetration of Hard-Steel Spheres Into Plane Metal Surfaces. Werner Goldsmith and Peter T. Lyman. Journal of Applied Mechanics (ASME, Transactions), Series E, v. 27, Dec. 1960, p. 717-725.

Determination of the force-indentation relations governing the contact of hard-steel ball and plane surfaces of toolsteel, Al 2024-T4 alloy and commercially pure Pb and Al sheets. Static and dynamic conditional measurements made by Hopkinson-bar technique. 36 ref. (Q29b; Al-b, Pb-a, TS)

416-Q. Effect of Structure and Purity on the Mechanical Properties of Columbium. A. L. Mincher and W. F. Sheely. Metallurgical Society of AIME, Transactions, v. 221, Feb. 1961, p. 19-25.

Mechanical properties of Cb studied at -196 to 1093° C. The decreased strengthening influence of cold work at temperatures below ambient is interpreted in terms of the Peierls-Nabarro effect. Maxima in the rate of strain hardening observed during tensile testing at 250-600° C. are correlated with interstitial impurities to indicate the temperature range at which C, O and N are responsible for strain aging. 12 ref. (Q-general, M26b, N7e, 2-61, 3-69; Cb)

417-Q. Effect of Explosive Shock Waves on a Gold-Silver Alloy. A. S. Appleton, G. E. Dieter and M. B. Bever. Metallurgical Society of AIME, Transactions, v. 221, Feb. 1961, p. 90-94.

The stored energy, microhardness and microstructural changes of Au-17.4% Ag alloy deformed by explosive loading are investigated at several shock pressures up to 510 kilobars. Deformation twinning and other phenomena are interpreted in terms of the probable imperfections introduced and are compared with changes induced by conventional deformation processes. 12 ref. (Q24, Q-general, M27; Au-b, Ag, NM-k34)

418-Q. Dispersion Strengthening of Copper by Internal Oxidation. Oliver Preston and Nicholas J. Grant. Metallurgical Society of AIME, Transactions, v. 221, Feb. 1961, p. 164-173.

A series of dilute solid solutions of Al and Si in Cu, in powder form, are internally oxidized, compacted and extruded to produce Cu-Al_2O_3 and CuSiO_2 alloys with 0.1 to 12% oxide. Room temperature tensile tests, creep-rupture tests at 450-859° C., conductivity measurements and recrystallization studies are made with oxide particle, size and interparticle spacings being determined to relate the structure to measured strength value using known dispersion strengthening theories. 36 ref. (Q-general, N7a, R2s, 3-71; Cu-b, Al, Si, 6-72, 14-68)

419-Q. Internal Friction Behavior of an Aluminum-Aluminum Oxide SAP-Type. G. S. Ansell and P. E. Arnold. Metallurgical Society of AIME, Transactions, v. 221, Feb. 1961, p. 206-207.

Activation energy for the relaxation process and temperature of the relaxation peak are determined with the internal friction constant and damping characteristics of fine-grained as-extruded and recrystallized coarse grain dispersion alloy specimens at 343-923° K. and frequencies of 0.9-1.8 cycles per sec. 6 ref. (Q22, P13a, 2-61; Al-b, 6-72, 14-68)

420-Q. Embrittlement of Ultra-High Tensile Steels in Relation to Surface Coatings. R. L. Samuel and N. A. Lockington. Institute of Metal Finishing, Transactions, v. 36, 1958-1959, p. 135-141.

Effect of Cd, Zn, Ni, Al and hard silicone stoving lacquer corrosion resistant coatings on hydrogen embrittlement of notched specimens under steady load. Influence of stress corrosion mechanism, rather than extent of corrosion, on fracture. 4 ref. (Q26s,^{4}R1d; ST, Cd, Zn, Ni, Al, 8-62)

421-Q. Hydrogen Embrittlement of Steel by Cathode Charging, Pickling and Cadium Plating. K. Sachs and S. H. Melbourne. Institute of Metal Finishing, Transactions, v. 36, 1958-1959, p. 142-152.

The effects of electrolytic cathode charging and subsequent aging at various temperatures on ductility and the embrittlement resulting from hydrogen absorption in routine plating operations are studied on mild steel screw wire and on carbon steel coil springs. The operations considered are pickling, storage in cyanide solution, cadium plating, hot air centrifuge drying and baking. 5 ref. (Q26s, 2-66, L12g; CN, Cd, 8-62)

422-Q. Short-Time Annealing Characteristics of Capped, Rimmed and Semi-Killed Wide Strip. P. N. Richards. Paper from "Production of Wide Steel Strip". Iron and Steel Institute, London, England. May 1960, p. 118-127.

Influence of annealing at 980-1540° C. on Brinell hardness, spring back and reverse bend properties, crack susceptibility, yield point, ultimate tensile strength and microstructure. Results are also obtained after hot dip galvanizing and roller levelling. (Q-general, 2-64; ST, 4-53, 8-65)

423-Q. (German.) Tensile Tests on Low-Phosphorus Basic Bessemer Openhearth and Electro Steels at 250° C. F. Erdmann-Jesnitzer, W. Precht and W. Scholz. Bergakademie, v. 12, Dec. 1960, p. 679-684.

Establishment of stress-strain curves by tensile testing at 250° C. for unalloyed, low-carbon (0.05-0.14% C) and low-phosphorus (0.023-0.175% P) steels to investigate influence of phosphorus on stress oscillation. (Q27, Q25, 2-60; ST)

424-Q. (German.) Some Peculiarities of the Temperature Dependence in Damping Unalloyed Titanium. H. Scholl and W. Knorr. Technische Mitteilungen Krupp, v. 18, Dec. 1960, p. 115-118.

Forged Ti rods are annealed at 50-850° C. to obtain 1700-10,000 micron grain size and subsequently subjected to bending oscillations at frequencies of 800-6220 Hz and temperatures from 20-600° C. Damping is then measured as a function of temperature, amount of plastic deformation and vanadium content. (Q22h, 2-60, 2-61, 3-68; Ti, 4-55)

425-Q. (German.) Mechanical Testing of Nodular Cast Iron. Georg Sille, Waldemar Lewerenz and Rudolf Wahren. Giesserei-Technik, v. 6, Dec. 1960, p. 358-362.

Results of notch-impact and shock-bending tests on ferritic, pearlitic and heat treated nodular cast iron (3.25% C, 2.33% Si, 0.34% Mn, 0.084% P, 0.006% S, 0.08% Mg, 0.08% Cr, 0.05% Ti) of given tensile strength. Investigation of fracture mechanism. Suggestions for standardizing test methods. (Q6, Q5; CI-r)

426-Q. (German.) Use of Zr to Compensate for Effect of Residual Elements in Production of Nodular Cast Iron. Hans Grossman. Giesserei-Technik, v. 6, Dec. 1960, p. 370-375.

Specimens of nodular cast iron with 0.04-0.084% Mg, 0.02-0.15% Ti, 0.03-0.09% Cr and 0-0.11% Zr are melted in a basic arc furnace and subsequently investigated to determine microstructure and mechanical properties in the as-cast state and after ferritic annealing at 950° C. and controlled cooling. Zr additions are found to compensate for Ti content. (Q-general, M27, 2-60, 2-64; CI-r)

427-Q. Practical Implications of Trace Additions of Silver to Commercial Aluminum-Zinc-Magnesium Alloys. I. J. Polmear. Australian Defense Scientific Service, Aeronautical Research Laboratories, Metallurgy Rept. 39, 1960, 23 p.

Effects of a 0.3% addition of Ag to Al-Zn (4.36-6.65%)-Mg (2.38-2.95%) alloys on their tensile, aging and fatigue properties, microstructure and stress corrosion resistance. (Q27a, N7a, Q7, M27, R1d, 2-60; Al-b, Mg, Zn, Ag)

428-Q. (Translation.) The Problem of Conditions Necessary for Formation and Development of Cracks in Crystals. V. N. Rozhanskii. Soviet Physics, Solid State, v. 2, Dec. 1960, p. 978-983. (Translation of Fizika Tverdogo Tela, v. 2, June 1960, p. 1033-1360.)

Reduction in strength of Zn whiskers when coated with mercury is attributed to cracks and dislocations induced by the surface active impurity. 30 ref. (Q27a, Q26q; Zn, 14-61)

429-Q. (Translation.) Slip at the Boundaries of Twins During Forward and Reverse Twinning of Iron. I. A. Gindin and Ya. D. Starodubov. Soviet Physics, Solid State, v. 2, Dec. 1960, p. 968-977. (Translation of Fizika Tverdogo Tela, v. 2, June 1960, p. 1033-1360.)

Compressive and tensile loading of high-purity iron at 77° K. cause formation and removal of twinning layers. Slip mechanism affects magnitude of forces required. 7 ref. (Q24; Fe-a)

430-Q. (Translation.) The Calculated and Empirical Values of the Lifetime of Metals and Alloys Under a Load. B. Ya. Pines and A. F. Sirenko. Soviet Physics, Solid State, v. 2, Dec. 1960, p. 942-949. (Translation of Fizika Tverdogo Tela, v. 2, June 1960, p. 1033-1360.)

Stress-rupture values for pure Sn, Pb, Al, Pt, Ag, Cu and Ag-Al (95-5) alloy as influenced by self-diffusion coefficient, modulus of elasticity, Boltzmann's constant, linear atomic dimension and lattice vacancies at temperatures up to 800° C. and tensile stress up to 87,500 psi. 13 ref. (Q3q, 2-61; Ag, Al, Cu, Pb, Pt, Sn)

431-Q. (Translation.) A Study of the Time and Temperature Dependences of Mechanical Strength. S. N. Zhurkov and T. P. Sanfirova. Soviet Physics, Solid State, v. 2, Dec. 1960, p. 933-938. (Translation of Fizika Tverdogo Tela, v. 2, June 1960, p. 1033-1360.)

Investigations of the mechanical strength of amorphous and crystalline solids as influenced by time and temperature are used to establish a relationship between lifetime of a material under load, tensile stress and temperature. Results are illustrated by measurements on pure Al and Al-2% Mg alloys. 12 ref. (Q27, 2-61, 3-66; Al-b, Mg)

432-Q. The Low Temperature Properties of Stainless Steels. J. R. Hunter. Steel Horizons, v. 23, no. 1, 1961, p. 14.

After annealing, sensitizing and cold working processes, 300 series steels are tested at -423 to 68° F. to determine low temperature embrittlement effects. Data are given for impact, yield and tensile ratio and elongation. (Q-general, 2-61; SS)

433-Q. Residual Stress Distribution in and Around Spot Welds. W. Bolton. British Welding Journal, v. 8, Feb. 1961, p. 57-60.

Determination of three-dimensional stress distribution of spot in FV520 stainless steel using a method involving the drilling of a hole at the center of a system of electrical strain gages. Residual stress distribution is found for spot welds in the fully precipitated, hardened condition and also after a low temperature treatment. (Q25h; SS, 7-51)

434-Q. Effect of Oxygen and Nitrogen on Properties of Welds in Unalloyed Titanium. J. C. Borland. British Welding Journal, v. 8, Feb. 1961, p. 61-67.

Effect of O_2, N_2 and air on weld joint properties such as bend ductility and bead hardness in unalloyed Ti containing 0.17% Fe and 0.05% C. Permissible levels of contamination. 12 ref. (Q5g, Q29n, 3-69; Ti, 7-51)

435-Q. (English.) Notch Sensitivity in Steel. Erik Agerman. Acta Polytechnica Scandinavica, no. 8, 1960, p. 3-44.

Values for the notch effect in steel observed experimentally and calculated by various formulae are analyzed statistically to determine the theory which best fits the experimental data. A calculating method is also proposed in which the safety factor is associated with the probability of fracture. 81 ref. (Q23s, Q7a; ST)

436-Q. (Japanese.) Brittle Fracture of Welded Structures. Yoshio Akita. Japan Society of Mechanical Engineers, Journal, v. 63, Dec. 1960, p. 1632-1640.

High tensile steels and their weldments are tested by brittle cracking, notch sensitivity, tensile and rupture tests to determine crack propagation rate, arresting temperature, allowable stress, low temperature limits, weldability and effects of preheating and prestressing. (Q-general, K9s; ST, 4-57)

437-Q. (Japanese.) Structure and Strength of Cast Iron. Masatoshi Morita. Japan Society of Mechanical Engineers, Journal, v. 63, Dec. 1960, p. 1656-1661.

Mechanical strength of cast iron discussed in relation to its structure, carbon equivalent and globularity. (Q27, 2-60, 3-71; CI)

438-Q. Stress Rupture Tests at 1350° F. on Type 304 Stainless Steel. W. D. Jenkins, W. A. Willard and W. J. Youden. Materials Research & Standards, v. 1, Feb. 1961, p. 104-108.

Stress rupture testing of bar specimens at a stress of 13,500 psi. to determine the suitability of a heat of this stainless steel as a source of calibration specimens for future tests. (Q3q; SS)

439-Q. The Evolution of Nickel-Base Precipitation-Hardening Superalloys. J. S. Hoag. Defense Metals Information Center, Battelle Memorial Institute, DMIC Memo. 84, Feb. 6, 1961, 10 p.

Addition of Cr, Al, Ti, Co and Mo as they affect creep, rupture, oxidation resistance, forgeability and strength in the 1200-1800° F. range. Effect of Cr-carbide precipitation on hardness and of B and Zr on grain boundary stability, microcracking and ductility. 18 ref. (Q-general, 2-60, 2-61; Ni-b)

440-Q. (Japanese.) Some Observations on the Fracture of Cermets. Masataka Sugiyama, Hisashi Suzuki and Akio Hara. Japan Institute of Metals, Journal, v. 24, Nov. 1960, p. 740-743.

Microscopy studies of brittle fracture mechanisms in WC-Co-cemented carbides and TiC base alloys containing Co, Ni and Cr metal binders after impact and bending tests. Crack initiation and growth, fracture modes and fracture patterns, flake graphite precipitation and chrome carbide aggregation are correlated with strain rate and temperature. 8 ref. (Q26; Ti, W, 6-69, 6-70, 14-68)

441-Q. (Japanese.) Study of Zone-Refined High Purity Copper. Pt. 2. Tensile Tests and Room Temperature Recrystallization of Zone-Melted Copper. Tomisaburo Nara and Yoshito Yamada. Japan Institute of Metals, Journal, v. 24, Nov. 1960, p. 744-748.

Tensile properties, hardness and recrystallized microstructure of cold

worked Cu wires prepared from zone refined ingots are examined as a function of purity and time and temperature of heat treatment. Comparisons are made with OFHC and vacuum melted Cu. 14 ref. (Q27, C28k, N5, Q29; 2-60, 2-64; Cu-a)

442-Q. Deoxidation of Reactive and Refractory Metals With Selected Reducing Agents (Deoxidation of Molybdenum). I. R. Lane, Jr., and E. J. Chapin. Report of NRL (Naval Research Laboratory) Progress, Jan. 1961, p. 25-26.

As-cast specimen ingots of pure Mo and Mo containing small amounts of Er, Gd, Th and Y as potential deoxidants are examined by tensile test and fractography methods to determine effect of addition on chemical analysis, microstructure and room temperature tensile ductility. Transgranular and intergranular fracture and intergranular embrittlement occurring in the specimens are attributed to failure of the deoxidants to remove oxygen from solid solution and to precipitation of carbon as grain boundary and matrix carbides. (Q23p, Q26, M26, M27, 2-60; Mo, AD-r31, Er, Gd, Th, Y)

443-Q. Radiation Damage of Metals (Effect of Irradiation Temperature on the Transition-Temperature Characteristics of Pressure Vessel Steels). J. R. Hawthorne and L. E. Steele. Report of NRL (Naval Research Laboratory) Progress, Jan. 1961, p. 30-31.

Charpy V-notch test specimens from a 4 in. thick ferritic A212B plate steel is exposed to fast neutron flux reactor irradiation at 260-550° F. Notch ductility is measured before and after irradiation at -100 to 300° F. A low shift in brittle transition temperature is attributed to self-annealing of radiation induced charges. (Q23r, Q23s, 2-67; ST)

444-Q. (Translation.) Microstructure and Physiomechanical Properties of Rare Earth Metals and Their Alloys. E. M. Savitskii and V. F. Terekhova. Rare Earth Elements, 1959, p. 325-332.

Mechanical and physical properties of rare earth elements La, Ce and Pr with other metals and alloys (Fe, Ti, Cr, Al, Co, Si, Ni, Ag, Th and Mg alloys) tested at 20-800° C. 12 ref. (Q-general, P-general, 2-60; Eg-g45)

445-Q. (Translation.) Use of Rare Earth Metals for Alloying Magnesium Cast Alloys. N. M. Tikhova and V. A. Blokhina. Rare Earth Elements, 1959, p. 350-356.

Measurement of mechanical properties of Mg alloys with rare earth metal additions at 20-350° C. show properties are improved by alloying with metals from La to Nd. (Q-general, 2-60; Mg-b, EG-g45)

446-Q. Design Properties as Affected by Cryogenic Temperatures. Defense Metals Information Center, Battelle Memorial Institute, DMIC Memo. 81, Jan. 24, 1961, 18 p.

Tensile testing of 6Al-4V-Ti alloy, 4340 steel and 7079-T6 Al alloy at 70 to -423° F. Data are given for the ultimate tensile strength, notch strength, yield strength and stress-strain curve. 5 ref. (Q27, 2-63; Al-b, ST, Ti-b)

447-Q. Dust Injection Tests Reveal Relative Merits of Ring-Liner Combinations. Glenn F. Hyde, Fred A. Robbins and Paul R. Shipler. SAE Journal, v. 69, Mar. 1961, p. 68.

Wear tests of Cr-plated or unplated Fe ring liner combinations to determine minimum end clearance change obtainable when tested over a period of 48 hr. (Q9; Fe)

448-Q. Prediction of Unstable Crack Length in Aluminum Alloys. R. H. Ryder. College of Aeronautics, Cranfield, Oct. 1960, 4 p.

Theoretical calculation of the unstable length of a crack in Al alloy sheet subjected to steady tensile stress. (Q26; Al-b, 4-53)

449-Q. (Russian.) Low Carbon Unalloyed Steels Replace Some High Strength Alloy Steels. M. E. Blanter, K. P. Koryagin and O. V. Martishin. Metallovedenie i Obrabotka Metallov, Dec. 1960, p. 2-7.

Quenching of 10 and 15 steels in 10% NaOH solution at 800-950° C. followed by comparative mechanical testing at -50 to 500° C. Effect of temperature and quenching conditions on plasticity, impact and tensile strength, elongation, yield point and reduction in area. Properties are compared to 30KHGSA structural steel. 5 ref. (Q-general, 2-64; CN-g, AY)

450-Q. (Russian.) Nickel-Free Steel for Large Forgings. M. P. Baun, K. F. Gurzhienko, A. I. Kondrashev, B. V. Vinokur and A. L. Geller. Metallovedenie i Obrabotka Metallov, Dec. 1960, p. 16-17.

Heat treatment and mechanical testing of newly developed 30KHGVT structural steel. The steel exhibits satisfactory hardenability, tensile strength, plasticity and viscosity and is recommended for forgings of up to 700 mm. cross sections in place of Cr-Ni 40KHN and 40KHNM steels. 7 ref. (Q-general, F22, 17-52, J-general; ST, SGB-s)

451-Q. (Russian.) Oxygen-Converter Steel. A. A. Mitrofanov. Metallovedenie i Obrabotka Metallov, Dec. 1960, p. 18-21.

Improvement in quality of rimming steel by top oxygen blowing during the converter process. Cold shortness, mechanical aging tendency, weldability, corrosion resistance, gas, sulphur and phosphorus content and mechanical properties of such steel are found to be analogous to these of the openhearth steel. 10 ref. (Q-general, D3; ST-g)

452-Q. (Russian.) Effect of Copper and Graphite on the Properties of Iron-Base Powder Alloys. V. K. Sorokin. Metallovedenie i Obrabotka Metallov, Dec. 1960, p. 42-43.

Selection of optimum amount of Cu and graphite additions to the powders to produce pearlitic structure sintered parts with high tensile properties and hardness. (Q27, Q29, N8h, 2-60; Fe-b, C, Cu, 6-72)

453-Q. (Italian.) Influence of Heat Treatment on the Fatigue Failure Curve Under Rotary Bending Load. C. Panseri and L. Mori. Alluminio, v. 29, Dec. 1960, p. 563-566.

Curves obtained during bending fatigue tests on Avional 22 in a tempered and age hardened state (TN) and in a tempered and artificially aged state (TA). Hypotheses concerning the anomaly observed in the curve, a "knee" occurring in the TN curve but not observed in the TA curve. 11 ref. (Q7c, 2-64; Al-b)

454-Q. (French.) Transitory Increase of Internal Friction in the Course of Isothermal Precipitation of Carbon in a Ferro-Carbon Alloy. Gaston Collette. Comptes Rendus, v. 251, Dec. 19, 1960, p. 2930-2932.

Development of internal friction as a function of time in a ferrous alloy of 0.0092% C, 0.024% Si, 0.003% P, 0.005% S, 0.003% O and 0.0004% Mn during isothermal precipitation of the carbon, after producing a solid solution in the alpha range and water quenching. (Q22, N7, 2-64, 3-67; Fe-b, C)

455-Q. (French.) Influence of Small Quantities of Impurities on the Restoration of Mechanical Properties of Highly Worked Iron. Paul Morgand and Christian Messager. Comptes Rendus, v. 251, Dec. 19, 1960, p. 2936-2937.

Role of impurities on deformation hardening and restoration of hardness before recrystallization investigated in cold rolled specimens of Armco iron, Armco iron purified in a hydrogen atmosphere, electrolytic iron and purified by molten zone. 3 ref. (Q23a, 3-69; Fe-a)

456-Q. (Italian.) Lead Steels. R. Roja and E. Massa. Macchine, v. 15, Dec. 1960, p. 1119-1124.

Influence of the addition of Pb to steel on its fatigue limit and machinability. (Q7a, G17k, 2-60; ST, Pb)

457-Q. (Italian.) Spheroidal Cast Iron in the Machine Tool Industry. R. M. Bronson. Macchine, v. 15, Dec. 1960, p. 1153-1160.

Rigidity, machinability, wear resistance and elasticity of spheroidal gray castings containing 3-4% C, 2-3% Si, 0.2-1% Mn, up to 0.08% P, up to 0.02% S and up to 3% Ni used in machine tools. (Q9, Q21, G17k, 2-60; CI-r)

458-Q. How to Choose the Right Soft Solder Alloy. Howard H. Manko. Product Engineering, v. 32, Mar. 6, 1961, p. 39-46.

Comparison of the following properties of 28 basic soft solder alloys: tensile strength, shear strength, elongation, Brinell hardness, electrical conductivity, electrical resistivity, expansion coefficient and specific gravity. Solderability of base metals. Review of iron, torch, resistance, induction and wave soldering techniques. 6 ref. (Q-general, P-general, K7; SGA-f)

459-Q. New Answer for Brittle Failure Problem. J. G. Parr. Canadian Metalworking, v. 24, Feb. 1961, p. 37-40.

Discussion of the dislocation theory as an aid in predicting brittle failure. (Q26s)

460-Q. Magnetic Relaxation at High Temperatures Due to Grain Boundary Slip and to Dislocations. G. Biorci, G. Montalenti and A. Ferro. Solid State Physics in Electronics and Telecommunications, Proceedings of the International Conference, Brussels, Belgium, June 2-7, 1958, v. 3. Magnetic and Optical Properties. Pt. 1. 1960, p. 235-244.

Magnetic relaxation and diffusion viscosity field of polycrystalline iron at 150-500° C. are interpreted in terms of grain boundary slip. (Q3, M27f, M26b, 2-61; Fe)

461-Q. Mechanical Damping of Germanium and Silicon Containing Impurity Oxygen. P. D. Southgate. Solid State Physics in Electronics and Telecommunications, Proceedings of the International Conference, Brussels, Belgium, June 2-7, 1958, v. 1. Semiconductors. Pt. 1. 1960, p. 240-250.

Measurements on Ge and Si single crystals at 100-300 kc. per sec. and 100-1300° C. Determining internal friction as a function of temperature. 17 ref. (Q22, 2-61, 3-69; Ge, Si, 14-61)

462-Q. (Japanese.) An Abnormal Hardening Phenomenon in Kovar Caused by Transformation During Cold Working. Satoru Mito. Japan Institute of Metals, Journal, v. 24, Dec. 1960, p. 790-794.

Work hardening occurring during gamma to alpha phase transformation as a function of temperature, heat treatment and Ni content is examined in Fe-base Kovar alloy specimens by measuring the change in hardness in cold rolling and the stress strain curve in tensile tests and by X-ray diffraction analysis. Rolling and test temperature are -183 to 400° C., with annealing at 200-1000° C. and Ni composition at 25.1-31.4%. 7 ref. (Q23a, N-general, 2-60, 2-61, 2-64; Fe-b, Ni)

463-Q. (Japanese.) The Rigidity Modulus and Internal Friction in Quench-Hardened Steel Wires. Seita Sakui and Hideo Takei. Japan Institute of Metals, Journal, v. 24, Dec. 1960, p. 810-813.

The rigidity modulus, the electrical resistivity, the microhardness and the internal friction in quench-hardened steel wires containing 0.08% and 0.12% of carbon are measured as a function of reduction in area and tempering and annealing temperature at 20-920° C. 6 ref. (Q1g, Q22, Q29q, P15g, 2-64, 3-68; ST, 4-61)

464-Q. (Japanese.) Creep Rupture Strength and Changes in Microstructure of Austenitic Stainless Steels. Gunji Shinoda, Tadao Sano, Tadakazu Sakurai, Tadashi Kawasaki and Hisashi Izumi. Japan Institute of Metals, Journal, v. 24, Dec. 1960, p. 818-822.

Creep rupture tests at 600° C. on plain and V and U-notched specimens of 304, 304L and a high Cr (19.58%), high Ni (20.86%) stainless, with metallographic examination of microstructures after testing. The microstructure of specimens having short rupture life show a large number of slip bands in each grain with drastic individual grain deformation, while specimens with longer life show grain boundary voids and twin bands, suggesting different fracture mechanism. Data are given for creep rupture strength, notch factor and tensile properties. 8 ref. (Q3, Q24, M27, 2-62; SS-e)

465-Q. (Japanese.) The Relation Between Impact Stress and Impact Energy Stress of Beams by Impact Load. Koichi Akizono. Japan Institute of Metals, Journal, v. 24, Dec. 1960, p. 822-825.

Test pieces of 0.8% carbon steel of various shapes and sizes are tested under different impact conditions using a Matsumura's impact fatigue testing machine with strain gage measurement of stresses. The value of the impact stress and the ratio of energy absorbed by the test pieces and the impact energy are correlated with size effects for application to study of impact fatigue. (Q6, Q7, 3-66; CN)

466-Q. (Japanese.) Formation and Propagation of Fatigue Cracks. S-N Curves of Impact Fatigue. Koichi Akizono. Japan Institute of Metals, Journal, v. 24, Dec. 1960, p. 826-829.

Tests on annealed 0.2-0.3% carbon steel specimens using Matsumura's impact fatigue testing machine. Correlation of crack length and propagation velocity with number of blows for fracture and tensile, compressive and tensile-compressive stresses in the specimen notch. 7 ref. (Q6, Q7, Q26, 3-66; CN-g)

467-Q. (Japanese.) The Cause of Banded Structures (Role of P, Mn, Cr and Ni). Koichi Furusawa. Japan Institute of Metals, Journal, v. 24, Dec. 1960, p. 833-836.

Pearlite and ferrite banded structures observed in the welded segregation region of a steel specimen after various heat treatments at 600-1000° C. Correlation of ferrite nucleation with high phosphorous segregation and with retained austenite and carbon atom migration as a function of composition, cooling rate and heat treatment time and temperature. 6 ref. (Q24c, N2, N8n, 2-60, 2-64; ST, Cr, Mn, Ni, P)

468-Q. (Russian.) Effect of Nuclear Irradiation on Properties of Fe-C Systems. I. M. Pronman. Metallovedenie i Termicheskaya Obrabotka Metallov, Jan. 1961, p. 36-47.

Study of hardness, tensile and impact strength, plasticity, yield point, electrical resistivity and phase transformation as affected by neutron irradiation in various steels. (Q-general, P15g, N-general, 2-67; ST)

469-Q. (Russian.) Effect of Heat Treatment Parameters on the Hardness and Wear Resistance of High Speed Tool Steel. E. P. Nadeinskaya and A. A. Badaeva. Metallovedenie i Termicheskaya Obrabotka Metallov, Jan. 1961, p. 36-47.

R18 and R9 steel tools are quenched from 1100-1270° C., tempered at 100-600° C. and tested for wear during turning of 45 steel at widely varying cutting and feeding rates. (Q29n, Q9n, 2-64; TS-in)

470-Q. Ductile Molybdenum. J. A. Belk. New Scientist, v. 9, Jan. 12, 1961, p. 79-81.

Ductility and other mechanical properties of Mo in applications at high temperatures or in corrosive atmospheres. Effect of annealing and rolling temperature on the tensile strength and elongation of Mo. Description of a 50% Mo-50% Rh alloy which is ductile work hardens slowly and retains high strength at high temperatures. (Q23, Q-general; Mo-b, Rh)

471-Q. The Relation Between the Plastic Deformation of Aluminum Single Crystals and Polycrystals. S. Howe and C. Elbaum. Philosophical Magazine, v. 6, Jan. 1961, p. 37-48.

Shear stress-shear strain curves for Al single crystals of (100), (111) and (110) axial orientation as a function of temperature from 27-600° C. Mode of deformation as affected by orientation. Evaluation of the Taylor criterion for comparison of stress-strain curves of mono and polycrystals. (Q24, 2-61; Al)

472-Q. Dieselmaker Improves Technique for Wear Study. Steel, v. 148, Mar. 6, 1961, p. 76.

Radioactive wear testing of diesel engine cylinders by a technique in which the cylinder liner is partially shielded externally with Cd, placed in a watertight Al capsule and irradiated in a reactor for four weeks. Wear products are then recovered from lubricating oil and exhaust gas streams. (Q9, 1-59, W11j)

473-Q. New Plastic Clad Steel Plates, Steel, v. 148, Mar. 6, 1961, p. 95.

Development of rolled steel plates clad with vinyl plastic which can be bent, twisted, cut and shaped and which withstand heat up to 150° F. or subfreezing temperatures. (Q23q; ST, 4-53, 8-65)

474-Q. Which Instrument-Gear Materials Wear Least? R. J. Benson. Product Engineering, v. 32, Feb. 27, 1961, p. 37-41.

Relative wear tests are conducted on spur gears hobbed from untreated, anodized, electrolized and chrome-plated Al; untreated and electrolized stainless; Rulon B; Nylon 3001, Nylasint and Sinite D105. Gears are meshed in various combinations and operated under different conditions of lubrication and temperature. (Q9, T7a, 17-52; Al-b, ST, NM-d31, 17-57)

475-Q. Ductile-Brittle Transition in Alpha Brass. H. Nichols and W. Rostoker. Acta Metallurgica, v. 8, Dec. 1960, p. 848-850.

Tensile test data for annealed 70-30 brass is correlated with analysis of theoretical models to show that embrittlement of alpha brass by liquid mercury is temperature dependent and that the functional relationship is a transition from ductile to brittle behavior in the same manner as experienced by iron and other b-c-c. metals tested in their normal recyrstallized state. The transition temperature is governed by the

recrystallized grain size. The significance of this dependency is discussed in terms of current dislocation theory of the transition effect. 8 ref. (Q23r, M26b, N5, 2-59; Cu-n)

476-Q. The Growth of Twins in Tin Single Crystals as Observed by Transmission Electron Microscopy. J. T. Fourie, F. Weinberg and F. W. C. Boswell. Acta Metallurgica, v. 8, Dec. 1960, p. 851-863.

The nucleation and growth of twins in melt-grown Sn single crystals are examined by transmission electron microscopy and electron diffraction after several minutes exposure in the electron beam. Twins are observed to nucleate at the edge of the crystal foil, etch pits, other twin boundaries, defects and areas relatively free from dislocations. Twin propagation is attributed to stresses present at a lower level than necessary for nucleation, with growth rate being a function of time in the electron beam. 14 ref. (Q24b, M21e, N2, 3-66; Sn, 14-61)

477-Q. Stress Inducing Ordering in Gold-Silver Alloys. T. J. Turner and G. P. Williams, Jr. Acta Metallurgica, v. 8, Dec. 1960, p. 891-892.

An inverted torsion pendulum and an elastic after-effect apparatus are used for relaxation measurement of the order of 1 sec. and 1000 sec., respectively, on 42-68% Ag-Au specimens in vacuum at 200-550° C. to determine atomic and grain size and valency effects on stress induced ordering. Values for internal friction and relaxation time and activation energy are determined as a function of temperature and composition. Ordering theories are reviewed, with an effective size resulting from compressibility difference being suggested as the most important criterion for stress induced ordering. 8 ref. (Q3, Q22, N10, 2-60, 2-61; Ag-b, Au-b)

478-Q. Effect of Zone-Refining and Orientation on the Hardness of High Purity Rhenium. A. Lawley and R. Maddin. Acta Metallurgica, v. 8, Dec. 1960, p. 896-897.

A singel crystal of rhenium (close packed hexagonal) 0.23 cm. diameter x 15 cm. long is grown from sintered round bar using the electron bombardment floating zone technique. The extremely anisotropic single crystal occupies the central portion of the 25 cm. long bar, with a recrystallized matrix adjacent to the first and last zones to freeze. The orientation and longitudinal and circumferential Knoop hardness are determined after two, four and six passes along the original 15 cm. long single crystal. (Q29n, J28k, 3-72; Re, 14-61)

479-Q. Twinning in Vanadium. C. J. McHargue. Acta Metallurgica, v. 8, Dec. 1960, p. 900.

Electron beam melted vanadium single crystals are deformed in slow compression at liquid nitrogen temperature. Twins are observed comparable to those found in other b-c-c. metals--thin, with serrated boundaries and (112) twin planes. Comparison is made with Ta and Cb and it is suggested that all group Va b-c-c. metals twin with relative ease below room temperature if very pure and with large grain size. 4 ref. (Q24b, 2-59, 2-63, 3-68; V, 14-61)

480-Q. Can Copper Alloys Hold the Line at Ultralow Temperatures. C. L. Bulow. Iron Age, v. 187, Mar. 9, 1961, p. 92-93.

Comparison of mechanical and electrical properties of Cu alloys at room temperature and -180° C. (Q-general, P15, 2-61; Cu-b)

481-Q. Predicting Very Short-Time Creep Behavior for Missiles. S. F. Frederick. Metal Progress, v. 79, Mar. 1961, p. 88-90.

Conventional time-temperature parameters may be applied to very-short-time creep data. (Q3, 1-54)

482-Q. Effect of Grip Constraints on the Tensile Deformation of F.C.C. Single Crystals. J. J. Hauser and K. A. Jackson. Acta Metallurgica, v. 9, Jan. 1961, p. 1-13.

Theoretical analysis of geometrical grip effects and their relation to easy glide regions during deformation, establishing the orientation dependence of both. Correlation with tensile, compressive and shear stresses and strain, lattice rotation, dislocation interactions in various slip systems, Cottrell-Lomer locking and specimen size and shape effects to determine deformation mechanisms and geometry. 12 ref. (Q24, Q25, M26, 3-72, 3-73; 14-61)

483-Q. Low-Temperature Elastic Constants of Magnesium Alloys. S. Eros and C. S. Smith. Acta Metallurgica, v. 9, Jan. 1961, p. 14-22.

The elastic constants of a series of Mg alloy single crystals, containing Ag, Sn or In and with an electron-atom range of 1.996-2.020 are measured at 4-298° K. to look for effects which are predicted to be associated with the initiation of a new electronic overlap and which can only be observed at low temperatures. 18 ref. (Q21, M25, 2-63; Mg-b, Ag, Sn, In, 14-61)

484-Q. Magnitude of the Zener Relaxation Effect. Pt. 1. Survey of Alloy Systems. A. S. Nowick and D. P. Seraphim. Acta Metallurgica, v. 9, Jan. 1961, p. 40-48.

Stress-induced ordering phenomenon in substitutional solid solutions. A brief review of the two proposed mechanisms for this phenomenon, the pair reorientation theory of Zener and the directional short-range order theory of Le Claire and Lomer, is presented with data for the relaxation strength of polycrystalline samples from 19 alloy systems, with information from lattice-parameter data. For solid solutions of the noble metals, it is shown that there is no relation between relaxation strength and the size factor, but that there is rough correlation between relaxation strength and the magnitude of the deviation from Vegard's law. 29 ref. (Q3, Q22, M26, N10, 10-54; 14-67)

485-Q. Temperature Dependence of the Relaxation Strength in Alpha Ag-Zn Magnitude of the Zener Relaxation Effect. Pt. 2. C. Y. Li and A. S. Nowick. Acta Metallurgica, v. 9, Jan. 1961, p. 49-58.

The dependence of the magnitude of stress-induced ordering on temperature is measured by static, internal friction and dynamic modulus methods at 32-297° C. on polycrystalline samples of alpha Ag-Zn alloys of three compositions. The relaxation strength is found to follow the equation derived by Zener (rederived here under more general assumptions). The critical temperature for self-induced ordering is found to be equal to 175, 140 and 97° K. for alloys containing 33.5, 30.2 and 24.2 at.% Zn, respectively. 10 ref. (Q3, Q22, N10, 2-61; Ag-b, Zn)

486-Q. Microcreep Relaxation of Pinned Dislocations in Gold. R. Kamel. Acta Metallurgica, v. 9, Jan. 1961, p. 65-68.

Internal friction and elastic modulus measurements on quenched and annealed Au wire specimens at 0-1000° C. to determine dislocation line-vacancy interaction and the resulting effect on dislocation climb, phase lag between stress and dislocation motion and related microcreep phenomena. Relaxation curves are obtained as a function of time and temperature, with vacancy or divacancy diffusion being attributed as the rate controlling process. 4 ref. (Q3, Q22, M26, 2-61, 3-67; Au)

487-Q. Void Formation in Ductile Fracture of a Cobalt-Iron Alloy. C. W. Chen. Acta Metallurgica, v. 9, Jan. 1961, p. 68-71.

Room temperature tensile tests on a 49% Fe-49% Co-2% V alloy, after martensitic conversion of the gamma phase by heat treatment, with metallographic analysis of the resultant cup-and-cone fracture surface. Void initiation sites and formation and growth mechanism in ductile fracture are related to plastic deformation and hydrostatic tension processes and dislocation pile-up and stress concentration mechanisms. 7 ref. (Q26, M23p, M26p, 3-66, 3-68; Fe-b, Co-b, V)

488-Q. On the Fine Structure in Twins. H. Kiho and S. Maruyama. Acta Metallurgica, v. 9, Jan. 1961, p. 82-83.

Electron micrographic and sterographic projection examination of markings across the twin bands in zone melted Zn single crystal after cleaving in liquid nitrogen. The markings are identified as kink-bands produced by local slip in twinning. (Q24b, Q24c, M21e; Zn, 14-61)

489-Q. Materials for Astronautic Vehicles. A. J. Murphy. College of Aeronautics, Cranfield, England, Nov. 1960, 21 p.

Alloys based on Fe, Ni and Co, refractory metals, particularly Mo, Cb and W, nonmetallics such as carbon and ceramic oxides, synthetic resins and cermets are evaluated for application in space ships operating at high speeds in the extreme conditions of outer space, with special attention to heat ablation and dissipation. Data are compiled for thermal, thermodynamic and kinetic properties; reactivity, irradiation sensitivity; creep, fatigue stress and oxidation resistance at high

temperatures and mechanical properties at low temperatures. (Q-general, P-general, T24e; SGA-h, EG-d37, Fe-b, Co-b, Mo-b, Ni-b, W-b, Cb-b, NM, 17-52, 17-57)

490-Q. (French.) Effect of Remelting on the Properties of A-U5GT and A-G3 Alloys. Claude Mascre and Michel Drouzy. Fonderie, Nov. 1960, p. 469-472.

A charge of A-U5-GT containing 0.24-0.29% Mg and 0.17-0.35% Ti and a charge of A-G3 containing 2.90-3.07% Mg, 0.38-0.40% Mn and 0.08-0.09% Ti are melted in a foundry furnace, cast and twice remelted, to study changes of the composition, tensile strength, elongation and grain size. (Q27a, Q23p, M27c; Al-b)

491-Q. (German.) Attenuation of Ultrasonic Waves in Austenitic Cr-Ni-Steels. Paul Midecke. Materialprufung, v. 3, Jan. 1961, p. 1-4.

Measurement of ultrasonic reflection by reflectograms and hardness tests on austenitic forged, rolled and cast CrNi steel (18-25% Cr, 8.5-21.3% Ni, 0.1-0.49% C). Ultrasonic penetration depth as influenced by microstructure precipitations, carbon content and mode of shaping. (Q8g, 1-74; SS, 4-51, 5)

492-Q. (German.) Fatigue Testing of Titanium. Dieter Haffer and Wilhelm Hofmann. Materialprufung, v. 3, Jan. 1961, p. 5-14.

Tensile and fatigue testing of notched and notchless cold drawn (10-40% deformation) 650-800° C. annealed and nonannealed round Ti specimens of varying grain size and tensile strength at temperatures from 20-300° C. Comparison of fatigue strength of Ti and steel. (Q7, Q27, 2-59, 2-61, 2-64; Ti)

493-Q. (German.) Novel Nickel Materials. H. A. Hocking. Radex Rundschau, Dec. 1960, p. 353-364.

Mechanical properties of a novel 9% stainless and case hardenable Ni steel at temperatures down to -190° C.; mechanical properties and heat treatment of a 5% Ni, 2% Al steel with good age hardening and nitriding properties. Properties of gas-turbine materials, high-temperature alloys and vacuum cast alloys on Cr-Ni basis. Review of world production of Ni. (Q-general, J-general; Ni-b, ST, Ni, 17-57)

494-Q. (Russian.) Wear Resistance of Worm Gears. G. I. Kornilov and A. N. Tynnyi. Vestnik Mashinostroeniya, Dec. 1960, p. 26-29.

Wear resistance of Ti-Cu cast iron reducer gears is tested at various contact pressures and sliding rates and compared to that of five steel and cast iron gears. (Q9n, T7; CI)

495-Q. (Russian.) Investigation of Steel--High Tin Aluminum Alloy Bimetal. N. M. Rudnitskii, A. D. Kuritsyna, F. V. Korolev and K. N. Korsunskaya. Vestnik Mashinostroeniya, Dec. 1960, p. 33-37.

Developments in production of antifrictional bimetal sheets having AMS intermediate layers for use in manufacture of ball bearings. Method provides increased adherence between layers, improved galling resistance and high fatigue strength. (Q10c, Q7a, T7d; Al-b, ST, 7-59, 17-57)

496-Q. (French.) Developments and Applications of Stainless Steels. L. Guitton. Metallurgie et la Construction Mecanique, v. 92, Nov. 1960, p. 881-898.

Stainless steel with 17% Cr and 18-10 steels with 7-12% Ni are mechanically tested, deep drawn, descaled in a solution containing nitric acid, hydrofluoric acid and sodium fluoride and corrosion tested in oxalic acid and NaCl. Tensile strength, elastic limit, elongation, deep drawing properties, modulus of elasticity, structure, electrolytic potential. (Q-general, R6; SS)

497-Q. (French.) Special Steels Containing Cobalt. Metallurgie et la Construction Mecanique, v. 92, Nov. 1960, p. 901-912.

Low-alloy steels are subjected to austenitization heating for 2 hr., air cooled and mechanically tested. Tensile strength, elastic limit, hardness, fracture and heat resistance as functions of the Co content. Use of Co in superalloys, permanent magnet materials, high-speed toolsteels, hard materials and low thermal expansion, elasticity and electrical resistor materials. (Q-general, 2-60; AY, Co)

498-Q. (French.) Use of Stainless Steels in Architecture and Civil Engineering. H. Waisblat. Metallurgie et la Construction Mecanique, v. 92, Nov. 1960, p. 961-969.

Density, thermal expansion, elastic limit, tensile strength, elongation and Young's modulus of steels containing 16-19% Cr, 0-13% Ni and 0-2.5% Mo. Corrosion resistance in air. Electrode potential in very diluted acids. (Q-general, R3; SS)

499-Q. Materials--Metallic and Non-Metallic. N. J. L. Megson. Royal Aeronautical Society, Journal, v. 65, Feb. 1961, p. 83-85.

Paper presented at Supersonic Transport Aircraft discussion in Dec. 1960. Mechanical properties, potential applications and means for improving or modifying Al alloys, steels, Ti alloys, transparencies, radomes and elastomers for high temperature use. (Q-general, T24; Al-b, ST, Ti-b, EG-j, 17-57)

500-Q. The Principles and Practice of Torque Loading. J. M. Sharman. Production Engineer, v. 40, Feb. 1961, p. 139-154.

Improving fatigue life of steel and light alloy bolts through tensioning with torque wrenches. 4 ref. (Q7b, T7f; ST, 17-57)

501-Q. (French.) General Tendencies in the Development of Steel and Special Alloys in the Tube Industry. Jacques Dedieu. Societe des Engenieurs Civil de France, v. 113, Dec. 1960, p. 17-30.

Special heat, stress and corrosion resistance requirements placed on tubes in the petroleum, aeronautical, mechanical, nuclear and other industries concerned with problems of fluid materials. Evaluation of carbon and special steel and Ni and Zr alloys developed for these demands. (Q-general, R-general, 2-61; ST, Ni-b, Zr-b, 4-61, 17-57)

502-Q. (French.) Copper-Aluminum Alloys--Their Characteristics and Properties With Respect to Application in the Petroleum Industry. P. Weill-Couly. Association Francaise des Techniciens du Petrole, Bulletin, Nov. 30, 1960, p. 1041-1064.

Copper alloys containing 4-12% Al and 4-5% of Mn, Fe and Ni are evaluated in terms of corrosion and cavitation resistance, influence of temperature on mechanical properties and weldability. Application as containers for corrosive liquids. (Q-general, K9s, R-general, T29n; Cu-b, Al, Mn, Fe, Ni, 17-57)

503-Q. (French.) Reversion, Cause for a Transitory Weakening of Some Aluminum Alloys Under the Effect of Heat. J. Calvet and H. Martinod. Recherche Aeronautique, Nov-Dec. 1960, p. 27-34.

Conditions under which the reversion of structural strength occurs. Effects of reversion on the Brinell hardness of AU4G, AU4G1, AU4SG, AZ5GU (French), AZ5GU (English) and AU2GN alloys under short-time heating to 250° C. Mechanical properties of the alloys at the state of reversion. 21 ref. (Q-general, Q3, Q29n, 2-62; Al-b)

504-Q. (German.) Investigation of Roll Wear With Particular Reference to Drag Rolling in Finish Rolling of Hot Strip. Hans Altmeyer, Herbert Sedlaczek and Fritz Fischer. Stahl und Eisen, v. 81, Feb. 2, 1961, p. 184-194.

Measurement of wear on chill cast and nodular cast iron rolls by a surface feeler with automatic recording during finish rolling of unkilled unalloyed mild openhearth and basic Bessemer steels and of Cr-alloyed razor blade steel. (Q9, W23k; CI, 17-57)

505-Q. Ductile Iron in Steel Mills. C. R. Isleib. Iron and Steel Engineer, v. 38, Feb. 1961, p. 83-90.

Wear, corrosion, creep and impact resistance, castability, weldability, tensile properties and microstructure of ductile cast iron. Applications in metal-working rolls, gears, furnace doors, coke cars, crankshafts and blast furnaces. (Q-general, R-general, K9s; CI-r, 17-57)

506-Q. Effect of Tin on the Mechanical Properties of Pearlitic Nodular Iron. J. C. Prytherch and G. N. J. Gilbert. Foundry, v. 110, Feb. 16, 1961, p. 197-206.

Use of Sn in pearlitic nodular cast iron to suppress the formation of free ferrite without introducing massive cementite. Hardness, proof stress at ductile-to-brittle transition temperature and impact toughness of the irons at all Si levels as affected by Sn. 7 ref. (Q-general, E25q, 2-60; CI-r, Sn)

507-Q. Superalloy Forgings. H. J. Henning and F. W. Boulger. Defense Metals Information Center, Battelle Memorial Institute, DMIC Memo. 86, Feb. 10, 1961,

44 p. (Available as PB 161236 from U. S. Office of Technical Services, Washington 25, D. C.)

Tensile and stress-rupture-properties of disks composed of Waspaloy, U-500, Rene 41; Astroloy and V-57 as dependent on melting practice, heat treatment, alloy composition and forging practice. 19 ref. (Q27, Q3m, 2-60, 2-64; SGA-h, 4-51)

508-Q. Iron in Aluminum-Magnesium-Silicon Alloys. M. Paganelli and F. Sacchi. Metal Industry, v. 98, Feb. 10, 1961, p. 109-110, 112.

Microstructure, mechanical properties and corrosion resistance of Al-0.65 Mg-0.4 Si alloy as affected by Fe content. (Q-general, M27, R-general, 2-60; Al-b, Fe, Mg, Si)

509-Q. Wear Resistance of High Phosphorus Cast Iron Brake Shoes. Minonu Nakai, Seizo Saito and Kunio O. Kabayashi. Imono (Japan Foundrymen's Society, Journal), v. 32, Nov. 1960, p. 765-772.

Laboratory and car wheel tests on brake shoes composed of cast iron containing 0.7-1% phosphorous and with Brinell hardness of 250. Wear resistance is determined to be a function of hardness and phosphorous content. 3 ref. (Q9n, Q29n, T23s, 2-60; CI, P, 17-52, 17-57)

510-Q. Mechanical Properties of Centrifugally Cast Alloy of Complicated Form. Mitsuo Ochiai. Imono (Japan Foundrymen's Society, Journal), v. 32, Nov. 1960, p. 789-793.

Mechanical properties of test piece cut from a centrifugally cast rock cylinder are determined in the as-cast condition and after 850° C. annealing for 3 hr. Data are given for tensile strength, elongation impact value and reduction in area as a function of revolving rate and segregation occurring in centrifugal casting process. 9 ref. (Q-general, E14; AY)

511-Q. A Note on Brittle Fracture Initiation in Mild Steel by Prior Compressive Pre-Strain. C. E. Turner. Iron and Steel Institute, Journal, v. 197, Feb. 1961, p. 131-135.

Brittle fractures of a 3 in. wide notched tensile test piece of a relatively notch ductile 1 in. thick plate steel after aging and precompression. Testing is at -63 to 1° C. to determine crystalline appearance, reduction in mid-plate thickness and nominal stress at fracture as a function of temperature. (Q26s, Q27d, 2-63, 3-68; ST)

512-Q. The Hardness of Iron, Low-Carbon Steels and Cast Iron Roll Materials at Various Temperatures. E. R. Petty and Hugh O'Neill. Iron and Steel Institute, Journal, v. 197, Feb. 1961, p. 141-145.

Investigation of blue hardening in low-carbon steels and pure iron at 20-900° C. Comparison with spheroidal graphite iron. Relationships between blue hardening and strain hardening capacity and tensile strength. Softening characteristics of hot roll irons. (Q29, N7e; Fe-b)

513-Q. The Factors Influencing the Fracture Characteristics of High-Strength Steel. C. W. Marshall. Defense Metals Information Center, Battelle Memorial Institute, DMIC Rept. 147, Feb. 6, 1961, 40 p. (Available as PB 151106 from U. S. Office of Technical Services, Washington 25, D. C.)

External and metallurgical factors affecting the ductile-brittle transition of high-strength steel include temperature, stress concentration and notches, strain rate, stress state, specimen size, nature of carbide dispersion and ferrite matrix, retained austenite and nonmetallic inclusions. 30 ref. (Q26r, Q23r; ST, SGB-a)

514-Q. Present Status of Guaranteeing the Quality of Titanium Sponge. Pt. 1. Determination of Brinell Hardness Number. Toshio Noda, Masaki Kitamura, Kameji Shimasaki and Shinichi Nakamura. Union of Japanese Scientist and Engineers, Statistical Application Research, Reports, v. 7, Sept. 1960, p. 30-40.

Determination of the Brinell hardness number of small Ti sponge ingots (20 x 40 x 45 mm.) prepared in an arc melting furnace with argon gas at 30-40 mm. Hg of pressure, then dried at 95-105° C. for one hr. in an electric oven. Discussion of test's reliability in predicting the quality of sponge. 3 ref. (Q29n, C5h; Ti, 6-74)

515-Q. (Italian.) Metallurgical Production: Common and Special Steels. Pt. 4. Classification of Steel. Angelo Bellini. Rivista di Meccanica, v. 11, Dec. 7, 1960, p. 65-69.

Composition of Co, W and Mo high-speed steels; hot working temperatures and application in cutting tools. (To be continued.) (Q23q, 1-66, T6n, 2-60; TS-m, Co, W, Mo, 17-57)

516-Q. (Italian.) Impact Test on Gray Castings. D. Fortino. Fonderia Italiana, v. 9, Nov. 1960, p. 433-445.

Relation between rupture and the chemical, physical and mechanical characteristics of gray iron castings. 4 ref. (Q6, Q-general, P-general, 2-60; CI-n)

517-Q. (French.) Annealing of 70/30 Brass. D. Whitwham, R. Leguet and J. Herenguel. Memoires Scientifiques de la Revue de Metallurgie, v. 57, Nov. 1960, p. 809-828.

Changes in mechanical properties and microstructure of cold rolled 70/30 brass after isothermal annealing as a function of cold rolling reduction and annealing temperature. Recrystallization accompanying various degrees of reduction. 23 ref. (Q-general, M27, N5, 2-64, 3-68; Cu-n)

518-Q. (Japanese.) Influences of Defects in Steel Castings on Safe Operation. Tsuguyoshi Matsuura. Japan Society of Mechanical Engineers, Journal, v. 63, Dec. 1960, p. 1622-1631.

Mechanical strength of high-tensile steel castings as influenced by concentration and type of defects. Gamma-ray nondestructive testing of cast machine parts to determine defects. (Q27, 9, S13e, T7; ST, 5)

519-Q. Ductile Molybdenum. J. A. Belk. New Scientist, v. 9, Jan. 12, 1961, p. 79-81.

Mechanical and thermal properties of Mo. Methods of sintering, arc melting, zone refining, rolling and annealing to improve ductility. (Q23p, Q-general, P11; Mo)

520-Q. (German.) Microhardness Measurements on Age-Hardenable Aluminum Alloys at Room Temperature and at Elevated Temperatures. K. L. Maurer. Radex Rundschau, Dec. 1960, p. 395-399.

Method and apparatus for microhardness measurements during 20-160° C. aging of 530° C. annealed Al-5.18% Cu cylindrical specimens. Study of structure changes in aging. Comparison of hardness-time curves with values for macrohardness. (Q29q, N7a, 2-61; Al-b, Cu)

521-Q. (Russian.) Strength of Butt Joints of EI659 Steel Under Variable Loads. I. I. Markov. Svarochnoe Proizvodstvo, Nov. 1960, p. 8-11.

Numerous weld joints of various shapes and thicknesses are tensile and bend tested under vibration. Effect of reinforcement height on the fatigue strength and sensitivity to concentrated stresses of welded structural joints. 3 ref. (Q27, Q5, Q7a; ST, 7-51)

522-Q. (Russian.) Wear Resistance of Hard Facing Materials. V. G. Kolesov. Svarochnoe Proizvodstvo, Nov. 1960, p. 20-24.

Numerous materials are tested for abrasive wear under impact loading. Methods for determination of wear resistance by weight, volume or linear measurements as applied to various machine parts. Relationship of hardness to the wear resistance of hard facing materials. (Q9, Q29n; SGA-m)

523-Q. A. O. Smith Develops Lighter Truck Frame. Steel, v. 148, Mar. 13, 1961, p. 125.

Development of a modified 1027 steel containing 0.22-0.30% C and 1-1.35% Mn which achieves the hardness of enriched steels upon quenching in a die quench press. Application in manufacture of lighter weight truck components. (Q29n, T21e; ST, 17-57)

524-Q. Here's a Simple Test for Open Face Honeycomb. Steel, v. 148, Mar. 13, 1961, p. 132.

Testing of bonds on brazed, open-faced honeycomb by filling the cells with a light liquid of low surface tension. Unbonded areas fail to hold the liquid. (Q10c; 4-57)

525-Q. Most Magnesium Alloys Can Be Investment Cast. Kenneth Herrick and Harry Matthieson. Precision Metal Molding, v. 19, Mar. 1961, p. 53-55.

Mechanical and physical properties of AZ92A, AZ91C, HK31A and other Mg alloys as they affect investment casting applications at room and elevated temperatures. (Q-general, P-general; Mg-b, 5-62)

526-Q. Heat Treatment of Cast Stainless Steels. W. P. James. Precision Metal Molding, v. 19, Mar. 1961, p. 56-57.

Effect of annealing, hardening and tempering on the tensile strength, yield strength, elongation and reduction in area of AM-355 stainless steel casting alloy. (Q27, Q23, 2-64; SS, 5)

527-Q. (French.) Brinell Hardness of Cast Alloys. Journal d'Information Techniques des Industries de la Fonderie, Jan. 1961, p. 21-24.

Directions for sampling. Effect of sphere diameter on measuring result. Correlation between Brinell hardness and tensile strength. (Q29, Q27; 5)

528-Q. Magnesium as a Tooling Material. Metalworking Production, v. 105, Feb. 8, 1961, p. 65-66.

Advantages of Mg, in contrast to Al or steel, as a tooling plate material in the aircraft industry in terms of superior machinability, wear resistance, minimum deflection and a coefficient of thermal expansion nearly equal to that of the aircraft. (Q-general, G17k, T6; Mg, 17-57)

529-Q. (Croatian.) Improvement of the Mechanical Properties of Nickel Steels by the Addition of Small Amounts of Boron. Dorde Blagojevic. Saopstenja, v. 6, Nov. 1958, p. 79-89.

Effects of boron with Ti on the mechanical properties of Ni-Cr-Mo alloy steel determined by laboratory and steel-mill controlled testing. The strength, toughness and hardenability of treated samples are significantly higher than similar properties in untreated samples. (Q23r, Q27, J5, 2-60; AY, Ni, Cr, Mo, B)

530-Q. (German-French.) Subterraneous Shelters of Light-Metal. K. Guler. Aluminium Suisse, v. 11, Jan. 1961, p. 3-18.

Elastic limit, tensile strength, elongation, Brinell hardness, resilience, bend, alternate bend and fatigue strengths of Anticorodal and Extrudal used in the construction of cylindrical and spherical shelters. Stress distribution in the construction and deformations caused by the weight of tanks and detonations. (Q-general; Al-b, SGB-s)

531-Q. (Japanese.) Cooperative Study of the Mechanical Properties of Copper-Base Alloy Castings. Masataka Sugiyama, Takajiro Aizawa and Shigeo Oya. Imono (Japan Foundrymen's Society, Journal), v. 32, Dec. 1960, p. 903-908.

Study conducted by a subcommittee of the Japan Foundrymen's Society for determining mechanical properties of tensile bars and foundry products cast from Cu-based alloys specified in the Japan Industrial Standards (JIS). Properties are determined for shell and green sand mold castings of yellow brass, high-strength yellow brass, leaded gunmetal and Sn, Al and phosphorus bronzes as a function of pouring temperature, heat treatment, wall thickness, solidification mode and feeding direction and gating system in the casting process. 3 ref. (Q-general, E-general; Cu-b)

532-Q. (Japanese.) Mechanical Properties of Castings of Yellow Brasses. Umewo Honma, Setuzi Kobayashi, Masaaki Oya and Kazanori Kobayasi. Imono (Japan Foundrymen's Society, Journal), v. 32, Dec. 1960, p. 908-915.

Tensile properties of 57-84% Cu yellow-brass specimens taken from "L" sectional and stepped castings, produced by dry sand, green sand and shell mold processes. Lack of mechanical property dependence on casting thickness, location of specimen in the casting and feeding direction is attributed to the alloys being of the skin formation type. (Q27, Q-general, E-general, 2-60; Cu-n)

533-Q. (Japanese.) Mechanical Properties of Castings of High Strength Yellow Brasses. Tatsuichi Fukusako, Yukio Kono and Takeshi Miyata. Imono (Japan Foundrymen's Society, Journal), v. 32, Dec. 1960, p. 915-920.

Tensile properties of various sections of step formed and "L" formed castings of 52-59% Cu. Effect of pouring temperature, cooling rate and casting variables, such as position of risers on mechanical properties and defect occurrence. (Q-general, E25; Cu-n)

534-Q. (Japanese.) Mechanical Properties of Castings of Tin Bronzes. Tatsuichi Fukusako, Takeshi Kondo, Seizi Kurata, Shiyoga Yosida and Narimitsu Koto. Imono (Japan Foundrymen's Society, Journal), v. 32, Dec. 1960, p. 921-933.

Mechanical properties, in particular elongation, of tensile test bars produced from stepped and "L" sectioned castings containing 8.45-10.30% Sn. Influence of

pouring temperature and section of casting from which specimen is taken on properties. (Q-general, Q23p, Q27, E-general; Cu-s, Sn)

535-Q. (Japanese.) Mechanical Properties of Castings of Leaded Gunmetals. Tatsuichi Fukusako, Yasumaso Aizawa, Hiroshi Yamada, Takashi Oya, Nobumitsu Kitajima, Takeshi Kordo, Shegemitsu Koto and Kazunori Kabayashi. Imono (Japan Foundrymen's Society, Journal), v. 32, Dec. 1960, p. 933-939.

Tensile test data for specimens taken from stepped and "L" sectioned castings containing 1.69-5.48% Pb, produced in dry and green sand and shell molds. Effect of casting thickness and heaviness and process variables, such as feeding direction, on tensile strength, elongation and other mechanical properties. (Q-general, Q27, E-general 3-73; Cu-b, Pb)

536-Q. (Japanese.) Mechanical Properties of Castings of Phosphor Bronzes. Shigeru Yoshida, Kazuo Tazaki, Horuo Tanisawa and Kyozi Mizuta. Imono (Japan Foundrymen's Society, Journal), v. 32, Dec. 1960, p. 940-947.

Tensile test bars containing 0.5-0.27% phosphorous are taken from stepped and "L" sectioned castings produced in dry sand, shell and metallic molds. Tensile and fatigue data are determined as a function of section thickness and of process variables. (Q6, Q27, Q-general, E-general, 3-73; Cu-s, P)

537-Q. (Japanese.) Mechanical Properties of Castings of Aluminum Bronzes. Masayashi Awada, Nobuya Iwano, Horuo Tanisawa, Syogo Yosida and Kinya Yamagata. Imono (Japan Foundrymen's Society, Journal), v. 32, Dec. 1960, p. 948-957.

Radiographic examination and tensile testing of specimen bars and of stepped and "L" sectioned castings containing 8-11% Al. Influence of casting variables, such as gating systems and pouring temperatures on structure, mechanical properties and defect occurrence. (Q-general, Q27, M23h, E25; Cu-s, Al)

538-Q. (English.) The Effect of Niobium on Properties of 18 Chromium-12 Nickel Austenitic Stainless Steels. Ryuichi Nakagawa and Yasuo Otoguro. National Research Institute for Metals, Transactions (Japan), v. 2, Feb. 1960, p. 63-68.

X-ray diffraction examination and mechanical testing of specimens containing 0-1.80% Cb and 0.029-0.126% C after aging and solution treatment at 650-1200° C. Data are given for creep rupture and tensile strengths, Charpy impact value, hot hardness, age hardening characteristics, microstructure resulting from grain boundary carbide precipitation and resistance to deformation as a function of Cb and C contents at 20-1100° C. (Q-general, M-general, 2-60, 2-61, 2-64; SS-e, Cb)

539-Q. (English.) Chromium-Base Heat Resisting Alloys. Pt. 2. Effects of Titanium and Aluminum on the High Temperature Properties of 60% Chromium-25% Iron-15% Molybdenum. Tetsutaro Mitsuhashi, Renpei Yoda and Masao Yukushiji. National Research Institute for Metals, Transactions (Japan), v. 2, Feb. 1960, p. 69-73.

Age hardening characteristics, bending creep strength, oxidation resistance, forgeability and microstructure of specimens containing up to 2% Al and Ti and up to 15% Co, are examined at 500-1200° C. as a function of Al and Ti content, Co replacement for Fe and aging and solution treatment time and temperature at 800-1300° C. (Q-general, F22, 17-52, M-general, N7a, 2-60, 2-62, 2-64; Cr-b, Mo, Fe, SGA-h)

540-Q. (English.) Nickel-Base Heat Resisting Alloys. Pt. 1. Effect of Aluminum and Titanium on the Forgeability and Age Hardening Characteristics of Nimonic 100 Type Alloys. Renpei Yoda, Heitano Yoshida and Sennosuke Takahachi. National Research Institute for Metals, Transactions (Japan), v. 2, Feb. 1960, p. 74-83.

Hot working and forging tests and metallographic analysis of vacuum cast specimen after aging, solution treatment and water quenching at 900-1150° C. Data are given for Vickers hardness, high temperature strength, deformation and oxidation resistance, microstructure and phase transformations. 9 ref. (Q-general, F22, 17-52, M-general, N7a, 2-60, 2-64; Ni-b, SGA-h)

541-Q. (English.) Hot Workability of Pure Chromium. Susumu Yoshida, Yukio Ohba and Norio Nagata. National Research Institute for Metals, Transactions (Japan), v. 2, Feb. 1960, p. 89-95.

Impact compression testing at 800-1300° C. of high purity specimens prepared by electrolysis from chromic

acid solutions and by the aluminathermic process. Resistance to deformation is temperature dependent as a function of grain boundary dissolution of nitrogen atoms in the grains. 10 ref. (Q23q, Q6, 2-60, 2-62; Cr-a)

542-Q. The Present State of Ship Plate Specification. A. F. Mohri. Canadian Mining and Metallurgical Bulletin, v. 54, Feb. 1961, p. 157-162.

Review of chemical composition specifications and Charpy impact tests for ship plate. Effect of chemical composition, steelmaking practice, metallurgical factors and fabricating practices on the impact properties and transition temperature range of steels. 15 ref. (Q6, Q23r, 2-60, T22; ST, 4-57)

543-Q. B-70 Spurs Wider Use of Sandwich Design. Randolph Hawthorne. Space/Aeronautics, v. 35, Mar. 1961, p. 46-49.

Discussion of trends in sandwich materials, types of sandwich construction and applications for sandwich design. Facing stress, core shear and maximum temperature of some brazed Al, superalloy and stainless steel sandwich panels. Typical physical properties such as strength, thermal conductivity, dielectric constant and heat distortion temperature of foamed-in-place plastics. (Q-general, P-general; Al, SS, SGA-h, 4-57)

544-Q. Materials for Low Temperature Use. O. A. Hansen. Paper from "Short Course on Process Industry Corrosion, Proceedings". National Assoc. of Corrosion Engineers, Houston 2 Tex., 1960, p. 273-286.

Establishment of the ductile-brittle temperature range of alloy steels, cast iron, Cu and Ni alloys, stainless steel, Al alloys and plastics. Evaluation as to suitability for cryogenic application. 8 ref. (Q23r, 2-63, T29; Al-b, AY, CI, Cu-b, Ni-b, SS, NM-d30)

545-Q. (German.) Mechanical Properties of Uranium. G. J. Sergeev, V. V. Titova, E. M. Savickij, A. A. Zulkova and Z. P. Nikolaeva. Kernenergie, v. 2, Oct-Nov. 1960, p. 935-939.

Mechanical testing of uranium containing 0.05-0.24% C at room and elevated temperatures (up to 850° C.) under Ar protective atmosphere. Mechanical properties as influenced by temperature, carbon content and crystal modification (alpha, beta and gamma phase). (Q-general, 2-60, 2-61; U)

546-Q. (German.) Investigation of Increase of Internal Friction With Temperature Changes in Polycrystalline Uranium Specimens. J. N. Sokurskij and J. V. Bobkov. Kernenergie, v. 3, Oct-Nov. 1960, p. 1067-1071.

Change of internal friction with temperature (20-290° C.) is measured in terms of damping of torsion oscillations of specimens, which are quenched from the gamma phase and annealed and recrystallized in the alpha and gamma field. (Q22, 2-61; U)

547-Q. (French.) A New Structure Hardening Nitralloy Steel. W. S. Mounce and A. J. Miller. Revue du Nickel, v. 26, Nov-Dec. 1960, p. 163-166.

Hardness depth and aging behavior of steel samples containing 0.20-0.25% C, 0.25-0.45% Mn, 4.75-5.25% Ni, 0.40-0.60% Cr, 0.20-0.30% Mo, 1.80-2.20% Al and 0.08-0.15% V after end quenching, tempering and artificial aging or nitriding by various methods. Tensile strength, elastic limit and ductility measured at 20-600° C. after normalization at 950° C. and artificial aging at 565° C. for 4 hr. (Q29, Q27, Q23p, 2-65; AY-b)

548-Q. Plastic Flowing; Studies of Yield-Delay Time for Various Materials. J. M. Krafft and A. M. Sullivan. Report of NRL (Naval Research Laboratory) Progress, Feb. 1961, p. 27-28.

Grain size and composition effects on yield strength and yield point mechanisms in mild steel specimens are examined in uniaxial compression by impact and explosive tests at room temperature. Dynamic stress-strain curves are obtained with data for upper yield and plastic flow stresses. (Q23b, Q24b, Q28h, 2-59, 2-60; CN)

549-Q. Metals and Alloys at Elevated Temperatures. G. J. Danek, H. H. Smith and M. R. Achter. Report of NRL (Naval Research Laboratory) Progress, Feb. 1961, p. 29-31. (Available as PB171315 from U. S. Office of Technical Services, Washington 25, D. C.)

High temperature optical strain measurement of metal specimens in reverse

cyclic bending using oscillating mirrors to reflect streaks of light corresponding to the curvature and surface strain. Comparison of results with strain gage measurements on stainless steel, Inconel X and Ni at 68-1500° F. Application to study of high temperature metal fatigue. (Q24h, Q25, Q7j, 1-54, 2-62; SS, Ni-b)

550-Q. Basic Studies of the Metallic State (The Effect of Hydrogen Absorption and Desorption on the Ultrasonic Velocities and Hardness of Palladium). A. I. Schindler and E. W. Kammer. Report of NRL (Naval Research Laboratory) Progress, Feb. 1961, p. 32-33. (Available as PB171315 from U. S. Office of Technical Services, Washington 25, D. C.)

Measurements of the longitudinal velocity at 5 mc., the transverse velocity at 2.5 mc. and the Vickers pyramidal hardness at room temperature on polycrystalline specimens at 99.99% Pd in the as-cast, hydrogen-charged, hydrogen-desorbed and fully annealed conditions. Relation of Debye temperature to acoustic velocities and determination of both by electrical resistivity measurement as a function of lattice expansion. (Q29n, Q26s, P12r, 1-54, 1-74, 2-60; Pd, H)

551-Q. Irradiation of Some Pressure-Vessel Steels. L. P. Trudeau. Paper from "Materials in Nuclear Application". STP no. 276, American Society for Testing Materials, Philadelphia, Pa., 1960, p. 102-115.

Effect of neutron irradiation on tensile and impact properties of high strength A 201, A 203, A 302, A 353, HY-80, T-1, 1146 and Ni-Zr steels and Smithweld 91 weld metal. 4 ref. (Q27, Q6, 2-67, T26q; ST, 17-57)

552-Q. Neutron Radiation Embrittlement at 500 and 650° F. of Reactor Pressure Vessel Steels. J. V. Alger and L. M. Skupien. Paper from "Materials in Nuclear Application". STP no. 276, American Society for Testing Materials, Philadelphia, Pa., 1960, p. 116-135.

Effect of neutron radiation on impact and tensile properties of ASTM A 302 grade B, SA-36 and HY-65 high-strength pressure vessel steel and weld metal. Effect of heat treatment condition. 6 ref. (Q27, Q6, 2-67, T26q; ST, 17-57)

553-Q. Radiation Effects in Steel. Lew F. Porter. Paper from "Materials in Nuclear Application". STP no. 276, American Society for Testing Materials, Philadelphia, Pa., 1960, p. 147-195.

Theoretical interpretation of changes occurring during irradiation. Existing information on the effect of neutron irradiation on the mechanical properties of carbon, alloy and stainless steels. Effect of composition and structural variables on extent of radiation damage. Influence of radiation on recrystallization and phase changes. 82 ref. (Q-general, N5, 2-67; AY, CN, SS)

554-Q. Interpretive Report on Operating Conditions for Nuclear Pressure Vessels. K. F. Smith. Welding Research Council, Bulletin Series no. 66, Jan. 1961, 12 p.

Summary of nuclear pressure vessel operating parameters. Effect of slow and fast irradiation at 175-600° F. on tensile strength, yield strength, area reduction, impact strength and uniform elongation of fabricating materials including 304, 304L and 347 stainless steel, A212, A302B steels, Zircaloy-2 and Inconel. 30 ref. (Q-general, 2-67, T26q; Ni-b, SS, Zr-b, 17-57)

555-Q. How to Find Thermal Stresses in Two-Ply Cylinders. George T. Ladd and D. M. Pearce. Product Engineering, Design Work Sheets, 14th Series, 1961, p. 37-38.

Curves for finding thermal stresses--radial tensile strength and axial shear stress--at bond of cylinders of alloy steel and Al firmly bonded together. (Q25p; Al, AY, 4-60)

556-Q. Best Spring Material for High Temperature. V. A. Stanton. Product Engineering, Design Work Sheets, 14th Series, 1961, p. 110-113.

Comparison of high-temperature stability of ferritic alloys, ferritic austenitic stainless steels, austenitic stainless steels, Ni-base alloys, Ni-Cr-Co alloys and Co-base materials. Selection of spring metals. (Q-general, 2-62; Co-b, Ni-b, SS)

557-Q. How to Get Stronger Parts From Work-Hardened Sheetmetal. Herbert A. Jahnle. Product Engineering, Design Work Sheets, 14th Series, 1961, p. 134-136.

Effect of cold working on mechanical properties of cold worked metals at elevated temperatures. Design of welded joints in cold rolled sheet metal. (Q-general, 3-68; 4-53)

558-Q. Furnace Requirements for the Mechanical Testing of Materials at Elevated Temperatures. J. A. Dunsby. National Aeronautical Establishment Structures Laboratory, Report no. MS-103, National Research Laboratories, Ottawa, Canada, Nov. 1960, 17 p.

Review of the sensitivity to temperature change of the results of tensile, creep, stress rupture and fatigue tests on typical engineering metals such as 24S T3 Al alloy, Ti-4Al-4Mn Ti alloy, AM-350 stainless steel, D-979 Fe-Ni alloy, S816 Cr-Ni-Co alloy, recrystallized Mo and wrought sintered W. Examination of the temperature tolerances specified by existing standard codes for elevated temperature testing. Temperature control requirements of BS1 and ASTM standards. 22 ref. (Q-general, 1-54, 2-62; Al-b, Mo, Ni-b, SS, Ti-b, W)

559-Q. Effect of Strain Rate and Temperature on the True Stress-True Strain Properties of Commercially Pure Titanium. Thomas S. Desistro and David E. Driscoll. Paper from "High Speed Testing", v. 1. Interscience Publishers, Inc., New York, 1960, p. 97-105.

Measurement of specimens in tension at -319 to 800° F. and strain rates of 0.001-40 min.$^{-1}$. Maximum load strain decreases with increasing strain rate and increases with decreasing temperature. 7 ref. (Q25n, Q27, 2-61, 3-68; Ti-a)

560-Q. Studies of Metals at Ballistic Rates of Loading. J. O'Brien and R. S. Davis. Paper from "High Speed Testing", v. 1. Interscience Publishers, Inc., New York, 1960, 107-112.

Procedure for determining the quantitative effects of the tensile fracture of metals, produced when a compression pulse is reflected as a tension pulse from a free surface, i.e., scabbing phenomenon, using specimens of high-purity Al and Al alloys. A stress for fracture of approximately 240,000 psi. is obtained through measurement of stress distribution within a tension pulse resulting from pressure, of energy and rate of crack propagation. 3 ref. (Q6a, Q26r, 3-66; Al-b)

561-Q. (Russian.) Method of Plane Face Grooves, Filled With Lubricant, for Determination of Deformation Resistance. I. M. Pavlov and E. V. Ushakov. Zavodskaya Laboratoriya, Dec. 1960, p. 1403-1404.

Determination of deformation resistance of Al alloy samples of cylindrical shape and of various thickness with paraffin used as lubricant; uniform distribution of deformation in a sample. (Q24, 1-54; Al-b)

562-Q. (Croatian.) Influence of Nickel on the Mechanical Properties of Chromium-Molybdenum Steel During Long Time Testing at High Temperatures. Caslav Vuckovic. Saopstenja, v. 7, June 1959, p. 32-36.

High temperature testing (2900-3900° C.) of Cr-Mo steel castings to determine the effect of Ni on mechanical properties and on the amount and distribution of precipitating elements from base mass and carbides. Supporting data indicate the most suitable effects are obtained with 0.2-1% Ni content. 5 ref. (Q-general, N7b, 2-60, 2-62; ST, Cr, Mo, 5)

563-Q. (Japanese.) Effect of Plastic Deformation on Ultrasonic Attenuation in Metals. Akira Hikata. Government Mechanical Laboratory (Japan), Report no. 39, Oct. 1960, 94 p.

Stress-strain relations in Al, Cu, Al alloys and steel are determined by fatigue and creep testing at various temperatures, stresses, frequencies and strain rates. Attenuation and its recovery mechanisms are analyzed by the Granato-Luecke's dislocation theory. (Q25n, Q3, Q22; Al-b, Cu, ST)

564-Q. (Polish.) Effect of Nickel on the Fatigue Strength of Structural Steels. S. Przegalinski, R. Bak and J. Wojnarowski. Prace Instytutow Hutniczych, v. 12, May 1960, p. 219-222.

Heat treated notched and unnotched Cr-Ni steel samples (up to 2.5% Ni) are subjected to rotary-bend and tensile-compression tests. No significant effect of Ni on fatigue strength is noted. 6 ref. (Q7a, Q5, Q27, 2-60; ST, SGB-s)

565-Q. Microstructures and Notes on Manganese-Nickel-Chromium-Molybdenum Steel Heat Treated to B.S. 3100:1957:1458 and 1459. J. Turton and B.H.C. Waters. British Foundryman, v. 56, Feb. 1961, p. 60-66.

Effects of annealing, hardening and tempering on microstructure, tensile

properties, Izod properties and hardness of Mn-Ni-Cr-Mo low alloy steel. (Q27, Q29n, Q6, M27, 2-64; AY)

566-Q. The Properties of Some Metals and Alloys at Low Temperatures. R. E. Lismer. Institute of Metals, Journal, v. 89, Jan. 1961, p. 145-161.

Plain and notched tensile, Charpy V-notched impact and Navy tear tests at -196 to 60° C. on plate specimens to determine temperature effects on toughness and fracture characteristics. Specimens include Cu and Cu alloys (arsenical Cu, 60-40 brass, 90-10, 80-20 and 70-30 cupronickel, Kunifer 5 and 20 and Superton 40, a Mn-Al bronze; Ni alloys (Monel and Inconel); austenitic stainless steels (Ti-stabilized 18% Cr, 8% Ni with and without 3% Mo) and low carbon Ni steels (2 1/4-9% Ni). Mechanical properties are observed to improve with heat treatment. (Q-general, 2-63; Cu-b, Ni-b, AY, SS-e)

567-Q. The Effect of Persistent Slip Bands on the Fatigue of Copper. A. H. Meleka, W. Barr and A. A. Baker. Institute of Metals, Journal, v. 89, Jan. 1961, p. 176.

Effect of incomplete removal of the fatigue damaged surface layer on the reduction of fatigue life in specimens is examined microscopically with the decrease in fatigue strength of electropolished OFHC Cu specimens being attributed to persistent slip band and "electrogroove" formation leading to microcrack initiation in the deformation area. 3 ref. (Q7, Q24c, L13p, 3-68; Cu-a)

568-Q. The Effect of Low-Temperature Annealing on the Indentation Hardness of Cold Worked Alpha-Brass. C. Baird and P. H. Jennings. Institute of Metals, Journal, v. 89, Feb. 1961, p. 191-192.

Examination of two alternative hypothesis, strain hardening and relief of internal stress, for explaining hardening phenomena observed in heavily cold worked specimens after low temperature annealing. Experiments on cold rolled 70-30 brass, stress relieved by annealing at 105-235° C., by plastic extension and by a combination of both, support the view that the hardening is due to stress relief. (Q29, J29a, 2-64, 3-68; Cu-n)

569-Q. The Properties of Commercial Al-Zn-Mg Alloys. Practical Implications of Trace Additions of Silver. I. J. Polmear. Institute of Metals, Journal, v. 89, Feb. 1961, p. 193-202.

Effect of 0.3% Ag additions on age-hardening, mechanical properties and structures of Al-Zn-Mg alloy specimens, in particular DTD 683, 7079 and 7178 alloys, is examined after aging, solution and quenching heat treatments and cold working. A fine, evenly dispersed precipitate is observed in the grain boundary region as a function of temperature and Ag influence on nucleation of the phase formed on aging. Data are given for tensile properties, S-N curves, stress-corrosion resistance and Vickers hardness. (Q-general, M27, N-general, 2-60, 2-64; Al-b, Ag)

570-Q. Stress Relaxation in Copper and Alpha-Brasses at Low Temperatures. P. Feltham. Institute of Metals, Journal, v. 89, Feb. 1961, p. 210-214.

Relaxation at 77-291° K. of the applied tensile stress at constant strains of up to 1% is studied in polycrystalline copper (99.99 and 99.999%) and alpha-brasses (10-35% zinc), vacuum-annealed at 800° C. to a grain size of 4.5×10^{-3} cm. Logarithmic equations are derived for maximums in the relaxation curves, as a function of temperature and composition, which are ascribed to local ordering near jogs, resulting in a lowering of their misfit energy and facilitation of dislocation migration. Relaxation results from continuation of glide initiated on yielding and the drag of conservatively moving jogs in edge dislocations is rate-determining. 18 ref. (Q3a, M26b, N-general, 2-63; Cu-b)

571-Q. The Tensile Properties of Some Polycrystalline Magnesium Alloys at Low Temperatures. W. J. McG. Tegart. Institute of Metals, Journal, v. 89, Feb. 1961, p. 215-218.

Polycrystalline binary solid-solution alloys of Mg with Ag, Cd and In are tested in tension at -196 to 200° C. While the alloys exhibit plastic properties similar to those of pure Mg, their flow and fracture stresses are higher at all test temperatures. In addition to the size effects of solute and solvent atoms, the valency differences play an important part in the solid solution strengthening of Mg and basal slip is the dominating deformation mechanism. 16 ref. (Q27, Q24, Q25, 2-63; Mg-b)

572-Q. A Simple Test to Predict the Increase in Permanent Set of Springs Under

Repeated Loading. R. S. Loubber. South African Mechanical Engineer, v. 10, Jan. 1961, p. 147-151.

An acceptance overload test of three to four load applications is proposed from data on silico-manganese spring steel blades. (Q7, 1-54; ST, SGA-b)

573-Q. Creep and Stress Relaxation in Alpha-Brass at Low Temperatures. P. Feltham. Philosophical Magazine, v. 6, Feb. 1961, p. 259-270.

Creep of vacuum annealed polycrystalline 65/35 alpha-brass is studied at constant stress in the range 77-300° K., close to the yield point and at elongations not exceeding 3%. Data are correlated with logarithmic stress relaxation. 16 ref. (Q3; Cu-n)

574-Q. Evidence of Subsurface Cross-Slip in Fatigued Copper. A. H. Meleka, W. Barr and A. A. Baker. Philosophical Magazine, v. 6, Feb. 1961, p. 315-316.

Specimens of Cu are fatigued in reverse bending to about half their expected life in order to observe slip bands. Results are used to support the Mott theory of dislocation motion. 6 ref. (Q7, M26b; Cu)

575-Q. (Translation.) Mechanical Properties of Solids at a Temperature of 4.2 K. and Below. O. V. Klyavin. Soviet Physics--Solid State, v. 2, Feb. 1961, p. 1706-1713. (Translation of Fizika Tverdogo Tela, v. 2, Aug. 1960, p. 1681-2006).

Investigation of relatively pure polycrystalline Al, Cu and Ni to determine the effect of preliminary plastic deformation in tension on mechanical properties. Findings indicate that the form of the tension diagram depends on form, amount and temperature of the predeformation of the material. 11 ref. (Q-general, 1-67, 3-68; Al, Cu, Ni)

576-Q. High-Temperature Properties of Rene 41 and Astraloy. Donald P. Moon, James F. Barker and Ward F. Simmons. Metal Engineering Quarterly (American Society for Metals), v. 1, Feb. 1961, p. 3-11.

Effects of heat treatment and prolonged exposure to stress and temperature on the microstructure are reported for two precipitation hardenable high-strength nickel-base alloys, Rene 41 and Astroloy. Microstructural changes are then used as a basis for explaining losses in strength and ductility occurring during long time exposure at elevated temperatures. 6 ref. (Q-general, 2-62; Ni-b)

577-Q. Properties of Gray and Ductile Irons. John F. Wallace. Metals Engineering Quarterly (American Society for Metals), v. 1, Feb. 1961, p. 12-23.

Influence of the different forms of flake graphite in gray iron and spheroidal graphite in ductile iron, together with various matrices in the strength, ductility and stress-strain characteristics of these irons. 29 ref. (Q-general; CI)

578-Q. Failure of Steam-Water Heat Exchangers. B. F. Brown. Metals Engineering Quarterly (American Society for Metals), v. 1, Feb. 1961, p. 68-74.

Gross wastage and embrittlement were observed in plain carbon steel desuperheaters in five new naval power plants. The gross wastage could be duplicated in laboratory bomb tests using sodium hydroxide solutions and was concluded to be caused by free caustic concentrated by high heat flux. The embrittlement is shown to be caused by the flow of corrosion-generated hydrogen which converted the cementite to methane which nucleated voids in the steel. (Q26s, W13b)

579-Q. Fracture-Toughness of Steel for Pressure. Harold Bernstein and George C. Young. Metals Engineering Quarterly (American Society for Metals), v. 1, Feb. 1961, p. 75-89.

Factors influencing notch toughness; comparison of various tests. 5 ref. (Q26, T26q)

580-Q. Brittle Fracture in Welded Structures: A Contemporary View. A. A. Wells. Welding and Metal Fabrication, v. 29, Mar. 1961, p. 89-94.

Effect of stress-relieving on brittle cleavage fracture in welded plates composed of low carbon steel, low and high Ni ferritic alloy steels, austenitic steels and Al alloys. 18 ref. (Q26s, 2-64; Al-b, CN, SS, 4-53, 7-51)

581-Q. Metal Fatigue and Cold Extrusion. Welding and Metal Fabrication, v. 29, Mar. 1961, p. 101.

Review of research on fatigue of mild steel, Cu, Al, 4 1/2% Cu-Al alloy and Zn as affected by static ductility, fretting

and abrasive wear and on cold extrusion of metals to improve surface finish and eliminate machining. (Q7, G5; Al, Cu, CN, Zn)

582-Q. Steels for Reactor Pressure Circuits. Welding and Metal Fabrication, v. 29, Mar. 1961, p. 116-118.

Review of papers from a symposium on fabrication and welding of steel plates to form reactor pressure vessels. Data given for Charpy V-notch impact values, ultimate tensile strength, reduction of area, elongation, yield stress, corrosion resistance and high temperature properties of weldments. (Q-general, T11, T26q; ST, 17-57)

583-Q. Some Factors Affecting the Notch Toughness of Steel Weld Metal. K. E. Dorschu and R. D. Stout. Welding Journal, v. 40, Mar. 1961, p. 97-105.

Welding energy-input, restraint during welding and weld-metal composition are investigated to determine their effects on notch toughness. Using A-201 and 212 steel samples and both submerged-arc and gas-shielded consumable electrode welding processes, it is found that lowering energy input and restraint and adding Ni and Mn will increase notch toughness. 18 ref. (Q23r, K1; ST, 7-51)

584-Q. Use of the Center Notch-Tensile Test to Evaluate Rocket-Chamber Materials. Joseph J. Warga. Welding Journal, v. 40, Mar. 1961, p. 130s-134s.

Tensile testing of Vascojet 1000, Unimach II, 4340, Mellon X-2 and other ultrahigh-strength steels to determine effects of processing variables such as rolling direction, melting practice, heat treatment and welding procedure on mechanical properties. (Q27d, Q-general, T2p; ST, SGB-a)

585-Q. Catastrophic Fracture Caused by Ductile to Brittle Transition Under Residual Stress. W. N. Platte. Welding Journal, v. 40, Mar. 1961, p. 135s-137s.

Controlled testing of the relationship between residual welding stress, catastrophic rupture and transition temperature in b-c-c. metals using arc-cast Mo welds deoxidized with carbon. Cracking due to loss of ductility is prevented if stresses are removed by heat treatment prior to cooling below the ductile-to-brittle transition temperature. 13 ref. (Q23r, Q26s, 2-61, 3-66; Mo, 7-51)

586-Q. Theory of Brittle Crack Initiation and Propagation--A Theoretical Analysis of ESSO Test. Yoshio Akita and Kazuo Ikeda. Welding Journal, v. 40, Mar. 1961, p. 138s-144s.

Information is developed from a dynamic theory on the effects of impact energy, temperature yield stress and plastic surface energy on brittle crack initiation and propagation in steel. Theory is used to interpret the ESSO test which requires an impact on a notch in order to initiate a brittle crack. (Q26; ST)

587-Q. Development of Methods and Instruments for Mechanical Evaluation of Refractory Materials at Very High Temperatures. D. H. Fisher. Battelle Memorial Institute (Wright Air Development Division). U. S. Office of Technical Services, PB 171012, June 1960, 82 p. $2.25.

Mechanical testing system, providing tensile and compressive stress-strain and shear-strength data up to 4000° F. in a vacuum, devised as part of a program to develop equipment and techniques for mechanical-properties measurements of refractory metals. The system evaluated by testing a bar consisting of Mo and 1/2% Ti. Tension, compression, shear and bearing tests are conducted at temperatures up to 3500° F. (Q-general, 1-54; EG-d)

588-Q. The Damping Capacity of Metals. K. M. Entwhistle. Paper from "The Physical Examination of Metals". Edward Arnold Ltd., London, England, 1960, p. 487-558.

Comparison of resonant bar, inertia and mechanical hysteresis loop methods for measuring damping capacity. Theoretical explanation of the origins. Damping capacity measurements as used in flaw detection and other test methods. (Q8g)

589-Q. Measurements of the Elasticity of Metals Using Mechanical Vibrations. G. Bradfield. Paper from "The Physical Examination of Metals". Edward Arnold Ltd., London, England, 1960, p. 559-604.

Fundamentals of elasticity and wave propagation in isotropic solids. Elasticity testing methods, including electrical, resonance and pulse methods. (Q21, 1-54)

590-Q. New Materials for Process Units. Canadian Chemical Processing, v. 45, Feb. 1961, p. 69-76.

Corrosion resistance, oxidation resistance, tensile strength, high temperature resistance and weldability of Ti, Zr, Be, Co, stainless steels, Al alloys, Nucerite, glass, graphite, plastic and brick for use in process equipment. (Q27, K9s, R1h, R-general; Al-b, Be, Co, SS, Ti, Zr)

591-Q. (Japanese.) Structure and Rolling Fatigue of Bearing Steel. Masao Kuroda. Japan Society of Mechanical Engineers, Journal, v. 63, Nov. 1960, p. 1442-1451.

Specimens of bearing steel are tested by rotary testing machines until galling occurs. Data are given for fatigue life as influenced by impurities, composition, segregation, cracks and scars, micro and macrostructures, grain size, mechanical strength and deformation. (Q7; ST, SGA-c)

592-Q. High-Strength Steel: Effect of Varying Composition to a Target Hardenability, and an Experimental Silicon-Rich Boron-Treated Low Alloy Steel. S. V. Arnold. Watertown Arsenal Laboratories. U. S. Office of Technical Services, PB 161007, Oct. 1959, 39 p. $1.

To determine the feasibility of measures for conserving alloys, studies are made of the tensile, notched tensile and impact properties of a number of 0.3% carbon nickel-chromium-molybdenum steels after quenching and tempering at 450° F. In one series nickel content was reduced from 1.74% to 0% while hardenability was maintained approximately constant by increasing Mn from 0.81-1.47%. Nickel content in a second series was reduced from 2.02-0% while hardenability is maintained by increasing Mn from 1.06-1.74%. (Q-general, 2-60; AY, B, Si)

593-Q. Kinetics and Mechanism of Hydrogen Attack of Steel. L. C. Weiner. Corrosion, v. 17, Mar. 1961, p. 137t-143t.

Kinetics of hydrogen attack on a killed steel and high purity Fe-C alloys at temperatures of 800-1200° F. and at hydrogen pressures of 450-950 psi. Quantitative relationship between incubation time of attack and temperature and pressure. Theoretical mechanism of hydrogen attack. 14 ref. (Q26s; Fe-b, ST-c)

594-Q. Recent Advances in Beryllium Metallurgy. S. H. Salles, J. J. Peckett and A. Wolff. Norelco Reporter, v. 8, Jan-Feb. 1961, p. 16-20.

Attempt to reduce the brittleness of Be by alloying with Ni to produce a crystal structure having greater ductility than the hexagonal close packed structure found in Be at room temperature. Effect of impurities on the brittleness of Be. 11 ref. (Q26s, 2-60; Be-b, Ni)

595-Q. Recent Research on Fatigue in Metals. P. G. Forrest. Chartered Mechanical Engineer, v. 8, Mar. 1961, p. 148-157.

Fatigue testing of mild carbon steel, austenitic steel, Cu, Al, Zn, Tufnol, 4% CuAl alloy, 5 1/2% ZnAl alloy, M-252 Ni alloy, S-816 Co alloy, brass and phosphor bronze at high and low temperatures and in various environments. Fretting corrosion, corrosion fatigue, thermal fatigue and crack propagation due to fatigue failure are investigated. 67 ref. (Q7, R-general; Al-b, Co-b, Cu-b, Ni-b, ST)

596-Q. (Russian.) Surface Layer Processes in Steel During Cyclic Deformation in Low-Melting Metals. M. I. Chaevskii. Doklady Academii Nauk SSSR, v. 134, June 1960, p. 1399-1402.

1KH18N9T and 50 steel are deformed at 50 cycles per sec. in molten Sn, Pb-Sn or Pb-Bi baths maintained at 400° C. in air of 20° C. Diffusion process and formation at intermetallic compounds. Fatigue strength as a function of composition of the deformation medium. 14 ref. (Q24g, N12, N7a; ST)

597-Q. Graphic Methods for Calculating Principal Stresses and Equivalent Stresses. Paul Sahmel. Acier-Stahl-Steel, v. 26, Jan. 1961, p. 41-44.

Illustration of graphic methods for determining stresses in rolled steel beams sections with relatively thin webs. (Q25; ST, 4-57)

598-Q. Titanium-5% Aluminum-4% Vanadium Alloy: Effects of Sponge Purity, Aluminum Content and Heat Treatment. L. S. Croan. Watertown Arsenal Laboratories. U. S. Office of Technical Services, PB 151995, Sept. 1959. 42 p. $1.25.

Tests to determine heat treating characteristics should consist of a

solution temperature, high in the alpha-plus-beta range, followed by short-time aging at a temperature that will give the maximum strength. Increased aluminum or interstitial content produces increased strength but lowers the toughness. (Q27, Q23r, 2-60, 2-64; V-b, Al, Ti)

599-Q. (Russian.) Decrease in Strength of Lead-Coated Steel Caused by Adsorbtion. H. F. Koshohov and V. I. Likhtman. Doklady Akademii Nauk SSSR, v. 134, Jan. 1960, p. 81-84.

Tensile testing of steel samples coated with a layer of Pb, Sn, Bi or Cd to determine tensile strength and elasticity as a function of coating composition and thickness. Influence of the amount of C and N in steel on the coating process. (Q27, Q21; ST, Bi, Cd, Pb, Sn, 8)

600-Q. Elevated Temperature Dynamic Moduli of Vanadium, Titanium and V-Ti Alloys. W. H. Hill and B. A. Wilcox. Materials Central (Wright Air Development Division). U. S. Office of Technical Services, PB 171014, May 1960, 16 p. $.50.

Dynamic moduli of calcium-reduced vanadium, high-grade aluminothermic vanadium, iodide titanium and titanium-75 argon alloy determined for temperatures up to 1250° F. The decrease in modulus of vanadium with increasing temperature is fairly small in comparison to iodide titanium and titanium-75 argon. (Q21; Ti-b, V-b)

601-Q. A Study of the Titanium-Liquid Oxygen Pyrophoric Reaction. J. D. Jackson. Battelle Memorial Institute (Wright Air Development Division). U. S. Office of Technical Services, PB 171017, June 1960, 59 p. $1.50.

Determination of the mechanism of the Ti-LOX reaction. Investigations using both an unalloyed Ti and an alloy (6Al-4V) suggests that the primary cause of this reaction is that heat generated by impact produces gaseous oxygen, which is compressed at local sites. A fresh surface exposed by the impact reacts with the high-pressure gaseous oxygen. Propagation is dependent on the amount of heat generated and the rate of heat loss from the affected area. (Q6, R1h; Ti-b)

602-Q. Mechanical Properties of Titanium Alloys as a Function of Heat Treatment and Section Size. C. F. Hickey, Jr. Watertown Arsenal Laboratories. U. S. Office of Technical Services, PB 161799, July 1960, 61 p. $1.75.

Effects of heat treatment, section size, directionality and specimen location on three Ti alloys of Al-V, Al-Mo-V and Mo-Al. (Q-general, 2-64, 3-73; Ti-b)

603-Q. Ultra-Short-Time Creep Rupture. Pt. 2. J. S. Ives, Jr. American Machine and Foundry Co. (Wright Air Development Division). U. S. Office of Technical Services, PB 161983, May 1960, 131 p. $2.75.

Sheet materials used in high speed aircraft and missiles encounter aerodynamic drag friction which causes a rapid increase in the temperature of stressed skin sections. Apparatus is developed to heat samples of these materials to temperatures up to 3000° F. within 200 milliseconds so as to simulate the extreme temperature shocks these materials are subjected to when re-entering the atmosphere. Results for a test program using this apparatus to examine the creep behavior of eight structural sheet materials at four creep rates for each temperature. (Q3)

604-Q. Selected Short-Time Tensile and Creep Data Obtained Under Conditions of Rapid Heating. D. P. Moon and W. F. Simmons. Battelle Memorial Institute (Defense Research and Engineering Division). U. S. Office of Technical Services, PB 151088, June 1960, 88 p. $2.25.

Selected short time elevated-temperature strength data obtained under conditions of rapid heating for 28 alloys in sheet form, including 3 Al alloys, 6 Ti alloys, 2 Al steels, 3 toolsteels and 8 superalloys. (Q3, 2-62; Al, Ti, AY, TS, 4-53)

605-Q. Investigation of Bearing Creep of Two Forged Aluminum Alloys. L. Mordfin, N. Halsey and P. J. Granum. National Bureau of Standards (Bureau of Naval Weapons). U. S. Office of Technical Services, PB 161556, Aug. 1960, 32 p. $1.

Results of creep tests on 14 bearing specimens of 7075 T6 and 2014-T6 forged aluminum alloy at 400° F. (Q3; Al-b)

606-Q. A Mechanical Property Forecaster for Titanium Alloys. C. F. Hickey, Jr., and L. S. Croan. Watertown Arsenal Laboratories. U. S. Office of Technical Services, PB 161018, Sept. 1959, 16 p. $.50.

Economical, time-saving method of forecasting the mechanical properties of heat treated titanium alloy forgings in various upset thicknesses. Method employs controlled simulated cooling in a thin test coupon section of the material. By duplicating the cooling rates of the heavier section of the material in the test coupon, the mechanical properties of the heavier section can be calculated. (Q-general, 1-54; Ti-b)

607-Q. Fracture Testing of High-Strength Sheet Materials Under Conditions Appropriate for Stress Analysis. G. R. Irwin. U. S. Naval Research Laboratory. U. S. Office of Technical Services, PB 161474, July 1960, 48 p. $1.25.

Method for testing the fracture toughness of thin sheet metals, which involves taking the criterion of toughness as a parameter K which characterizes the intensity of the stress field surrounding the crack tip. A fixed load, this intensity grows with crack length; when it can no longer be counteracted by the fracture toughness, crack growth becomes unstable. (Q26q; SGB-a, 4-53)

608-Q. Study of Fatigue Properties of Ultra-High Strength Steel. H. B. Nudelman and J. P. Sheehan. Illinois Institute of Technology (Wright Air Development Division). U. S. Office of Technical Services, PB 171056, Apr. 1960, 57 p. $1.75.

Fatigue strength of a temper-resistant, high-strength steel alloy prepared by two different melting techniques. The first method consisted of induction melting in air using standard deoxidation techniques. The second method involved the application of a special deoxidation practice to induction melting; silicon-free steel was deoxidized with carbon and aluminum to minimize the presence of silicate inclusions. (Q7; ST, SGB-a)

609-Q. Crack Propagation Tests of High-Strength Sheet Materials. Pt. 5. Air-Melted and Consutrode AMS 6434 Steel. C. D. Beachem and J. E. Strawley. U. S. Naval Research Laboratory. U. S. Office of Technical Services, PB 161697, Aug. 1960, 22 p. $.75.

Tests on high-strength sheet material using sheets of four different thicknesses rolled from a conventional heat of low-alloy steel and sheets of two thicknesses from a consumable-electrode vacuum remelt of material from the same conventional heat. (Q26q; AY, SGB-a)

610-Q. The Effect of Neutron Irradiation on the Charpy V and Drop-Weight Test Transition Temperatures of Various Steels and Weld Metals. J. R. Hawthorne and I. E. Steele. U. S. Naval Research Laboratory. U. S. Office of Technical Services, PB 161448, May 1960, 28 p. $.75.

Charpy V-notch and drop-weight specimens used to determine changes in transition temperatures of various steels and weld metals irradiated in different nuclear and thermal environments. Irradiations to integrated fast-neutron flux levels of 5×10^{18} causes shifts in transition temperature of 40-100° F. (Q6, 2-67; ST, 7-51)

611-Q. (German.) Current State of Development of Heat-Resistant Titanium Alloys. Hans Hermann Weigand. Jahrbuch 1959 der WGL, v. 13, Oct. 1959, p. 383-388.

Review of chemical composition, mechanical properties after heat treating, high-temperature strength, stress rupture strength, thermal stability and other properties (elasticity, deformability, machinability and weldability) of following Ti alloys: Ti12Zr4Al, Ti5Al2.5Sn, Ti8Al2Cb1Ta, Ti8Al8Zr1Cb, Ti16V2.5Al, Ti4Al3Mo/V, Ti6Al4V, Ti7Al4Mo and Ti13V10Cr3Al. (Q-general, G17k, K9s; Ti-b)

612-Q. (German.) Steels for High-Speed Aircraft. Rudolf Oppenheim. Jahrbuch 1959 der WGL, v. 13, Oct. 1959, p. 376-383.

Review of workability, mechanical properties, machinability and weldability of following steels for supersonic aircraft low-alloy structural steel, heat treatable 12% Cr steel, high-temperature toolsteel, cold rolled stainless steel, age hardenable stainless steel, age hardenable austenitic steel and Ni based alloys. (Q-general, G17k, K9s, T24; ST)

613-Q. A Study of the Strain-Hardening and Cumulative Damage Behavior of 2024-T4 Aluminum Alloy in the Low-Cycle Fatigue Range. R. D'Amato. Massachusetts Institute of Technology (Wright Air Development Division). U. S. Office of Technical Services, PB 161905, Apr. 1960, 108 p. $2.50.

Tests on tapered round specimens of 2024-T4 aluminum alloy under axial loading show that the amount of strain-hardening or strain-softening that occurs during cyclic straining depends upon the rate of straining. Cycling tests are carried out between limits of local strain based upon the change of diameter at the minimum section or the strain across the specimen depending upon the length of the tapered portion. (Q7, N7e; Al-b)

614-Q. (German.) Development of High-Temperature Resistant Metallic Material. Albert von der Steinen. Jahrbuch 1959 der WGL, v. 13, Oct. 1959, p. 370-376.

Mechanical properties at elevated temperature with particular emphasis on stress rupture strength and chemical composition of heat treatable Cr steel, austenitic CrMn steel and CrNi steel, Co and Ni alloys and alloys of the high melting metals W, Re, Ta, Mo, Cb and Cr. Vacuum melting of Ti and Al alloyed Ni alloys. Temperature limits in application of Fe, Ni and Co alloys. (Q-general; SGA-h)

615-Q. Statistical Summary of Mechanical Property Data for Titanium Alloys. Defense Metals Information Center, Battelle Memorial Institute, DMIC Memo. 87, Feb. 14, 1961, 23 p. (Available as PB 161237 from U. S. Office of Technical Services, Washington 25, D. C.)

Review in a series of histograms and charts of the mechanical properties of several alpha and alpha beta Ti alloys. Room temperature properties and variation of properties with temperature. (Q-general, 2-61; Ti-b)

616-Q. Pressure Vessels for Space, Aerospace and Hydrospace - A Symposium. Pt. 1. Evaluating Fracture Toughness. W. S. Pellini and J. E. Srawley. Journal of Metals, v. 13, Mar. 1961, p. 195-199.

Evaluations by explosion bulge testing are made on pressure vessel steel plates to determine fracture toughness, tensile stress and stress concentration, fracture path and transition temperatures. The features of the test transition series are correlated to Charpy V transition curves. (Q26, Q27, T26q; ST, 4-53)

617-Q. Pressure Vessels for Space, Aerospace and Hydrospace - A Symposium. Pt. 2. Materials for Space Pressure Vessels. V. W. Cooke and R. C. Powell. Journal of Metals, v. 13, Mar. 1961, p. 198-201.

Comparison of steels, Al alloys and Ti alloys as to strength-weight ratio, ductility, fracture toughness, fabricability, corrosion resistance and stability in pressure vessel applications. (Q27, Q23p, Q26r, T26q; Al-b, ST, Ti-b, 17-57)

618-Q. Pressure Vessels for Space, Aerospace and Hydrospace - A Symposium. Pt. 3. Structural Significance of Ductility. George Gerad. Journal of Metals, v. 13, Mar. 1961, p. 201-203.

A ductility ratio is determined for Ti alloys by evaluating ductility in the presence of stress concentrations. Data are given for relationship between the strength-to-weight and ductility ratios and the influence of geometry upon fracture strains. Elastic stress concentration factors are plotted against plastic concentration factors. (Q23p, T26q; Ti-b, 17-57)

619-Q. Pressure Vessels for Space, Aerospace and Hydrospace - A Symposium. Pt. 4. Titanium Alloys for Hydrospace Vehicles. George Sorkin and Abner Willner. Journal of Metals, v. 13, Mar. 1961, p. 204-205.

Tension, compression, impact and grain size evaluations using standard ASTM procedures were employed for drop weight and explosion crack starter testing of Ti alloy plates. Data are given for loading rate sensitivity, compressive-tensile yield strength ratio, ductile to brittle transition behavior, energy absorption and mechanical properties. (Q-general, T26q; Ti-b)

620-Q. Uranium in Steel. S. L. Gertsman. Machine Production, v. 20, Mar. 1961, p. 21-23.

Addition of uranium to 1010 and 1040 carbon steels as it affects pitting, corrosion resistance, fatigue strength and stress-rupture life at high temperatures. (Q7a, Q3m, R-general, 2-60; CN, U)

621-Q. Intercrystalline Cracking and Creep Rupture Life. H. H. Bleakney. Materials Research & Standards, v. 1, Mar. 1961, p. 181-183.

Effect of impurities, precipitation, grain growth and atmosphere on the creep rupture life of Al, Sn-Cd alloy, C-Mo steel and heat resisting steels and alloys. 9 ref. (Q3, 3-71; Al, Cd-b, ST, SGA-h)

622-Q. Apparatus for Hardness Testing at Low Temperatures. L. L. France, R. T. Gegley and H. Kohute. Materials Research & Standards, v. 1, Mar. 1961, p. 192-194.

Hardness testing of recrystallized electron-beam melted Cb at -196 to 20° C. in a test chamber cooled with liquid nitrogen. The temperature dependence of the diamond pyramid hardness number is shown to be almost identical to that of the various flow stress criteria. 11 ref. (Q29; Cb)

623-Q. Creep in Pressurized Cylindrical Shells. Ivan Rattinger and Joseph Padlog. Aerospace Engineering, v. 20, Mar. 1961, p. 26, 97-108.

Theoretical analysis of creep deformation and time to failure in pressurized propellant tanks under biaxial and uniaxial loading. Derivation of equations to determine various creep properties and time to rupture. Comparison of theoretical time to rupture values with those resulting from tests on various steel specimens. 15 ref. (Q3, T26q; ST)

624-Q. (Russian.) The Mechanism of Continued Destruction of Metals Under Load. B. Ya. Rineo and A. F. Sirenko. Doklady Akademii Nauk SSSR, v. 134, May 1960, p. 1061-1064.

The diffusion hypothesis concerning crack propagation in metals is tested by static tensile loading of annealed, 20% and 50% cold worked Cu-ceramic specimens and electroplated Cu at 600-1040° C. Logarithmic isothermal plots of the ratio of nonequilibrium to equilibrium autodiffusion coefficients versus time show order of magnitude and slope resemblances to known diffusion phenomena. 8 ref. (Q26q, N1, Q27; Cu)

625-Q. (Italian.) The Effect of Overstressing in Fatigue Tests Carried Out With Decreasing Loads. Ugo Rossetti and Graziano Luboz. Ingegneria Meccanica, v. 11, Dec. 1960, p. 49-55.

NCM2 Cr-Ni steel is heated up to 850° C. in a salt bath, cooled to 200° C. in another salt bath and held at this temperature for 5 min., air cooled and salt bath annealed at 600° C. for 1 hr. Evaluation of fatigue tests. 12 ref. (Q7, 3-66, J-general; SS)

626-Q. Reports on Fatigue Failures. British Welding Journal, v. 8, Mar. 1961, p. 1s-16s.

Study of fatigue failure of weldments in steel structure such as trailer axles, the plating bulkheads and decks of ships, hoists and drive shafts of rolling mill reduction gears exposed to cyclic, static and bend stressing. (Q7, ST, 4-57, 7-51)

627-Q. Effect of Orientation and Temperature on the Modes of Deformation of Uranium. R. O. Teeg and R. E. Ogilvie. Journal of Nuclear Materials, v. 3, Jan. 1961, p. 81-88.

Specimens of alpha uranium are deformed in compression and thermal cycled at -196 to 350° C. with examination by Laue back reflection and establishment of orientation relationship by two-surface analysis. Data are presented for slip, twin and kink band mechanism and deformation planes and directions. 5 ref. (Q24, 2-61, 3-72; U)

628-Q. Graphite Metal Compatibility at Elevated Temperatures. J. C. Bokros. Journal of Nuclear Materials, v. 3, Jan. 1961, p. 89-100.

Austenitic stainless steels, ferritic and Ni-base heat resisting alloys, refractory metals and electroplated alloys are reacted with graphite in a He atmosphere at 704-1010° C. to determine applicability as a cladding material on graphite in nuclear reactor. Data are given for physical and mechanical properties, transformation, carburization reactions and microstructures. 9 ref. (Q-general, N-general, P-general, T11g, 2-62; Fe-b, SS, Ni-b, EG-d37, SGA-h, 8-62, NM-k36, 17-57)

629-Q. Plastic Anisotropy and Fracture in Beryllium. A. P. Green and J. Sawkill. Journal of Nuclear Materials, v. 3, Jan. 1961, p. 101-110.

Relationship between plastic anisotropy and ductility in beryllium between 20 and 400° C. and features of the plastic deformation and fracture of single crystals, including basal slip, bend plane formation and splitting,

crack initiation and propagation. Comparison with basal fracture observed in An and application of Stroh's theory for this type of fracture to Be. 23 ref. (Q23p, Q24, Q26, 2-61, 3-72; Be)

630-Q. Improved Mechanical Properties and Associated Constitutional Changes in Commercially Pure Ingot Beryllium as Affected by Heat Treatment Above 700° C. A. Moore. Journal of Nuclear Materials, v. 3, Jan. 1961, p. 113-114.

Specimens of 99.3-99.7% purity Be containing 0.04-0.4% Fe are solution treated, aged and overaged and annealed at 600-1050° C. Microprobe and X-ray diffraction analysis and mechanical testing methods are used to ascertain influence of Fe impurity and heat treatment on ductility and brittle ductile transition temperature. Hardening mechanism, including grain boundary segregation and precipitation are determined with data for lattice parameters, phase stability and deformation and fracture modes. (Q23p, Q23r, N-general, 2-60, 2-62, 2-64; Be-a)

631-Q. (French.) Some Fundamental Progress on Fatigue. Ch. Massonnet. Revue de Mecanique, v. 6, no. 4, 1960, p. 166-177.

Initiation and propagation of fatigue cracks in high-purity Al is investigated by electron microscopy. Outline of European research programs in this field. 15 ref. (Q26, M21e; Al)

632-Q. (French.) Fatigue and Welding. Henri de Leiris. Revue de Mecanique, v. 6, no. 4, 1960, p. 178-192.

Study of fatigue failures in welded steel structures during service and factors determining their fatigue resistance such as geometric and metallurgical notching and rigidity. Fatigue tests on welded structures. 19 ref. (Q7b; ST, 4-57, 7-51)

633-Q. (French.) Some Practical Endurance Examples and Stability of Various Parts and Assemblies. G. Bourceau. Revue de Mecanique, v. 6, no. 4, 1960, p. 193-208.

Study of cracking and fatigue failure in diesel engine crank shafts and engine mounts in ships. Stress measurements are made by strain gages and fatigue limit determined by rotary bend testing. (Q7, T22)

634-Q. (French.) Influence of Surface Finish on Fatigue Resistance. R. Mossoux and J. Collin. Revue de Mecanique, v. 6, no. 4, 1960, p. 209-210.

Influence of surface grinding, polishing and electropolishing on the descending part of the Wohler curve and the fatigue limit of 65 and 42 steel. (Q7; ST)

635-Q. (French.) Measuring Surface Conditions. E. Bodart. Revue de Mecanique, v. 6, no. 4, 1960, p. 211-222.

Microgeometric surface defects and their effect on fatigue behavior are studied by mechanical and optical surface scanning combined with oblique notching. (Q7, S15, 9-71)

636-Q. Heat Treatment Characteristics of a Cast Aluminum Bronze Alloy. A. Taub and I. Haas. Metal Treating, v. 12, Feb-Mar. 1961, p. 8-11.

Investigation of the effect of heat treatment on the Rockwell hardness value, Izod impact value and microstructure of an Al bronze in its as-cast condition. Analysis of the alloy is 10% Al, 4.5% Fe, 0.7% Sn, 0.5% Zn, 0.2% Pb and balance Cu. (Q29n, Q6, M27, 2-64; Cu-s, Al)

637-Q. Influence of Induced Internal Stresses on the Endurance Limit. Ondrej Puchner. Czechoslovak Heavy Industry, Jan. 1961, p. 4-11.

Effect of local heating either by resistance welder or oxy-acetylene flame on tensile and compressive stress. Relationship to fatigue strength and endurance limit of chords and girders of steel and Al. Calculations for Smith diagrams, Gerber-Weyrauch diagrams and Woehler curves. 20 ref. (Q7a, Q25p; Al-b, ST)

638-Q. Reliability Factors in Steel Usage. H. T. Hallowel. Test Engineering, v. 5, Feb. 1961, p. 8.

Review of design requirements of fatigue strength, tensile strength and elongation for toolsteel, alloy steel and carbon steel. Survey of testing methods including magnetic, ultrasonic, magnaflux, X-ray diffraction, spectrograph and chemical analysis, micro examination, inclusion count, grain size, checks and hardness, fatigue, tensile and stress corrosion testing. (Q-general, S13, 10-54; ST)

639-Q. (Translation-ConBur.) Effect of the Time Factor on the Character of the Composition-Heat Resistance Diagram of Alloys of the Five-Component System Ni-Cr-W-Ti-Al. I. I. Kornilov, L. I. Pryakhina and O. V. Ozhimkiva. Academy of Sciences of the USSR, Proceedings, Chemistry Section, v. 132, May-June 1960, p. 665-668.

Creep tests are used to study the effect of composition and conversion time on the change in heat resistance of Ni-Cr-Ti-Al-W alloy with a variable Al content (0-7.9%) calculated on Ni content. Results indicate that over a 300-400 hr. deformation period, alloys with 5.1% Al are most heat resistant. With increase in time, alloys with lower Al content show higher heat resistance. 9 ref. (Q3, M24d, 2-60, 2-62, 3-68; Ni-b, Al)

640-Q. (Italian.) Steels Containing Nickel Treated at Temperatures Above and Below the Upper Critical Temperatures. G. Mayer. Trattamenti Termici, v. 3, Nov-Dec. 1960, p. 3-18.

Influence of temperature on the mechanical properties of the core of cemented Ni steels with varying Ni content with attention to hardness of cemented layer of steel subjected to martempering. Effect of heat treatment between As_1 and Ac_3 critical points on low-carbon steel with 9% Ni. (Q-general, N-general, 2-60, 2-62, 2-64; ST, Ni)

641-Q. (Russian.) The Increase of Internal Friction in Uranium Through the Process of Its Temperature Change. Yu. N. Sokurski and Yu. V. Bobkos. Atomnaya Energiya, v. 9, Nov. 1960, p. 392-398.

Internal friction in uranium is investigated at -120 to 20° C. disclosing its dependence upon rate of temperature change, initial thermal condition and vibrational frequency and amplitude. 3 ref. (Q22, 2-61; U)

642-Q. (Italian.) State of Stress in Metal Wire. Aldo Nicolardi. Ingegnere, v. 34, Oct. 1960, p. 937-942.

Dependence of state of stress in drawn steel wire upon the drawing processes. Effect of aging, corrosion, preforming and of magnetic induction at high field intensity on the fatigue resistance of wire. 33 ref. (Q25; ST, 4-61)

643-Q. High-Temperature Stability of Tubular Products for Oil Refinery Use. A. B. Wilder, E. F. Ketterer, D. B. Collyer and D. T. Boughner. United States Steel - Engineering Sciences, v. 7, no. 87, 1960, 12 p.

Mechanical testing of stressed and unstressed bar, tubing and pipe of carbon steels and ferritic alloy steels to determine creep-rupture properties, hardness, tensile and impact strength, microstructure and stability at 900-1200° F. (Q-general, 2-62, T29n; AY, CN, 4-60, 17-59)

644-Q. (English.) X-Ray Examination and Weld Strength Factor. Olavi Eiro. Valtion Teknillinen Tutkimuslaitos, no. 110, 1960, p. 3-24.

X-ray and radiographic examination of steel welded with low-hydrogen and acid-coated electrodes to determine effect of porosity, slag inclusions, root defects and residual stress on tensile strength, yield strength and elongation. (Q27a, Q23, S13e, K1; ST, 7-51)

645-Q. The Friction and Contact Resistance of Metals and Alloys in Reciprocating Sliding. Yasukatsu Tamai. ASLE (American Society of Lubrication Engineers) Transactions, v. 3, Apr. 1960, p. 26-29.

Behavior of Au, Ag, Cu, Pt, Al, Sn and various alloys in reciprocating sliding is examined by measuring the coefficient of friction and the electrical contact resistance simultaneously. Data are given for microhardness and scar appearance. 3 ref. (Q9p; Ag, Al, Au, Cu, Pt, Sn)

646-Q. The Influence of Silicon Additions on Friction and Wear of Nickel Alloys at Temperatures to 1000° F. Donald H. Buckley and Robert L. Johnson. ASLE (American Society of Lubrication Engineers) Transactions, v. 3, Apr. 1960, p. 93-100.

Research is conducted on the hypothesis that the primary role of Si in a Ni alloy is to support the formation of a surface film. Friction and wear data are obtained at 75-1000° F. along with pertinent hot hardness, metallurgical and surface film data. 11 ref. (Q9; Ni-b, Si)

647-Q. Sliding Characteristics of Metals at High Temperatures. M. B. Peterson, J. J. Florek and R. E. Lee. ASLE (American Society of Lubrication Engineers) Transactions, v. 3, Apr. 1960, p. 101-109.

Friction tests are run on Fe, Cu, Ni, Mo and Cr specimens sliding against

themselves. Friction and surface damage are found to result until a particular transition temperature is reached. 13 ref. (Q9p; Cr, Cu, Fe, Mo, Ni)

648-Q. (German.) Bead Impact Bending Test for Investigation of Welded Steels. Wilhelm Radeker. Stahl und Eisen, v. 81, Feb. 16, 1961, p. 228-234.

Method and apparatus for impact bending (30°) of 250 mm. long and 50 mm. wide specimens with a circular bead at temperatures from -180 to 200° C. Interpretation of test results in terms of effect of electrode material and welding parameters, specimen thickness and stress relieving heat treatment on the brittle behavior of steels made by different melting and pouring practices. (Q23r, Q5; ST, 7-51)

649-Q. The Effect of Annealing on Fatigue Damage in Gold. J. M. Young and A. P. Greenough. Institute of Metals, Journal, v. 89, Mar. 1961, p. 241-246.

Hardness measurement and metallographic examination of the surfaces of Au rods after cyclic stressing and subsequent 950° C. heating. Surface cracking is found to be the essential characteristic of fatigue damage, with annealing tending to increase fatigue life. 11 ref. (Q7, Q26q, Q29, M-general, 2-64, 3-66; Au)

650-Q. Effect of Hydrogen on Room Temperature Properties of Titanium-Low-Aluminum-Low-Manganese Alloys. R. Haynes. Institute of Metals, Journal, v. 89, Mar. 1961, p. 249-252.

Tensile and Izod impact testing of Al-Mn-Ti alloys containing up to 200 ppm. hydrogen, with embrittlement and some intergranular fracture occurring during the Izod testing. Increase in hydrogen content does not affect strength and has only a slight effect on ductility at a high strain rate. 7 ref. (Q26s, Q-general, 2-60, 2-61; Ti-b, H, Al, Mn)

651-Q. A Study of Fatigue Deformation by Reflection Electron Microscopy. G. Thomas, N. P. Sandler and I. Cornet. Institute of Metals, Journal, v. 89, Mar. 1961, p. 253-254.

Reflection electron microscopic examination of polycrystalline electropolished high-purity Al to study surface effects resulting from fatigue deformation caused by cyclic stressing. 12 ref. (Q24, Q7, M21e, 3-66; Al-a)

652-Q. Development of Niobium-Base Alloys. Pt. 4. R. T. Begley and W. N. Platte. Westinghouse Electric Corp. (Wright Air Development Division). U. S. Office of Technical Services, PB 161936, May 1960, 132 p. $2.75.

Vacuum tensile data for pure Cb from room temperature to 1371° C. The ductile-brittle transition (in impact) for commercial purity, arc melted Cb is close to room temperature. Effect of binary additions of Ti, Ar, Hf, V, Mo, W, Re, Al and Yt on the hardness and workability of Cb. (Q27, 1-73, Q23, Q29, 2-60; Cb)

653-Q. Physical Metallurgy of Tungsten and Tungsten Base Alloys. R. H. Atkinson. Westinghouse Lamp Division (Wright Air Development Division). U. S. Office of Technical Services, PB 161978, May 1960, 251 p. $4.

Base line data on high-purity and commercial powder metallurgy tungsten reveal differences in tensile transition and recrystallization temperatures believed attributable to variations in metallic impurity concentrations. At high temperature (to 2700° F.) tensile properties of these materials are little affected by differences in levels of trace impurities except for the possibility that observed anomalous and poorly reproducible creep rupture behavior is impurity-induced. (Q27, Q3, 2-60; W-b)

654-Q. (German.) Wear Abatement by Proper Material Selection and Heat Treatment of Steels. K. Junghans. Bergbautechnik, v. 11, Jan. 1961, p. 28-33.

Selection of various rolled, cast or machined wear-stressed alloy steels for wear resistance in machine parts as a function of composition and heat treatment according to the required microstructure rather than strength properties. (Q9, T7, 2-64, 3-71; AY, 17-51, 17-57)

655-Q. (English.) Fatigue Tests and Tensiometric Records on Crankshaft Models Subjected to Torsional Stresses. Alfredo Pasetti. Fiat Stabilimento Grandi Motori, v. 12, Apr-June 1960, p. 49-61.

Determination of fatigue limit with resonance vibrator and stress analysis using brittle coatings performed on models of steel cranks. (Q7h, T21c, 3-66; ST, 17-56)

656-Q. (English.) Some Aspects of Materials for Supersonic Flight. N. F. Harpur. Jahrbuch 1959 der WGL, Oct. 1959, p. 357-365.

Review of design and material requirements for supersonic speed aircraft (at Mach numbers of 2 and over) in terms of skin temperatures as influenced by speed and material properties such as tensile strength, Young's modulus or density ratio, failure stress, creep, fatigue strength and stiffness, as influenced by temperature, emphasis being on Al alloys and steel. (Q-general, T24, 10-54; Al-b, ST)

657-Q. (German.) Deformation of Uranium While Exposed to Thermal Changes and Simultaneous Tensile Stressing. A. A. Bocuvar, G. J. Sergeev and V. A. Davydov. Kernenergie, v. 3, Dec. 1960, p. 1213-1216.

Measurement of dimensional changes of rolled alpha uranium specimens, with ordered and random orientation of crystallites, in a vacuum apparatus (10^{-5} Torr) in thermal shock tests by cycling between 180 and 550° C., with and without simultaneous tensile stressing and in creep tests at 550° C. (Q3, Q7j, Q24, 2-62, 3-66, 3-72; U)

658-Q. Summary of Present Information on Impact Sensitivity of Titanium When Exposed to Various Oxidizers. W. K. Boyd. Defense Metals Information Center, Battelle Memorial Institute, DMIC Rept. 89, Mar. 6, 1961, 7 p. (Available as PB 151108 from U. S. Office of Technical Services, Washington 25, D. C.)

Low-temperature reactivity of titanium and titanium alloys subjected to deformation while immersed in N_2O_4, F_2, ClF_3, ClO_3F, H_2O_2 and liquid oxygen as influenced by alloying, aged or hardened condition, amount of deformation, surface condition, pressure, impact velocity and temperature. 3 ref. (Q6q, 2-63, 2-66; Ti-b)

659-Q. Vacuum Melted Materials. H. C. Child. Engineering Materials and Design Conference, Proceedings, Feb. 1960, p. F1-F22.

Tensile, stress rupture, creep and fatigue properties of vacuum melted Ti alloys, martensitic Cr steels, austenitic steels, Ni base alloys, ball bearing steels and ultrahigh-tensile steels. Effect of heat treatment on properties; application of materials. Evaluation of vacuum melting processes and equipment. (Q-general, 2-60, 2-64, D8m, C25; AY, SS, Ti-b, Ni-b, 17-57)

660-Q. Weldable High Strength Stainless Steels. J. I. Morley. Engineering Materials and Design Conference, Proceedings, Feb. 1960, p. P1-P26.

Hardness, corrosion resistance, physical properties and tensile impact and fatigue properties of low-carbon, martensitic and semi-austenitic stainless steel. Response to heating and cooling treatments, wear resistance and weldability. 4 ref. (Q-general, J5, K9s, P-general; SS)

661-Q. Magnesium Alloys for Engineering Use. P. A. Fisher. Engineering Materials and Design Conference, Proceedings, Feb. 1960, p. R1-R8.

Tensile properties, modulus of elasticity, damping capacity, resistance to fatigue, impact strength and other mechanical characteristics of Mg base alloys. Applications in aircraft and automobile components and industrial and consumer products. (Q-general, T-general; Mg, 17-57)

662-Q. (French.) Steels and Heat Resistant Alloys Used in Cementation Furnaces. Gilles Pomey. Revue du Nickel, v. 26, Nov-Dec. 1960, p. 147-156.

Heat resistance, oxidation temperatures and phase constitution of austenitic Fe-Ni-Cr steels, austenitic Ni-Cr alloys and ferritic Fe-Cr and Fe-Cr-Al alloys and their behavior in various furnace atmospheres. 8 ref. (Q-general, M24, R1h, W27; SGA-h, AY, Cr-b, Ni, 17-57)

663-Q. (German.) Izod Impact Strength of Meehanite Cast Iron for Fittings. Werkstatt und Betrieb, v. 94, Jan. 1961, p. 33.

Comparative impact data for GG-18 and GG-22 gray cast iron and GC, GD and GE Meehanite cast iron in terms of tensile strength, impact energy and Izod impact strength. (Q6; CI)

664-Q. (Czech.) Resistance of Gray Cast Iron and S. G. Cast Iron to Thermal Shock. Josef Koritta and Karel Lobl. Slevarenstvi, v. 9, Jan. 1961, p. 6-7.

Wedge-shaped samples of ferritic gray iron, ferritic-pearlitic gray iron and S. G. iron are exposed to 50-400 thermal cycles by heating at the rate of 91.7-97° C. per min. to 700-800° C. and quenching immediately in a shower of water.

Dependence of the resistance to cycling on structure and composition. 7 ref. (Q10a, Q7j, 2-60, 3-71; CI)

665-Q. Cast Iron as an Engineering Material. H. Morrough. Engineering Materials and Design Conference, Proceedings, Feb. 1960, p. T1-T10.

Mechanical properties of gray, white heart malleable, black heart malleable, pearlitic malleable, nodular graphite, highly alloyed and white cast irons. Applications in industrial machinery and consumer products. (Q-general, T-general; CI, 17-57)

666-Q. Breakthrough: Beryllium Proved Inherently Ductile. Missiles and Rockets, v. 8, Apr. 3, 1961, p. 15.

Single crystals of pure Be are prepared by repeated zone refining. Room temperature, tensile and bend test data are given for the basal plane angle, slip system, reduction in area, elongation, glide strain and basal shear stress. (Q23p, Q24, C28k; Be, 14-61)

667-Q. (Japanese.) Shaper and Dimensions of a Tension Test Specimen for Sintered Metals. Pt. 11. Some Manufacturing Conditions of a Test Specimen. Etsuo Hayashi and Yuzi Nan-ya. Government Industrial Institute, Nagoya, Reports, v. 10, Feb. 1961, p. 76-82.

Effect of gage length, compacting pressure and resultant sintering density, surface finishing and weight on tensile strength and elongation of sintered flat specimens and machined bars. 5 ref. (Q27, Q23p, 3-73; 6-72)

668-Q. (Japanese.) Fatigue of Large Steel Specimens. Pt. 4. Propagation of Fatigue Cracks in Shoulder Fillet Specimens. Jiro Hoshino. Japan Society of Mechanical Engineers, Transactions, v. 27, Jan. 1961, p. 37-45.

Study of the relationship between stress and the propagating speed of fatigue crack by analyzing Shelly patterns of fracture surfaces of shoulder fillet specimens in bend tests. Equations are derived for influence of the stress concentration factor, the coaxing effect and strain hardening at the tip of the fatigue crack on the propagation velocity. 5 ref. (Q7, Q26q, 3-66; ST)

669-Q. (Japanese.) Fatigue of Large Steel Specimen. Pt. 3. Fatigue Tests on Shoulder Fillet Specimens. Jiro Hoshino and Junichi Arai. Japan Society of Mechanical Engineers, Transactions, v. 27, Jan. 1961, p. 25-35.

Determination of stress concentration factor and notch factor as a function of gage length-fillet radius ratio, size, shear strain energy and fatigue limit of specimens 135 and 14 mm. in diameter, the larger being 15, 25 and 40 mm. in fillet radius and the smaller having proportional fillet radius according to its size. 10 ref. (Q7, 3-66, 3-73; ST)

670-Q. (Japanese.) Ball-Bearing Steels Made From Sponge Iron as Raw Material. Manabu Ueno, Hirooki Nakajima and Sadao Ikeda. Tetsu-to-Hagane (Iron & Steel Institute of Japan, Journal), v. 47, Feb. 1961, p. 124-129.

The austenitizing behavior and durability of ball-bearing steels, made from sponge Fe in a basic electric arc furnace, are studied by chemical analysis, point-counting, lineal analysis and Rockwell hardness, static torsion and thrust-type life tests, as a function of sponge content of the charge. 3 ref. (Q9, Q-general, N8, D5a; ST, SGA-c)

671-Q. (Japanese.) Embrittlement of Steel in Contact With Liquid Phase. Pt. 3. Effect of Several Factors on Embrittlement of Solid Metals in Contact With Liquid Metals. Morio Nakajima. Tetsu-to-Hagane (Iron & Steel Institute of Japan, Journal), v. 47, Feb. 1961, p. 134-139.

Embrittlement of mild steel immersed in molten Cu and Cu-Sn and Zn-Sn alloys at 500-1200° C. and of Pb and Sn in liquid Hg and air is examined by tensile and bend tests at room temperature and by metallographic methods. Data are given for elongation and tensile strength of annealed and cold rolled specimens of both coarse and fine grain structures. 7 ref. (Q26s, Q-general; CN, Cu-b, Sn-b, Pb, Zn, 14-60)

672-Q. Three Stainless Steels Retain Hot Hardness Better Than Standard AISI Grade 440C. Materials in Design Engineering, v. 53, Mar. 1961, p. 19.

Modifications of Type 440 steel with decreased Cr content and increased Mo and V contents for improved high temperature properties. (Q29p, 2-60; SS-e, Cr, Mo, V)

673-Q. (Japanese.) Standardization of Hardness Test Pieces. Kentaroh Yamamoto. Japan Society of Mechanical Engineers, Journal, v. 63, Nov. 1960, p. 1474-1482.

Review of hardness tests with the Shore, Brinell, Vickers, Rockwell and micro-Vickers methods; statistics of average values and standard deviations; establishment of reliability and use of a standard test bar. (Q29)

674-Q. (Japanese.) Dimensional Effects on the Fatigue Properties of Steel Materials. Japan Society of Mechanical Engineers, Journal, v. 63, Nov. 1960, p. 1525-1539.

Fatigue test data for carbon, Si-Mn, Si-Mn-Cr and Ni-Cr steel using alternating tension-compression, torsion and rotary bending, with calculation of coefficient of the dimensional effect which is defined as the fatigue limit of a smooth specimen having diameter in relation to the fatigue limit of a standard smooth specimen. (Q7, 3-73; AY, CN)

675-Q. (Japanese.) Heat Treatment of TiC-Ni Cermet. Masataka Sugiyama and Hisashi Suzuki. Japan Institute of Metals, Journal, v. 25, Jan. 1961, p. 1-4.

Effect of heat treatment upon some room temperature properties of TiC-31% Ni cermet. Hardness, transverse-rupture strength, X-ray lattice parameter, Curie temperature and microstructure are observed for specimens held in vacuum at 700-1300° C. for 1/2-25 hr. or quenched from 700-1300° C. 10 ref. (Q-general, M-general, 2-64; Ti-b, Ni, 6-70)

676-Q. (Japanese.) Heat Treatment of TiC-50Ni-Cr-Co. Masataka Sugiyama and Hisashi Suzuki. Japan Institute of Metals, Journal, v. 25, Jan. 1961, p. 8-11.

The effects of heat treatment on some room temperature properties of 1280° x 1 hr. vacuum sintered TiC-50Ni-Cr-Co (3:1:1 ratio) cermet. Variation of transverse-rupture strength, hardness, X-ray lattice parameter, Curie temperature and microstructure of the alloy by heating in vacuum at 950-1260° for 5-25 hr. or by quenching from 950-1280° C. (Q-general, M-general, 2-60, 2-64; Ti-b, Ni, Cr, Co, 6-70)

677-Q. (Japanese.) Effect of Mo on Boron Bearing Low-Alloy High-Strength Steel. Yunoshin Imai and Toshio Saito. Japan Institute of Metals, Journal, v. 25, Jan. 1961, p. 11-15.

Mechanical properties and hardenability of multiple low-alloy high-strength steels such as contain 0.3% C, 1% Cr, 0.3% Cu, 0.01% Ti, 0.002% B and 0.0.5% Mo, oil quenched and tempered to Rockwell C 32 hardness are examined at -80 to 20° C. Improvement in tensile properties, Charpy impact value, toughness and transition temperature is observed as a result of the Mo addition. 13 ref. (Q-general, J5, 2-60, 2-64; AY-n, Mo, B)

678-Q. (Japanese.) The Effect of Cold Drawing and Annealing on the Rigidity Modulus and Internal Friction in Stainless Steel Wires. Seita Sakui and Hideo Takei. Japan Institute of Metals, Journal, v. 25, Jan. 1961, p. 30-33.

Changes in the rigidity modulus, electrical resistivity, hardness and internal friction due to cold drawing and annealing at 100-600° C. are measured in 13 Cr and 18-8 stainless steel wires of 0.7 or 0.6 mm. diameter, using torsion pendulum, potentiometer and micro-Vicker's hardness testing methods. 6 ref. (Q5g, Q22, Q29n, P15g, 2-64, 3-68; SS, 4-61)

679-Q. (Japanese.) The Effect of Age Hardening on the Rigidity Modulus and the Internal Friction in 17-7 PH Stainless Steel Wire. Seita Sakui and Hideo Takei. Japan Institute of Metals, Journal, v. 25, Jan. 1961, p. 34-36.

Changes in the rigidity modulus, electrical resistivity, hardness and internal friction following aging at 20-600° C. for various times are examined for stainless steel wire containing 1.24% Al of 0.65 mm. diameter, using a torsion pendulum, potentiometric and micro-Vicker's hardness measurements. 4 ref. (Q5g, Q22, Q29, N7a, P15g, 2-65; SS, 4-61)

680-Q. (Japanese.) Embrittlement of an Austenitic Stainless Steel Caused by Heating and Corrosion. Gunji Shinoda, Tadeo Sano, Tadakazu Sakurai, Tadashi Kawasaki and Hisashi Izumi. Japan Institute of Metals, Journal, v. 25, Jan. 1961, p. 36-40.

Embrittlement of 304, 316 and 347 stainless specimens by creep and fatigue loading during heating at 400-700° C. for times to 500 hr. and subsequent immersion in 0.1 mole uranium sulphate aqueous solutions for up to 30 days is examined by Charpy V-notch impact tensile tests. Carbide precipitation and intergranular corrosion degradation are determined as dominant mechanisms, as

a function of specimen composition and temperature. (Q26s, N8r, R1d, R2h, 2-60, 2-62; SS-e)

681-Q. (Japanese.) Vickers Microhardness of Zone Refined Copper. Tomisaburo Nara, Mikio Nishihata and Masahisa Akiyama. Japan Institute of Metals, Journal, v. 25, Jan. 1961, p. 72-75.

Effect of purity on Vickers microhardness and grain and grain boundary hardness distribution, is examined for zone-refined polycrystalline Cu wire in comparison with vacuum melted specimens. 14 ref. (Q29q, C28k, 2-60; Cu)

682-Q. A Comparison of Niobium-Vanadium and Niobium-Zirconium Alloys for Structural Applications in Boiling Water Reactors. D. L. Douglass. Nuclear Science and Engineering, v. 9, Mar. 1961, p. 391-398.

Evaluation of fabricability, creep, hot hardness, tensile and corrosion properties for Cb-V and Cb-Zr alloys for use as structural components of boiling water reactors. Results indicate Cb-V alloys possess superior properties for high-temperature application. 9 ref. (Q-general, F-general, G-general, T11; Cb-b, V, Zr, 17-57)

683-Q. Crack Formation in Uranium. K. R. Merckx. Nuclear Science and Engineering, v. 9, Mar. 1961, p. 413-414.

Evaluation of internal cracks in uranium fuel elements caused by post-irradiation thermal cycling. Elements with similar exposures and operating temperatures but with different cooling conditions are found to be crack-free. 5 ref. (Q26q, Q7j; U)

684-Q. (French.) Origin, Nature and Shape of Slip Bands. H. J. Latiere and R. Michaud. Memoires Scientifiques, v. 57, Dec. 1960, p. 923-929.

Slip band types on clusters of high-purity Al crystals. Interaction of mechanical and crystallographic factors. 7 ref. (Q24a, Q24c; Al-a, 14-61)

685-Q. (Italian.) Brittle Fracture of Pressure Vessels and Information Necessary to Avoid it by Correct Design. A. A. Wells. Revista Italiana Della Saldatura, v. 12, Sept-Oct. 1960, p. 222-227.

Role of transitional temperature in brittle fracture. Material requirements. Nondestructive testing, thermal treatment after welding and hydrostatic pressure tests in the course of production of pressure vessels from mild steel. 26 ref. (Q26s, Q-general, K-general, T26q, 17-51; CN, 17-57)

686-Q. Fracture Theory as Applied to High-Strength Steel Pressure Vessels. G. R. Irwin and J. A. Kies. Paper from "High-Strength Steels for the Missile Industry". American Society for Metals, Novelty, Ohio, 1961, p. 79-100.

The problem of determining responsibility for a fracture failure with respect to stress level, fracture toughness and flow size. Examples are given of appropriate methods of fracture toughness evaluation and of their use in the analysis of fracture failures. (Q26s, T26q; ST)

687-Q. Metallurgical Tests as a Contribution to Pressure-Vessel Reliability. Dean K. Hanink. Paper from "High-Strength Steels for the Missile Industry". American Society for Metals, Novelty, Ohio, 1961, p. 111-128.

Correlation of the Allison-developed instrumented bend test results with burst strength of pressure vessels. The importance of accurate appraisal of fracture appearance on pressure vessel performance is emphasized and attention is directed to linking this with crack-propagation behavior when considering maximum potential strength for any particular steel. Mass of the hardware is discussed as it affects compatibility of tensile strength and crack-propagation characteristics. (Q26, T26q; ST)

688-Q. NASA's Program and Findings on the Effects of High-Stress Concentrations on High-Strength Sheet Alloys. G. B. Espey. Paper from "High-Strength Steels for the Missile Industry". American Society for Metals, Novelty, Ohio, 1961, p. 129-152.

Past and recent findings of the influence of high-stress concentrations, at room temperature and low temperatures, on steel and Ti alloys strengthened largely by heat treatment. Outline data obtained and investigations planned on potential cryogenic alloys largely dependent upon deformation for their mechanical properties. (Q25; 4-53, ST, Ti-b)

689-Q. Important Factors in the Future Application of High-Strength Steels. E. P. Klier. Paper from "High-Strength Steels

for the Missile Industry". American Society for Metals, Novelty, Ohio, 1961, p. 254-274.

Steels can be employed in service applications at high-strength levels only if the element of notch sensitivity is suitably weighed in heat treating and fabrication. Several manufacturing methods are available which allow the fabrication of high-strength structural elements. At present, a most important need is the development of steels which have improved notch toughness at yield strengths above those now available. (Q26s; ST, SGB-a)

690-Q. Magnitude of the Zener Relaxation Effect. Pt. 3. Anisotropy of the Relaxation Strength in Ag-Zn and Li-Mg Solid Solutions. D. P. Seraphim and A. S. Norwick. Acta Metallurgica, v. 9, Feb. 1961, p. 85-97.

Variation of the Zener relaxation effect as determined in f-c-c. Ag-Zn and b-c-c. Li-Mg solid solutions from measurements on oscillating single crystal rods in flexure and in torsion. The effect has a high anisotropy, such that the relaxation strength is greater for (111) than for (100) oriented crystals, applying to both the f-c-c. and the b-c-c. solid solutions and explained by relaxations involving next-nearest neighbor atom pairs. 17 ref. (Q3a, Q22, M26, N10, 3-72; Ag-b, Zn, Mg-b, Li, 14-67)

691-Q. Magnitude of the Zener Relaxation Effect. Pt. 4. Anisotropy of the Relaxation Strength in Al-4% Cu. B. S. Berry. Acta Metallurgica, v. 9, Feb. 1961, p. 98-105.

The important parameters controlling the anisotropy of the Zener relaxation in quenched and reverted Al-4% Cu (1.8 at.% Cu) are determined from internal friction measurements in torsional and transverse vibration on (100) oriented single crystal specimens. The anisotropy is much larger than predicted by the theories of Le Claire and Lomer and Zener and the maximum tensile relaxation strength occurs in the (100) orientation, for which this theory predicts a minimum value. 9 ref. (Q3a, Q22, N10, 2-64, 3-72; Al-b, Cu, 14-61)

692-Q. Microstrain in Polycrystalline Metals. N. Brown and K. F. Lukens, Jr. Acta Metallurgica, v. 9, Feb. 1961, p. 106-111.

A theory is developed for the dependence of microplastic strain on stress and grain size of polycrystalline metals and is checked by measuring the stress-strain curve in the micro region, using a capacitance type extensometer, for ingot iron with grain sizes of 44-140 microns. The microplastic strain is calculated in terms of density of sources, applied stress, shear modulus, stress to move first dislocation and grain size. 10 ref. (Q25, 2-59; Fe-a)

693-Q. Twinning in Iron-Aluminum Alloys, R. W. Cahn and J. A. Coll. Acta Metallurgica, v. 9, Feb. 1961, p. 138-148.

Annealing and mechanical twins observed in chill cast and hot rolled 23.5% Al-Fe specimens by X-ray diffraction after annealing at 1150° C. and rapid cooling to 500° C. and impact testing in liquid nitrogen and at room temperature. Twin boundaries and orientation relations are determined as a function of order-disorder conditions. 17 ref. (Q24b, M-general, N10, 2-64, 3-68; Fe-b, Al)

694-Q. Temperature and Composition Dependence of the Strength of Aluminum Base Zinc Alloy Single Crystals. J. Dash and M. E. Fine. Acta Metallurgica, v. 9, Feb. 1961, p. 149-154.

The critical resolved shear stress of solid solution and zone-hardened 1.65-5.3% Zn-Al alloys measured at 4.2 and 293° K. increases with Zn concentration, suggesting that the stress necessary to shear the zones is larger than that necessary to overcome the Matt-Nabarro misfit stresses. This is attributed to off-center cutting of zones, cutting of mismatch dislocations located in the region between the core of the zone and the depleted shell and the presence of clusters in the solid solution. 19 ref. (Q25, Q27, M26, N-general, 2-60, 2-61; Al-b, Zn)

695-Q. (German.) The Plastic Deformation of Polycrystals. E. Kroner. Acta Metallurgica, v. 9, Feb. 1961, p. 155-161.

Derivation of a two part formulation for polycrystalline plasticity involving solution of a plastic deformation problem in single crystals and application of elasticity theory to polycrystals. Effective stresses in single crystals and resultant glide systems are determined as dependent on prior treatment, external stress and orientation. Using these calculations, the polycrystalline stress-strain curve is derived from the single crystal curve. 14 ref. (Q24)

696-Q. Steel Plus Uranium: What's the Result? S. L. Gertsman. Canadian Metalworking, v. 24, Mar. 1961, p. 36-37.

Effects of uranium addition on hardenability, fatigue strength, stress rupture life and corrosion resistance of SAE 1010 and SAE 1040 steels. (Q-general, J5, R-general, 2-60; ST, U)

697-Q. Can Uranium Improve Steel? S. L. Gertsman. Iron Age, v. 187, Apr. 6, 1961, p. 110-111.

Tensile and corrosion tests on various steels with uranium as alloying agent show improvement in hardenability, corrosion, heat and stress rupture resistance. (Q27, Q-general, R-general, 2-60, 2-62; ST, U)

698-Q. What Steels Next in Power Generation. Engineering, v. 191, Feb. 24, 1961, p. 274.

Evaluation of alloy ferritic steels containing C, Mn, Si, Cr, Mo, W, V and Ti as components of alloy ferritic steels in terms of design requirements for use in high-pressure steam power plant for electricity generation. It is suggested that some alloys require more development work particularly where a compromise is sought between strength, weldability and corrosion resistance and between hardenability and creep strength. (Q-general, A-general, W11, 17-57; AY, 17-51)

699-Q. Review of Recent Developments in the Evaluation of Special Metal Properties. J. E. Campell. Defense Metals Information Center, Battelle Memorial Institute, DMIC Memo. 94, Mar. 28, 1961, 6 p. (Available as PB 161244 from U. S. Office of Technical Services, Washington 25, D. C.)

Tensile tests on notched and straight specimens of Ti and steel alloys at 75, -320 and -423° F. Data include yield strength, smooth tensile strength, elongation, sharp notch tensile strength ratio of yield strength to density and fracture-toughness. 6 ref. (Q23, Q26s, Q27, 2-61; ST, Ti-b)

700-Q. Internal Friction Effects in Iron-Silicon-Nitrogen Alloys. R. Rawlings and P. M. Robinson. Iron and Steel Institute, Journal, v. 197, Mar. 1961, p. 211-215.

Internal friction of Fe-Si-N alloys containing 0.5-1.9 Si when quenched from the gamma and from alpha ranges. Probable causes of the five peaks in the internal friction-temperature curve. 18 ref. (Q22, 2-61, 2-64; Fe-b, Si, N)

701-Q. Resistance to Thermal Stress Fatigue of Some Steels, Heat Resisting Alloys and Cast Irons. H. G. Baron and B. S. Bloomfield. Iron and Steel Institute, Journal, v. 197, Mar. 1961, p. 223-232.

Thermal fatigue test in which cracks are produced by repeated heating of one edge of the cold specimen. Influence of temperature cycle, martensitic transformation and stress concentration on fatigue life. Resistance of cast irons, low alloy steels, stainless steels and Ni and Co heat resisting alloys to thermal fatigue. 10 ref. (Q7j, Q25, 2-62; ST, CI, Ni-b, Co-b, SGA-h)

702-Q. Hidden Causes of Bolt Failure: "Carb" and "Decarb". Iron Age, v. 187, Mar. 30, 1961, p. 112-113.

Effect of carbon content on fatigue life, surface strength, hardness and subsurface cracking in steel fasteners. Means of detecting carburization and decarburization. (Q7, Q27, Q29, 2-64, T7f; ST, 17-57)

703-Q. The Role of Stress Distribution in Fatigue. R. E. Peterson. Experimental Mechanics, v. 1, Apr. 1961, p. 105-115.

Effect of stress distribution, maximum stresses and stress-concentration factors on fatigue. An approximate method for analysis of conditions for crack formation and propagation in notched members. 35 ref. (Q7, 3-66; ST)

704-Q. Stress Redistribution During Bending Fatigue. A. A. Blatherwick. Experimental Mechanics, v. 1, Apr. 1961, p. 128-135.

Examination of the relationships among stress, strain and bending moment to determine the distribution of stress in bending fatigue specimens of 1020 steel and Al and its redistribution during fatigue resulting from change in the cyclic secant modulus of the material. 12 ref. (Q5m, Q7; Al, ST)

705-Q. We Can Predict Spot Weld Strength. W. A. Soward. Welding Design & Fabrication, v. 34, Mar. 1961, p. 45-46.

A formula based on nugget size, material composition, minimum gage shear

strength and stacked sheet thickness is used to accurately predict shear strength of spot welds in missile airframes without intensive testing. (Q2g, T24e; 7-51)

706-Q. Recommendations and Precautions for Fabricating 5% Cr Ultra-High Strength Steel. W. Scott Lightner and J. C. Hamaker, Jr. Western Machinery and Steel World, v. 52, Mar. 1961, p. 34-39.

Comparison of fatigue, notch, tensile and ductility properties in air and consumable-vacuum melted specimens subjected to various heat treatments. Recommendations for hot working, annealing, forming and joining. (Q-general, 2-64, G-general, K-general; ST, SGB-a)

707-Q. Exotic Alloys Forged by Heavy Presses. J. R. Canal and W. C. Kunkler. Space Aeronautics, v. 35, Apr. 1961, p. 54-57.

Tensile and stress-rupture properties of press forged Astroloy, Be, Cb, B120VCA Ti alloy, Waspaloy, Rene 41, Udimet 500, 6Al-4V-Ti alloy, Mo, H-11, 17-4PH, 4335, AM 355, 300M and D-6C steels. Applications in missiles, rockets and other space craft. (Q-general, T24e; SGA-h, EG-d37, 4-51, 17-57)

708-Q. When to Use Tool Steels for High Temperature Parts. G. B. Heydt. Space Aeronautics, v. 35, Apr. 4, 1961, p. 65-66, 68.

Data are given for stress-rupture properties, ultimate tensile strength and yield strength of Pyromet 882, Carpenter 636, Greek Ascoloy, A286 alloy, M252 alloy, Inconel X and Waspalloy tested at 1000-1800° F. (Q-general, 2-62; TS, SGA-h)

709-Q. Simple Fatigue Testing as an Essential Corollary to Nondestructive Testing. Frank Nixon. Nondestructive Testing, v. 19, Mar-Apr. 1961, p. 124-130.

Fatigue tests on cast, forged and welded aircraft engine components are used to determine the extent to which flaws detected by nondestructive testing will become critical under actual operating conditions of high stress. (Q7, S13, T24b, 3-66)

710-Q. (Japanese.) Free Cutting Steel. Chiaki Asada. Japan Society of Mechanical Engineers, Journal, v. 64, Feb. 1961, p. 231-239.

Data are given for composition, machinability, mechanical properties at high and low temperatures, wear resistance and degree of carburization obtainable. (Q-general, G17k; ST, SGA-k)

711-Q. (Japanese.) Some Studies on Dimensional Effects. Hisashi Ouchida. Japan Society of Mechanical Engineers, Journal, v. 64, Feb. 1961, p. 263-272.

Fatigue character of plain and notched specimens of steel, tested by universal, rotary bending or supported beam fatigue testers. Determination of fatigue limit, cracking susceptibility and notch sensitivity as a function of the notch and specimen geometry. (Q7, Q-general, 3-73; ST)

712-Q. (English.) High Temperature Materials Under Dynamic Stresses. A. J. Kennedy. Jahrbuch 1959 der WGL, v. 13, Oct. 1959, p. 365-369.

Creep, self-diffusion, fatigue, precipitation, aging transformation and recovery mechanisms as induced or accelerated deleteriously by dynamic stress. Stress-strain and related data are given for Al and steel alloys. (Q-general, Q25m, N-general, 3-66; Al-b, ST, SGA-h)

713-Q. Materials of Construction for Chemical Plant: Titanium. B. J. Connolly and R. J. Watkins. Chemical & Process Engineering, v. 42, Feb. 1961, p. 83-89.

Mechanical and physical properties and application of Ti alloys in chemical processing equipment with emphasis on the alloys' high resistance to corrosion fatigue. (Q-general, P-general, R-general, T29; Ti-b, 17-57)

714-Q. Microstructures and Notes on Carbon Steels Made to B.S. 3100:1760 Grades A and B. J. Turton and B. H. C. Waters. British Foundryman, v. 53, Dec. 1960, p. 524-530.

Mechanical tests show the effect of increasing carbon content from 0.4-0.49% in both annealed and normalized conditions on the tensile strength elongation, reduction in area and Izod properties. (Q27, Q23p, Q6, 2-60; CN)

715-Q. Structure and Properties of Sand-Cast Gunmetals. J. E. Stolarczyk. British Foundryman, v. 53, Dec. 1960, p. 531-548.

Tensile strength, elongation and hardness of sand-cast gunmetals as a function of Sn, Zn and Pb content. (Q27, Q23p, Q29n; Cu-b)

716-Q. Thoughts on Phosphoric Cast Iron. R. V. Riley. British Foundryman, v. 53, Dec. 1960, p. 549-555.

Fluidity, shock resistance, fatigue properties, hardness and other mechanical properties of phosphoric cast iron. Comparison with Zn, Al and other Fe alloys. (Q-general; CI)

717-Q. Double Block Shear Test for Foil Honeycomb Cores. H. P. O'Sullivan. Aircraft Engineering, v. 33, Mar. 1961, p. 64-66.

Double block shear testing to determine the core shear stiffness of a honeycomb core of B.S. 1470 Al foil bonded to the face plates with Araldite epoxy resin. (Q21d; Al-b, 7-59)

718-Q. Fatigue in Metal Joints. Pt. 2. Welded Joints. Ralph G. Crum. Machine Design, v. 33, Apr. 13, 1961, p. 176-178.

Cyclic stressing of spot welds and fusion welds in 17-7PH and 18-8 stainless, Cor-tin and alloy steels; Ti; 2014, 2024 and 7075 Al alloy to determine the fatigue strength of the weld. 3 ref. (Q7; ST, Ti, Al-b, 17-57)

719-Q. (Translation-Brutcher no. 4654.) Failure of Steels in Hydrogen at High Temperatures and Pressures. N. N. Kolgatin. Metallovedenie i Termicheskaya Obrabotka Metallov, July 1959, p. 16-21.

Microscopic study of changes in technical iron, carbon and alloy steels when in contact with hydrogen at high pressures and temperatures. Decarburization suffered by solid and tubular specimens exposed to hydrogen on one as against on all sides. Nature and progress of cracking in decarburized zone. (Q26s; AY, CN, Fe)

720-Q. (Translation-Brutcher no. 4655.) Study of High-Performance High-Speed Steels. A. P. Gulyaev and S. M. Saverina. Metallovedenie i Termicheskaya Obrabotka Metallov, July 1959, p. 22-30.

Technological properties and cutting performance of seven new experimental steels compared with standard 18-4-1. Data on compositions; optimum conditions of quenching and tempering. Factors governing carbide segregation. Mechanical properties, red hardness, grindability and carbon depletion in quenching. (Q-general, Q29n; TS-m)

721-Q. (Translation-Brutcher no. 4656.) Low Alloy Toolsteels. Yu. A. Geller and Ts. L. Olesova. Metallovedenie i Termicheskaya Obrabotka Metallov, July 1959, p. 30-45.

Advantages of low alloy over carbon toolsteels. Current Russian and American alloy toolsteels. Effects of carbon and small amounts of Cr and W, also of Cr + V and Cr + W, on steel structure, bend strength, hardness, hardenability, stability in tempering and magnetic saturation. (Q29, Q5g, P16; TS)

722-Q. (Translation-Brutcher no. 5079.) Data Sheet on a New Cr-W-V Toolsteel. A. P. Gulyaev and A. A. Badaeva. Metallovedenie i Termicheskaya Obrabotka Metallov, July 1959, p. 31-34.

T-T-T diagram, mechanical properties, hardenability and heat treatment of a 1-1.5% C, 0.45% Mn, 0.35% Si, 5.5-7% Cr, 1.1-1.5% W, 0.5-0.7% V, 0.35% Ni, 0.03% P, 0.03% S toolsteel for cold work dies. (Q-general, Q29, J-general; TS)

723-Q. (Translation-Brutcher no. 5064.) Effect of Tungsten on the Characteristics of 18% Cr, 12% Ni Stainless Steel. R. Nakagawa and Y. Otoguro. Tetsu-to-Hagane (Iron and Steel Institute of Japan, Journal), v. 46, Mar. 1960, p. 575-577.

Aging behavior, microstructure, intermetallic compounds, tensile properties at room and elevated temperatures and stress rupture strength of 18% Cr, 12% Ni stainless steel as function of tungsten contents of 1.90-5.5% and 0.03 and 0.11% carbon. (Q27, Q3m, N7a, M27, 2-60; SS, W)

724-Q. (Translation-Brutcher no. 5066.) Effect of Phosphorus and Boron Upon the Reversible (High Temperature) Temper Brittleness of Low-Carbon Nickel Steels. L. S. Lyakhovich and T. S. Shilkova. Izvestiya Vuz-Chernaya Metallurgiya, Sept. 1960, p. 167-168.

Study of 0.12% C, 1.20% Ni steel with 0.02, 0.06 and 0.11% P for effect of increasing P contents, in part jointly with 0.015% B on the high-temperature (reversible) temper embrittlement with rapid versus slow cooling from tempering temperature. Conditions under which

boron promotes reversible temper brittleness in the presence of phosphorus. (Q26s, 2-60; CN-g)

725-Q. (Translation Brutcher no. 5103.) On the Nature of Slip Lines on Steel. N. S. Alferova. Izvestiya Akademii Nauk SSSR, June 1959, p. 131-132.

Electron microscope study of the nature of slip lines in deformed Ti-stabilized 18% Cr, 9% Ni steel and ferritic 25% Cr, 0.8% Ti steel. Explanation of discontinuity of slip lines; localized distortion; microcracks; their orientation. Effect of externally applied loads. (Q24c; SS)

726-Q. Fatigue in Metal Joints. Pt. 1. Mechanical Joints. Ralph G. Crum. Machine Design, v. 33, Mar. 30, 1961, p. 108-113.

Stress ratio, linear-damage accumulation, notching and corrosion as they affect fatigue failure in riveted and threaded joints. 4 ref. (Q7; 7-53)

727-Q. (French.) Tensile Deformation Bands in Aluminum Single Crystals. H. J. Latiere. Journal de Physique et le Radium, v. 21, Nov. 1960, p. 106S-108S.

An Al single crystal is deformed 15% and subsequently X-ray tested to study the formation of slip lines of a width of 150-5000 Å and secondary slip bands of approximately 1 mm. width. 6 ref. (Q24c; Al, 14-61)

728-Q. (German.) Examination of Brittle Turbine Blades of 13% Cr Steel. H. Schumann. Technik, v. 16, Feb. 1961, p. 78-82.

Report of impact strength measurements, microstructural investigations and hardness measurements made on X20 Cr 13 steel specimens to investigate temper embrittlement after various heat treatments. (Q26s, Q6, Q29; ST)

729-Q. Heading With High Vanadium Dies. Robert S. Holder. American Machinist/Metalworking Manufacturing, v. 105, Jan. 9, 1961, p. 72-73.

Vanadium added to basic 0.90 carbon, water-hardening toolsteel used for cold heading dies increases wear resistance and stabilizes fine grain over the normal hardening range. Application of the dies to production of fasteners and bolts from 18-8 stainless and 1010 steel. (Q-general, J5, 2-60, G10, 17-57; TS)

730-Q. (German.) Steel Selection and Heat Treatment for Hot and Cold Working Tools. E. Zmihorski. Harterei-Technische Mitteilungen, v. 15, Apr. 1951, p. 229-233.

Comparison of hardness distribution and lifetime of various alloy steels for hot working tools. Wear and compression fatigue tests of cold working toolsteels after various hardening operations and subsequent annealing at temperatures from 175-570° C. (Q29, J-general; TS)

731-Q. Microhardness of Silver Deposits. S. Ramachandran and N. V. Parthasaradhy. Metal Finishing, v. 59, Mar. 1961, p. 40-44, 60.

Microscopic determination of the microhardness of electroplated films of Ag on brass and mild steel. Microhardness tests give a good indication of the wear resistance of the electrodeposited coating. 16 ref. (Q29q, L17; CN, Cu-b, Ag)

732-Q. Studies of Fracture Strength. H. L. Smith, W. E. Anderson and K. McKinney. Report of NRL (Naval Research Laboratory) Progress, Mar. 1961, p. 21-23. (Available as PB 171316 from U. S. Office of Technical Services, Washington 25, D. C.) $1.25.

The influence of various liquid environments on the fracture stress and crack propagation of 3 in. wide centrally Elox notched flat tensile specimens of X-200, M-255 and 300-M high-strength steels loaded to fracture in India ink, water, oils and preservatives. (Q26, 2-66; AY-n)

733-Q. Metals and Alloys at High Temperature. T. R. Cass and M. R. Achter. Report of NRL (Naval Research Laboratory) Progress Report, Mar. 1961, p. 23-25. (Available as PB 171316 from U. S. Office of Technical Services, Washington 25, D. C.) $1.25.

The rupture strength of metal couples bonded by sintered oxide layers is studied on 99.8% Ni specimens, preoxidized and sintered under compressive stress at 1500° F. to determine the stress at which oxide bonded grain boundaries will part and to investigate the influence of air strengthening or internal oxidation mechanism on the improvement of creep rupture strength of Ni and Ni alloys at high temperature. (Q3m, M27f, R2s, 2-64, 3-66; Ni-b, 6-72)

734-Q. Radiation Damage of Metals - (Neutron-Induced Changes in Steel--Relation to Total Neutron Dosage and Irradiation Temperature). L. E. Steele and J. R. Hawthorne. Report of NRL (Naval Research Laboratory) Progress, Mar. 1961, p. 30-31. (Available as PB 171316 from U. S. Office of Technical Services, Washington 25, D. C.) $1.25.

Upward shift of the brittle-ductile transition temperature for A201, A212B, A302B and SA336 pressure vessel steels as a function of specimen temperature and neutron dosage examined for Charpy V-notch specimens irradiated at 200-550° in a low intensity reactor. 3 ref. (Q23r, 2-67; AY)

735-Q. Bearing Materials and Properties. E. R. Booser. Machine Design Reference Manual (The Bearings Book), 1961, p. 95-103.

Load capacity, tensile strength, temperature effects, hardness, corrosion resistance, fatigue resistance and coefficient of expansion for babbitts, bronzes, Cu alloys, Al, plastics, porous bronze and Fe, steel, cast iron, graphite, cermets and ceramics. (Q-general, T7d; SGA-b, Al, ST, Cu-b, Fe-b, NM)

736-Q. High-Strength Aluminum Alloys: Where They Stand Now. Donald Peckner. Materials in Design Engineering, v. 53, Apr. 1961, p. 133-135, 138-140.

Data are given for composition, tensile properties, corrosion resistance and elevated temperature properties of 2014, X2020, 2024, 7075, 7079 and 7198 Al alloys. Comparison with steel. (Q27, R-general; Al-b, SGB-a)

737-Q. (Pamphlet.) Statistical Variations in the Lap-Joint Strength of Metal-Bonding Adhesives at Elevated Temperatures. H. W. Eickner and W. Z. Olson. U. S. Dept. of Agriculture Forest Service, Madison 5, Wis. no. 1880, Feb. 1961, 22 p.

Bonds of corrosion resistant Type 301 steel with epoxy phenolic and acrylonitrile phenolic are tested from 300-500° F. to determine effect of statistical variations such as curing and drying time, temperature and pressure on lap joint strength. (Q10c, K12; SS)

738-Q. (Pamphlet.) Bend Properties of Welded High Strength Titanium Alloy Sheet. A. J. Brothers, H. E. Martens and H. L. Wood. Jet Propulsion Laboratory, California Institute of Technology, Technical Report no. 32-39, Jan. 30, 1961, 12 p.

Six Ti sheet alloys with a 0.2% yield strength of greater than 150,000 psi. are welded with different Ti filler wire alloys. A combination three-point free and guided bend test is used to determine the ductility of the weld joints. Results are evaluated according to the effect of filler wire composition and welding heat treatment sequence on weld strength and graded according to weldability. (Q5, K9s, 2-60, 2-64; Ti-b, 4-53, 7-51)

739-Q. (Japanese.) The Effect of Rare Earth Metal "Mischmetal" on Some Properties of Al and Its Alloys. Pt. 2. Heat Resistance Properties of Al and Al-Mg Alloys Additions. Shigeo Sakai and Riei Ichikawa. Nagoya Institute of Technology, Bulletin, Dec. 1960, p. 323-328.

Mechanical properties, heat resistance and oxygen absorption of specimens containing 0.04-5.0% mischmetal are investigated by microscopic examination and tensile impact and oxidation tests at 20-400° C. 5 ref. (Q-general, R1h, 2-60, 2-62; Al-b, Mg, EG-g)

740-Q. (German.) Influence of Coarse-Grain Widmanstatten Microstructure on Bending Fatigue Strength of Notched and Unnotched C45 Steel. Gerhard Seeger and Gunther Holzmann. Archiv fur das Eisenhuttenwesen, v. 32, Feb. 1961, p. 103-105.

Bending fatigue testing of normalized and as-hot rolled notched and unnotched C45 steel specimens of given mechanical properties and microstructure. Influence of grain size and specimen surface on fatigue strength. (Q7, 2-59; ST)

741-Q. (German.) Crack Propagation in Fatigue Stressed Steels. Alexander Matting and Herbert Wolf. Materialprufung, v. 3, Feb. 1961, p. 51-62.

Crack propagation is investigated during fatigue bending and fatigue tensile testing by microstructure examination for unalloyed steels (0.07-0.35% C) of given mechanical properties. Reaction mechanism and kinetics of crack propagation. (Q26q, Q7; ST)

742-Q. (German.) Influence of Mounting Length and Pickling on Twist Testing of Steel Wire. Franz Bleilob and Horst Borst. Stahl und Eisen, v. 81, Mar. 16, 1961, p. 356-360.

Twist testing, using varying mounting lengths of steel wire (0.55-0.90% C) of 0.5-7 mm. diameter after various pickling treatments. (Q1; ST, 4-61)

743-Q. (German.) Heat Treatment in Hydrogen Atmosphere of Binary and Ternary Magnesium-Zirconium Base Alloys (Hydrogen-Effect). Hans Joachim Taschow and Franz Sauerwald. Zeitschrift fur Metallkunde, v. 52, Feb. 1961, p. 135-141.

Change of mechanical properties, electrical resistance and microstructure is investigated for MgZrZn alloys with 0.52-0.81% Zr and 0-5.38% Zn on annealing in pure hydrogen at temperatures from 250-500° C. Precipitation hardening by hydrogen (hydrogen effect). (Q-general, P15g, M27, 2-64; Mg-b, Zr-b, Zn)

744-Q. (English.) Slipping and Twin Bands in Crystals of White Tin. Tomoo Hirokawa. Hiroshima University, Journal of Science, Series A, v. 24, Oct. 1960, p. 337-357.

Electron and optical microscopic examination of etched and annealed single crystal Sn plates to determine effect of stretching on crystal structure. Relation between shear stress and slipping and twinning mechanism. (Q24, M26, M21, 3-68; Sn, 14-61)

745-Q. Structural Factors Affecting the Creep Properties of Precipitation-Hardened Nickel-Chromium Alloys. W. Butteridge. Metallurgia, v. 63, Feb. 1961, p. 79-85.

Factors in the development of creep-resisting Ni-Cr alloys including compositional effects relating to the matrix, precipitable phases and minor constituents and influences of processing procedure, heat treatment and size of the test bar. 14 ref. (Q3, 3-71; Cr-b, Ni-b)

746-Q. Easy Glide of Lead Single Crystals. R. L. Fleischer. Acta Metallurgica, v. 9, Mar. 1961, p. 184-190.

Effect of purity, orientation and temperature on easy glide and work hardening phenomena in f-c-c. Pb single crystals containing small impurities of Al, Cu or Sn tested in tension at 4.2 and 77° K. Examination by Laue back reflection and creep and hardness measurements with data for stress-strain relations and theoretical analysis in terms of a model due to Diehl. 23 ref. (Q24, Q23a, M-general, 2-60, 2-61, 3-72; Pb, Al, Cu, Sn, 14-61)

747-Q. Effect of Grain Size and Temperature on Slip Twinning and Fracture in 3% Silicon Iron. D. Hull. Acta Metallurgica, v. 9, Mar. 1961, p. 191-204.

The importance of twinning in brittle fracture is studied in a 3% silicon iron with tensile tests at 20, -78, -196 and -253° C. on unirradiated and irradiated specimens over a range of grain sizes. Specimens show plastic deformation by slip, with twins close to the fracture in the case of brittle fracture, the twinning causing crack nucleation. Twinning is observed to be most pronounced in the larger grains. 14 ref. (Q26s, Q24a, Q24b, 2-59, 2-67; Fe-b, Si)

748-Q. (Czech.) Computation of High-Temperature Creep. J. Sedlacek. Strojirenstvi, v. 10, Dec. 1960, p. 895-900.

Computation from the absolute temperature, time elapsing until rupture or a predetermined elongation and the initial load, based on the Larson-Miller equation. 6 ref. (Q3, 1-66)

749-Q. How Fastener Tension Varies With External Joint Loads. Pt. 1. W. T. Appleberry. Assembly & Fastener Engineering, v. 4, Apr. 1961, p. 26-30.

Factors affecting fatigue life of joints. Derivation of formulas relating bolt tension with preload and service load. (Q7; 7-54)

750-Q. Effect of Forming and Welding on Stainless Steel Columns. Robert E. Petersen and Axel O. Bergholm. Aerospace Engineering, v. 20, Apr. 1961, p. 26-27, 71-77.

A method is derived for predicting mechanical properties of Type 301 stainless steel columns taking into consideration the nonlinearity of the stress-strain relationship, the effects of forming and spot welding and the direction of rolling. 4 ref. (Q27, Q29, 3-68; SS, 4-57)

751-Q. Photoelastic Strain Gages. G. U. Oppel. Experimental Mechanics, v. 1, Mar. 1961, p. 65-73.

Measurement of stress magnitude and direction in Al, Mg and steel with uniaxial and biaxial photoelastic strain gages at temperatures to 1400° F.

Effects of stress ration, torsion and temperature on strain fringe pattern. (Q25, 1-52; Al, Mg, ST)

752-Q. Experimental Investigation of the Buckling Instability of Monocoque Shells. R. H. Homewood, A. C. Brine and A. E. Johnson. Experimental Mechanics, v. 1, Mar. 1961, p. 88-96.

Hydrostatic pressure tests and wire strain gage and electronic pressure transducer measurements to determine critical buckling pressure and stress distribution for shells of SAE 1020 steel, 2024 T3 Al alloy and 6061 T6 Al alloy of various shapes and thicknesses. (Q24, Q10, 3-74; ST, Al-b)

753-Q. Dislocation Relaxation Spectra of Cold Worked Body-Centered Cubic Transition Metals. R. H. Chambers and J. Schultz. Physical Review Letters, v. 6, Mar. 15, 1961, p. 273-275.

Measurement of the damping spectra of b-c-c. transition metals showed peaks in the internal friction versus temperature curve for Cb, Mo, Ta and W. 6 ref. (Q22, 2-61; Cb, Mo, Ta, W)

754-Q. (Russian.) Influence of Alloying Elements on Properties of Titanium-Aluminum Alloys. I. E. Kontorovich and A. T. Semenchenkov. Tsvetnaya Metallurgiya, June 1960, p. 144-148.

Determination of hardness, microstructure and electrical resistance of Ti-4% Al alloy as influenced by additions of Co, Fe, Ni, Cu, Nb, Cr, Mn, W, Mo and Cr. Influence of atomic diameter and lattice type of alloying elements on Ti-Al alloy. (Q29n, P15g, M27, 2-60; Ti-b, Al)

755-Q. (Russian.) Deformation Mechanisms in Round Samples Under Cyclic Heat Treatment. H. P. Lazarev. Tsvetnaya Metallurgiya, June 1960, p. 149-152.

Deformation and volume changes in solid Al rods and bimetallic two layer Al-Armco iron rods as affected by the number of cyclic heat treatments. Nonuniform strain and stress are obtained in various layers due to the increased lattice size of Al. (Q24, P10d, 2-64; Al, Fe-a, 4-55)

756-Q. Fatigue--The Problem in Relation to Welded Structures. Pt. 3. R. P. Newman. Welder, v. 29, Oct-Dec. 1960, p. 86-92.

Survey of factors influencing fatigue strengths of mild steel butt welds. Recommendations for obtaining high-fatigue strength welds in mild steel structures, plates and pipe. (To be continued.) (Q7a; CN, 7-51)

757-Q. Tensile and Compressive Creep of 6Al-4V Titanium-Alloy Sheet and Methods for Estimating the Minimum Creep Rate. H. L. Price and G. J. Heimerl. NASA Technical Note D-805, Apr. 1961, 19 p. (Available from National Aeronautics and Space Administration, Washington, D. C.) $.50.

Heat treatment at 1700° F. and aging at 1000° F. Testing at 80-1200° F. with tensile and compressive loads to determine effect of strain rate and temperature on tensile and yield strength, Young's modulus, elongation, stress and creep rate. (Q3, Q27, Q23, 2-64; Ti-b, Al, V, 4-54)

758-Q. Sag Characteristics of Steel Versus Temperature. Robert F. Patrick. Paper from "Porcelain Enamel Institute Forum, Proceedings". v. 20. Porcelain Enamel Institute, Inc., Washington, D. C., 1958, p. 8-12.

Strips of different cold rolled steels and of enameling irons are supported over a 10 in. span, placed in a furnace and fired for 3 1/2 min. at 1200-1550° F. Effect of firing temperature and metal thickness on sagging. 6 ref. (Q24, 2-61; Fe, ST)

759-Q. Mechanical Properties of Porcelain Enameled Aluminum. A. L. Sopp, Jr. Paper from "Porcelain Enamel Institute Forum, Proceedings". v. 21. Porcelain Enamel Institute, Inc., Washington, D. C., 1959, p. 69-77.

Determination of tensile strength, yield strength and elongation of no. 1 PEX, no. 1 PES, no. 3 PES and 6063 Al sheet and extrusion alloys. Effect of metal thickness, enamel thickness, age hardening and rate of cooling from enameling temperature to room temperature on strength properties. Data also given for static flexure, flexural fatigue and dent resistance properties. (Q27, Q23; Al, 4-53, 8-71)

760-Q. Factors in Evaluating Fatigue Life of Structural Parts. W. Illg. NASA Technical Note D-725, Apr. 1961, 10 p. (Available from National Aeronautics and

Space Administration, Washington, D. C.) $.50.

Evaluation of fatigue life by variable-amplitude loading, fatigue-crack propagation and equivalent fatigue loading. Effect of crack length and area on static residual strength. Experimental testing of parts made from 2024-T3 steel and 7075-T6 Al alloy. (Q7b; Al-b, ST)

761-Q. Welding--Engineering and Metallurgical Aspects. R. P. Newman and P. T. Houldcroft. Chartered Mechanical Engineer, v. 8, Apr. 1961, p. 214-221, 249.

Fatigue properties, brittle fracture at low stress and hydrogen embrittlement of arc welded mild steel, high-strength steel, alloy steel and Al alloys. (Q7, Q26s; Al-b, AY, CN, SGB-a, 7-51)

762-Q. Review of Recent Developments in the Technology of Columbium and Tantalum. F. S. Bartlett and F. F. Schmidt. Defense Metals Information Center, Battelle Memorial Institute, DMIC Memo. 97, Apr. 10, 1961, 5 p. (Available as PB 161247 from U. S. Office of Technical Services, Washington 25, D. C.)

Effect of additions of W, Mo, Rh, Zr, Hf and V on the tensile properties and ductile to brittle transition temperatures of Cb and Ta alloys. Effect of heat treatment on stress-rupture life. 11 ref. (Q27, Q23r, Q3m, 2-60, 2-64; Cb-b, Ta-b)

763-Q. The Bending Stress Distribution at the Base of a Stationary Crack. M. L. Williams. Journal of Applied Mechanics, Series E (American Society of Mechanical Engineers, Transactions), v. 28, Mar. 1961, p. 78-82.

Mathematical determination of the stress distribution at the base of a crack in a metal plate subjected to symmetrical and antisymmetrical bending. Computations indicate that reciprocity relationships exist between both types of bending conditions for the asochromatic fringe lines and stress trajectories. 5 ref. (Q5m)

764-Q. Size Effect in Brittle Fracture of Notched E-Steel Plates in Tension. J. H. Ludley and D. C. Drucker. Journal of Applied Mechanics, Series E (American Society of Mechanical Engineers, Transactions), v. 28, Mar. 1961, p. 137-139.

Testing in support of the assumption that the Griffith theory, based on a strong size effect, is not applicable to the initiation of brittle fracture in structural steel plates. 9 ref. (Q26s; ST, 4-53)

765-Q. Stresses in Thin-Walled Pressure Vessels With Ellipsoidal Heads. H. Kraus, G. G. Bilodeau and B. F. Langer. Journal of Engineering for Industry, Series B (American Society of Mechanical Engineers, Transactions), v. 83, Feb. 1961, p. 29-40.

Digital computer calculations of stresses in thin-walled pressure vessels with ellipsoidal heads, using a finite difference approximation to the Love-Meissner equations for the ellipsoidal shell. Tabulations are presented for stress and stress intensity indexes. 14 ref. (Q25, T26q)

766-Q. Studies of the Design of Steel Casting and Steel Weldments as Related to Methods of Their Manufacture. Harry R. Nara, D. K. Wright and Charles W. Briggs. Journal of Engineering for Industry, Series B (American Society of Mechanical Engineers, Transactions), v. 83, Feb. 1961, p. 73-91.

Research report on the design of steel castings and weldment sections and a comparison of their properties including fatigue, discontinuities, strength and stress concentrations. (Q7, Q27, Q25k; ST, S, 7-51)

767-Q. (Czech.) Dimensioning of Thick-Walled Tubing Designed to Withstand High Pressure at Elevated Temperature. N. Gorbatov. Strojirenstvi, v. 11, Jan. 1961, p. 4-12.

Low alloy steel with 0.83-2.08% Cr is creep tested at 482-649° C. and tubing of Cr-Ni steel containing 0.12% C, 1.0% Mn, 0.55% Si, 0.025% P, 0.02% S, 13% Cr, 13% Ni, 1.8% Mo, 1.3% W, 0.1% Ti, 0.4% V and 0.3% Cb is pressurized at 650° C. to determine optimum wall thickness. 22 ref. (Q3, Q10, S14; AY, 4-61)

768-Q. (Japanese.) Aluminum (Alloy) Sheet Ingot. Pt. 1. Relation Between Hot Cracking and Chemical Composition. Kobayashi Toziro and Otuzi Hisao. Light Metals, v. 11, Jan. 1961, p. 11-19.

Hot cracking of ring cast ingot specimens of Al-Fe-Si alloys containing 0.1% Fe and 0.8% Si and Al-Mg-Si alloys containing 0-4% Mg and 0-2% Si, 0.04-15% Ti or 0.3-4.5% Cu being

added to both alloys. Macrostructures and crack length data are given as a function of composition. 8 ref. (Q26q, M28p, 2-60; Al-b, 4-53)

769-Q. (Japanese.) The Directionality of Aluminum Sheet as Affected by Addition Elements. Pt. 1. The Effect of Mn and Sn. Morinaga Takuichi, Muromachi Shigeo and Zaima Shigeo. Light Metals, v. 11, Jan. 1961, p. 24-28.

Effect of 0.2-2.3% Mn and 0.1-2.0% Sn addition on the directionality elongation and recrystallization temperature of 1S Al alloy determined by Knoop indenter after 260-500° C. annealing and cold rolling. (Q23, Q29n, N5, 2-60, 3-72; Al-b, 4-53)

770-Q. (Japanese.) The Directionality of Aluminum Sheet as Affected by Addition Elements. Pt. 2. The Effect of Fe, Mg and Ti. Morinaga Takuichi, Muromachi Shigeo and Zaima Shigeo. Light Metals, v. 11, Jan. 1961, p. 29-34.

Effect of 0.1-0.6% Fe, 1.0-3.5% Mg and 0.2-1.5% Ti additions on the directionality, elongation, hardness and recrystallization temperature of 1S Al alloy determined by Knoop indenter after 260-500° C. annealing and cold rolling. 7 ref. (Q23, Q29n, N5, 2-60, 3-72; Al-b, 4-53)

771-Q. (Japanese.) Extrusion Effects on 61S Aluminum Alloy. Asada Hiroshi and Koike Kichizo. Light Metals, v. 11, Jan. 1961, p. 43-51.

Effect of extrusion ratio and temperature, heat treatment temperature and Cr content on the tensile strength and substructure of 61S Al alloy. Relation of substructure hardening and strengthening due to interaction between edge dislocations at sub-boundaries and solute atoms formed in Guinier Preston zones on aging. 23 ref. (Q27, M27, 2-60, 2-64, 3-68)

772-Q. The Crystallographic Dependence of Low Load Indentation Hardness in Beryllium. N. A. Hill and J. W. S. Jones. Journal of Nuclear Materials, v. 3, Feb. 1961, p. 138-155.

Low load indentation diamond pyramid hardness of Be as dependent on orientation, surface condition, deformation mechanism and angle of inclination of indentation. Data are given for measurements on single crystals, sheet rod and cylindrical specimens fabricated by extrusion, casting and sintering with various machining, etching, deformation and electropolishing treatments. 21 ref. (Q29n, 3-68, 3-72; Be)

773-Q. The Effect of Inclusions on the Fracture of Uranium. D. M. Davies and J. W. Martin. Journal of Nuclear Materials, v. 3, Feb. 1961, p. 156-161.

Metallographic study of the nucleation and propagation of tensile fracture in the alpha range of commercially pure uranium, the crack nucleus being associated with the inclusions present. Effect of prior annealing in the gamma range upon the size-distribution of inclusions. 20 ref. (Q26q, 2-64, 9-69; U-a)

774-Q. Creep Properties of a Zirconium-Hydrogen-Uranium Alloy. J. C. Bokros. Journal of Nuclear Materials, v. 3, Feb. 1961, p. 216-221.

The temperature and stress dependence of the steady-state creep rate of a Zr-8.03% U-1.07% H alloy is determined at 500-600° C., which includes an eutectoid transformation. Data are given for activation energy and transformation temperature. 3 ref. (Q3, N-general, 2-62, 3-66; Zr-b, H, U)

775-Q. Temperature Dependence of the Slip Direction for (100) Slip in Alpha-Uranium. L. T. Lloyd, P. LaCombe, D. Calais and N. Simenel. Journal of Nuclear Materials, v. 3, Feb. 1961, p. 241-245.

Theoretical analysis and review of experimental data for slip mechanisms and orientation relationships of crystals deformed in tension and compression at -196 to 600° C. 7 ref. (Q24a, M26c, 2-61, 10-54; U-a)

776-Q. Selection of Metals for Use at Cryogenic Temperatures. A. Hurlich and J. F. Watson. Metal Progress, v. 79, Apr. 1961, p. 65.

Since the newer missiles and rockets will be powered by liquid oxygen (boiling point, -297° F.) and liquid hydrogen (boiling point, -423° F.), there is much interest in materials which will remain tough at such low temperatures. List of several of the Al, Ti and stainless steel alloys which can be used for low temperature applications. (Q-general, T24e, T2p, 2-63, 17-57; Al-b, Ti-b, SS)

777-Q. A New Cast Alloy for Use at 1900° F. C. G. Bieber and T. E. Kihlgren. Metal Progress, v. 79, Apr. 1961, p. 97.

Laboratory tests indicate that IN-100--a new nickel-based alloy--has adequate tensile and rupture strength for turbine blades operating up to 1900° F. (Q-general, T7h, 17-57; Ni-b, 5-62)

778-Q. (French.) New Case-Hardened American Steels for the Automobile Industry. Revue du Nickel, v. 27, Jan-Feb. 1961, p. 15-18.

Composition, hardenability, mechanical properties and machinability of Inco 1-4, AISI 8620 and AISI 4620 steels. (Q-general, J5, G17k; ST)

779-Q. Hydrogen and Delayed Cracking in Steel Weldments. E. P. Beachum, H. H. Johnson and R. D. Stout. Welding Journal, v. 40, Apr. 1961, p. 155s-159s.

Lehigh restraint test used to study delayed cracking in carbon and alloy steel weldments. Relation of cracking susceptibility to base plate and welding wire composition and to hydrogen concentration. Effect of low-aging temperatures on cracking time. 14 ref. (Q26s, Q26q, K9r, 2-60, 2-64; ST, 7-51)

780-Q. Properties of Flash-Welded Molybdenum. Ernest G. Thompson, Harold Binder and Harold Collins. Welding Journal, v. 40, Apr. 1961, p. 160s-165s.

Technique for flash welding arc cast 0.5% Ti-Mo alloy bar stock. Mechanical properties of as welded joints at room temperature; influence of upset and of test temperature on weld bend ductility; and tensile properties of cold worked, flash welded sheet specimens at 2200-3200° F. 6 ref. (Q-general, K3s; Mo-b, Ti, 7-51)

781-Q. Influence of Residual Stresses and Metallurgical Changes on Low-Stress Brittle Fracture in Welded Steel Plates. A. A. Wells. Welding Journal, v. 40, Apr. 1961, p. 182s-192s.

Survey of failures induced by slowly applied loads in welded and notched wide plate and pressure vessel tests. Conditions for the initiation and propagation of cleavage cracks. Effects of residual stresses and defects. 40 ref. (Q26q, Q26s, 3-66, 9-71; ST, 4-53, 7-51)

782-Q. (English.) A Review of Pull and Torsion Tests on Cast Iron. Akimasa Ono. Japan Academy, Proceedings, v. 36, Nov. 1960, p. 601-606.

Mathematical analysis and review of rupture in pull and torsion testing of cast iron. Formulas developed are applicable to shearing, critical and tensile stress and cracking properties. (Q3q; CI)

783-Q. (English.) Photoelastic Investigation of Stresses Caused by Notches in Reinforced Bars. Heihachi Shimada. Japan Society of Mechanical Engineers, Bulletin, v. 4, Feb. 1961, p. 1-5.

Photoelastic investigation of bars of epoxy resin with a central duralumin or Cu stringer adhesively bonded by Araldite 121 to determine stress concentration at notches. 11 ref. (Q23s, Q25k; Al-b, Cu)

784-Q. (English.) Some Studies on Rotating Bending Fatigue of Large Mild Steel Specimens. Jiro Hoshino. Japan Society of Mechanical Engineers, Bulletin, v. 4, Feb. 1961, p. 33-40.

Study of relationship between stress and propagation speed of fatigue cracks in mild steel in terms of shell pattern. Development of formula to express this relationship. (Q7c; CN)

785-Q. (English.) Residual Stresses Due to Alternate Stressing of Annealed Steels. Shuji Taira and Yasunori Murakami. Japan Society of Mechanical Engineers, Bulletin, v. 4, Feb. 1961, p. 41-45.

Report of development of residual compressive stress in annealed steel caused by alternating stress in reversed bending as affected by carbon content and yield. The impact of residual stress on fatigue and the co-axing phenomena is calculated. 10 ref. (Q25h; ST)

786-Q. (English.) A Mechanism of Deformation of Metals at High Temperature With Special Reference to the Creep After a Sudden Change in Stress. Shuji Taira, Kichinosuke Tanaka and Kiyotsugu Ohji. Japan Society of Mechanical Engineers, Bulletin, v. 4, Feb. 1961, p. 46-51.

Study of work hardening and recovery mechanisms following abrupt stress change based on behavior dislocations. Using creep test data, mild steel behavior is predicted after stress changes. 5 ref. (Q3, Q23a, N4; CN)

787-Q. Fracture of Notched Bar Tension Specimen. Kazuo Terazawa, Midori

Otani, Toshio Yoshida and Kiyoshi Terai. Osaka University, Technology Reports, v. 10, Oct. 1960, p. 763-778.

Effect of notch geometry on crack initiation in mild steel specimens fractured in tension at room temperature is evaluated in terms of flow stress and the rim effect. Center cracking of the notched section is attributed to ductile or fibrous fracture while contour cracking is related to shear fracture. 13 ref. (Q26, Q27d; 3-73; CN)

788-Q. Brittle Fracture and Ductile Fracture of Alpha-Iron. Masaki Watanabe and Kazuyoshi Kamachi. Osaka University, Technology Reports, v. 10, Oct. 1960, p. 779-788.

X-ray microbeam and microscopic examination of fracture patterns and deformation modes of specimens tensioned and impacted to failure at liquid nitrogen and room temperature. 3 ref. (Q26, Q24, M23p, 2-61; Fe-a)

789-Q. (German.) Unsteadiness in the Temperature Curves of Notch Impact Strength of Ferritic Steels. Karl Wellinger and Hans-Joachim Wittwer. Naturwissenschaften, v. 48, Feb. 1961, p. 69.

Stepwise change of impact strength of notched and unnotched specimens of heat treated and soft ferritic steels of medium carbon content (Ck 35, Ck 45 and Ck 60 steel) and of hexagonal MgAl 6 Zn alloy and pure Zn as influenced by testing temperature, composition and heat treatment. (Q6n, 2-60, 2-61, 2-64; Al-b, CN-p, Mg-b, Zn-b)

790-Q. (German.) Behavior of a Magnesium Rolling Alloy After High-Degree Working in the Recovery Field. E. Mohr. Metall, v. 15, Mar. 1961, p. 228-230.

Tensile testing of a Mg-1.82% Mn alloy after rolling of 100 mm. thick bars to 0.55 mm. sheet with various intermediate annealing operations and 30 min. final annealing of the rolled sheet at temperatures from 90-290° C. Influence of final annealing temperature on tensile strength, yield point and elongation. (Q27, Q-general, F23, 2-64; Mg-b, Mn, 4-53)

791-Q. (German.) Mechanical Properties of Martensitic Nickel Steel Containing 13% Nickel at Temperatures of Liquid Air. Hermann Schumann. Neue Hutte, v. 6, Feb. 1961, p. 92-98.

Tensile and notch impact testing at -180 to 20° C. of hot rolled X 8 Ni 13 steel in the as-rolled state and after single and repeated normalizing at 750-900° C. Investigation of transformation mechanisms by magnetic, microstructure and X-ray (Co-K-alpha radiation) methods. (Q6, Q27, M-general, N-general, 2-63, 2-64, 3-68; SS-c)

792-Q. (German.) Work Hardening and Residual Stress of Surface Layers of Tensile Deformed Copper Specimens. Carl-Otto Leiber and Eckard Macherauch. Zeitschrift fur Metallkunde, v. 52, Mar. 1961, p. 196-203.

Plastic tensile deformation of electrolytically polished and vacuum stress-free annealed (300-450° C.) pure Cu specimens (99.985% Cu) with subsequent lattice expansion measurements of the surface layer by X-ray back reflection to investigate work hardening and the order of residual stresses. (Q23a, Q25, M22g, 3-68; Cu)

793-Q. (Russian.) Distribution of Stresses in Relation to Flake Formation in Deformed Steel Forgings. I. E. Brainin and V. A. Kharchenko. Izvestiya Vuz Chernaya Metallurgiya, Oct. 1960, p. 139-142.

Effect of residual elastic stresses and hydrogen diffusion and content on flake formation. Hydrogen embrittlement of areas at dislocations due to accumulation of atomic hydrogen. 4 ref. (Q25, Q26s, 9-70; ST, 4-51)

794-Q. (Russian.) Effect of Homogenizing on Redistribution of Silicon and Mechanical Properties of Magnesium Gray Cast Iron. V. G. Permyakov, R. P. Todorov, G. I. Koshovnik and A. V. Belotskii. Izvestiya Vuz Chernaya Metallurgiya, Oct. 1960, p. 143-147.

X-ray analysis and mechanical tests of samples heat treated by holding at 1050° C. for 5 min. to 15 hr. Microhardness of various structure constituents as a function of distribution. (Q-general, M22g, 2-60, 2-64, 9-69; CI-n, Si, Mg)

795-Q. Sulphide Inclusions in Steel. Lawrence H. Van Vlack, O. K. Riegger, R. J. Warrick and J. M. Dahl. Metallurgical Society of AIME, Transactions, v. 221, Apr. 1961, p. 220-228.

Summary of the dependence of sulphide inclusion microstructures upon

steel composition, particularly the Mn-Si-O ratio and an interpretation of the behavior of sulphide inclusions at steel-rolling temperatures to suggest a mechanism for MnS deformation in re-sulphurized steels and to rationalize hot shortness anomalies between plain carbon and resulphurized steels. 12 ref. (Q26s, Q24, F23, 2-60, 2-61, 9-69; ST, Mn, S)

796-Q. Effect of Temperate on the Creep of Polycrystalline Aluminum by the Cross-Slip Mechanism. J. E. Dorn and N. Jaffe. Metallurgical Society of AIME, Transactions, v. 221, Apr. 1961, p. 229-233.

An activation energy of 27,400 ± 1000 cal. per mole is obtained for the creep of polycrystalline Al at 273-350° K. at strains of 0.003-0.230 and stresses of 2250-6000 psi. and at varying strain rates. A strain temperature-compensated time correlation is obtained indicating that the structure is dependent solely upon the strain at a given stress. 8 ref. (Q3, Q24a, P13a, 2-61, 3-66, 3-68; Al-a)

797-Q. Effect of Hydrogen on the Tensile Properties of Iodide Vanadium. A. L. Eustice and O. N. Carlson. Metallurgical Society of AIME, Transactions, v. 221, Apr. 1961, p. 238-241.

Tensile tests on vacuum annealed and hydrogenated specimens at -200 to 40° C. showing that the presence of 10 ppm. hydrogen is sufficient to cause embrittlement over a small temperature range. The temperature of the observed ductility minimum, -100° C., is determined as a function of strain rate and hydrogen concentration with the yield stress rising sharply in the brittle temperature range. 10 ref. (Q27, Q26s, Q23b, 2-60, 2-61, 3-68; V-a, H)

798-Q. Easy Glide and Grain Boundary Effects in Polycrystalline Aluminum. Robert L. Fleischer and William F. Hosford, Jr. Metallurgical Society of AIME, Transactions, v. 221, Apr. 1961, p. 244-247.

Tensile data for coarse grained aluminum polycrystals suggest that the "grain size" effect is not due to dislocation piled up at grain boundaries but rather is primarily a relative size effect due to surface crystals being weaker and less confined. 17 ref. (Q24c, Q27, M26, M27f, 3-73; Al-a)

799-Q. A Study of Fracturing Behavior of Copper and Zinc Coated With Mercury. N. A. Tiner. Metallurgical Society of AIME, Transactions, v. 221, Apr. 1961, p. 261-265.

Effects of temperature (-70 to 120° F.), cyclic and static loading and electric polarization on the fracturing behavior of Hg-coated Cu and Zn single crystals. Hg embrittlement appears to result from the rapid propagation of cracks along an active path, such as grain boundaries, basal slip planes or the tip of fatigue crack embryos. 18 ref. (Q26s, R6m, 2-61, 3-68; Cu, Zn, Hg, 14-61)

800-Q. Yield Point and Easy Glide in Silver Single Crystals. Joachim J. Hauser. Metallurgical Society of AIME, Transactions, v. 221, Apr. 1961, p. 305-309.

Tension, compression and Bauschinger tests are used to determine latent hardening characteristics due to slip deformation, in particular, the effect of deformation direction on easy glide and yield point phenomena and on the stress level of the stress-strain curve. 11 ref. (Q24a, Q24c; Ag, 14-61)

801-Q. Creep and Creep-Rupture Relationship in an Austenitic Stainless Steel. F. Garofalo, R. W. Whitmore, W. F. Domis and F. von Gemmingen. Metallurgical Society of AIME, Transactions, v. 221, Apr. 1961, p. 310-319.

Constant-load creep-rupture tests at 1100-1500° F. on a Type 316, 18 Cr-8 Ni-2Mo, austenitic stainless steel to determine the relationship between rupture life and other aspects of creep behavior. The dependence of the rupture life on the initial stress is related to the stress dependence of the minimum creep rate and secondary creep strain. The secondary creep strain depends on the nature of the grain boundary precipitate, which affects grain boundary migration. 17 ref. (Q3, N3, 3-66; SS-e)

802-Q. The Effect of Copper, Nickel, Iron and Chromium on the Tensile Properties of Preferentially Oriented Beryllium Sheet. F. M. Yans, A. D. Donaldson and A. R. Kaufmann. Metallurgical Society of AIME, Transactions, v. 221, Apr. 1961, p. 364-370.

Be is mixed by powder metallurgical techniques with Cu, Ni, Fe and Cr to

form Be rich binary alloys which are then extruded and rolled transverse to the extrusion direction. The solution hardening and embrittlement effects of each alloying element is determined by tensile testing and by X-ray diffraction, metallographic and fractographic methods. 10 ref. (Q27, Q26s, Q29n, M-general, N7, 2-60, 3-68, 3-72; Be-b, Cr, Cu, Ni, Fe)

803-Q. Dispersion Strengthening in the Copper-Alumina System. K. M. Zwilsky and N. J. Grant. Metallurgical Society of AIME, Transactions, v. 221, Apr. 1961, p. 371-377.

A series of Cu-Al_2O_3 dispersion strengthened alloys are prepared using different Cu and Al_2O_3 powder sizes. Improvements in strength of up to 10 times that of pure Cu are found in room temperature and elevated temperature stress-rupture tests. Conductivity values remain from 70-90% that of pure Cu. 10 ref. (Q3m, Q27, N7a, P15g, 3-71; Cu-b, Al, 6-70)

804-Q. Trapping of Hydrogen in Cold Worked Steel. H. H. Podgurski. Metallurgical Society of AIME, Transactions, v. 221, Apr. 1961, p. 389-394.

Low temperature extraction of methane and calculation of volume of methane entrapping microvoids to determine the solubility of hydrogen in low alloy steel due to cold work deformation and density changes. 11 ref. (Q26s, P12e, 3-68, 3-71; ST, H)

805-Q. Recovery and Recrystallization in 99.85% Cr. M. E. de Morton. Metallurgical Society of AIME, Transactions, v. 221, Apr. 1961, p. 395-400.

Recovery and early recrystallization of heavily deformed, 99.85% Cr investigated by studying metallographic structure, X-ray line sharpening, electrical resistivity, plastic properties, internal friction and shear modulus. Effect of strain and relative dislocation mobility on anelastic properties. 17 ref. (Q22n, Q-general, M-general, N5, 3-68; Cr-a)

806-Q. Mercury Embrittlement of Titanium Alloy RC-130-A. H. P. Leighly, Jr. Metallurgical Society of AIME, Transactions, v. 221, Apr. 1961, p. 408-409.

Reduction of tensile strength, accompanied by brittle fracture, of specimens wet by Hg under stress. (Q27, Q26s, R6m, 3-66; Ti-b, Hg)

807-Q. A Simple Device to Improve Uniaxial Loading in Compression Tests. Wilhelm in der Schmitten. Metallurgical Society of AIME, Transactions, v. 221, Apr. 1961, p. 409.

Application of a steel hemisphere as a "self-adjusting" upper compression plate for central and uniform distribution of stress over the whole specimen surface to prevent crumbling due to load misorientation in testing brittle specimens such as ionic crystals. (Q28, 1-52)

808-Q. Observations on the Ductility and Fracture of Recrystallized Chromium. Rollin E. Haak, Attwell M. Adair and Harry A. Lipsitt. Metallurgical Society of AIME, Transactions, v. 221, Apr. 1961, p. 409-411.

Intergranular and transgranular fracture and loss of ductility in electrolytic Cr wire, single crystal and large grain polycrystals as a result of embrittlement caused by recrystallization annealing in vacuum at 1150° C. for two hours. 6 ref. (Q23p, Q26s, N5, 2-64; Cr-a)

809-Q. The Role of Strain Hardening in the Plastic Range Fatigue. Dogan E. Gucer. Metallurgical Society of AIME, Transactions, v. 221, Apr. 1961, p. 415-416.

Relation between the relative endurance of A-302 low alloy structural steel and A-201 low carbon steel under plastic range cycling and their strain hardening characteristics. Tests are made on grooved specimens after normalizing and stress relief heat treatment. (Q7, N7e, 2-64, 3-68; ST)

810-Q. Some Peculiarities in the Shape of Hardness Curves of End Quenched and Tempered Steels. H. R. S. Rao and V. G. Paranjpe. Tisco (Tata Iron & Steel Co., India), v. 8, Apr. 1961, p. 71-90.

Effect of composition, cooling rate, tempering, austenitizing and quenching temperatures of silicomanganese and other alloy steels on the Rockwell C hardness, end quench hardness traverse and microstructure. 21 ref. (Q29n, M27, 2-60, 2-64; AY)

811-Q. Minimum Toughness Requirements for High Strength Sheet Steel. J. A. Kies, H. Romine, H. L. Smith and H.

Bernstein. Journal of Basic Engineering, Series D (American Society of Mechanical Engineers, Transactions), v. 83, Mar. 1961, p. 1-7.

Theoretical considerations based on the macro-aspects of fracturing and experimental test results on specimens of various widths are used to state a value for the minimum required toughness based on effects of flaw dimensions, temperature, section thickness, stress or strain history and working stresses. 3 ref. (Q23r; ST, SGB-a, 4-53)

812-Q. Energy Versus Stress Theories for Combined Stress--a Fatigue Experiment Using a Rotating Disk. W. N. Findley, P. M. Mathur, E. Szczepanski and A. O. Temel. Journal of Basic Engineering, Series D (American Society of Mechanical Engineers, Transactions), v. 83, Mar. 1961, p. 10-14.

Description of an experiment in which the strain-energy at the critical location for fatigue failure is maintained constant while the stresses on a given plane of the material at the same location are caused to fluctuate. Material tested is 355-T61 cast Al alloy. 7 ref. (Q7c, 3-66; Al-b)

813-Q. Microplastic Strain Hysteresis Energy as a Criterion for Fatigue Fracture. C. E. Filtner and Jo Dean Morrow. Journal of Basic Engineering, Series D (American Society of Mechanical Engineers, Transactions), v. 83, Mar. 1961, p. 15-22.

On the basis of the postulated energy criterion for fatigue failure, a relation is developed between stress amplitude and the number of cycles to failure which utilizes only material properties obtained from the static true stress-strain tension test. Theoretical predictions are compared with experimental results on 4340 steel. 16 ref. (Q7, Q26r; ST)

814-Q. Crack Propagation in Thin Metal Sheet Under Repeated Loading. H. W. Liu. Journal of Basic Engineering, Series D (American Society of Mechanical Engineers, Transactions), v. 83, Mar. 1961, p. 23-31.

An expression for crack length in 2024-T3 Al alloy sheets is derived for a semi-infinite sheet subjected to repeated loads consisting of a constant stress and mean stress. The expression is in terms of a stress dependent propagation factor and an exponential function of the number of cycles of loading. It is modified for specimens of finite width. 13 ref. (Q26q; Al-b, 4-53)

815-Q. Fracture of Flat and Curved Aluminum Sheets With Stiffeners Parallel to the Crack. J. Frisch. Journal of Basic Engineering, Series D (American Society of Mechanical Engineers, Transactions), v. 83, Mar. 1961, p. 32-38.

Mode of crack propagation and failure is investigated in large 2024-T3 Al sheets reinforced as above to determine the effects of curvature, crack location and stiffener spacing. 8 ref. (Q26q; Al-b, 4-53)

816-Q. A Study of Theories of Fracture Under Combined Stresses. I. Cornet and R. C. Grassi. Journal of Basic Engineering, Series D (American Society of Mechanical Engineers, Transactions), v. 83, Mar. 1961, p. 39-44.

Experimental data are presented for a cast nodular iron and for high-Si cast iron materials which represent limiting conditions of ductility in a test of fracture theories. It is concluded that failure of brittle materials under combined stresses may be predicted by applying a notch modified distortion energy criterion. 25 ref. (Q26r; CI)

817-Q. (Translation.) Nature of Shear Formation on the Yield Surface of Metals. N. W. Davidenkov and E. I. Brainin. Soviet Physics Solid State, v. 2, Feb. 1961, p. 1642-1643. (Translation of Fizika Tverdogo Tela, v. 2, Aug. 1960, p. 1681-2006.)

Study of yield surface deformation of thin steel samples as characterized by massive shear formation which leads to an abrupt bend in the rectilinear axis of the sample forming an additional source of stress. (Q24c, Q2j; ST)

818-Q. Higher Strength Steels Mean Reduced Weight With Economy. G. Haaijer. SAE Preprint 327B, 1961, 18 p.

Data given for tensile strength, yield point, elongation and bend diameter of ASTM A245 structural steel, USS Exten 45, USS Exten 50, USS Manten, USS Triten and ASTM 375A high-strength steels and USS T-1 constructional alloy steel. 4 ref. (Q27a, Q24c, Q23p, Q5; ST, SGB-a)

819-Q. The Gear Blank and Heat Treatment. W. G. Wallace. SAE Preprint 333B, 1961, 7 p.

Effect of carbonitriding, cooling stress, carbon content and martensite

formation during and following heat treatment on wear resistance, strength and hardness of gears. (Q9n, Q29n, Q27, 2-64, T7a)

820-Q. Metallurgical Influences on Mechanical Properties of Induction Furnace Melted 13% Chromium Steel Castings. Jaroslav Koutsky. Foundry Trade Journal, v. 110, Mar. 30, 1961, p. 395-404.

Effect of chemical composition, melting method, heat treatment and cooling rate on notch impact strength, ductility, tensile strength, yield strength, hardness, temper brittleness and microstructure. 9 ref. (Q-general, 2-60, 2-64; ST, Cr, 5)

821-Q. (French.) Steels for Low Temperature. H. Lejay. L'Industrie de Petrole, v. 28, Dec. 1960, p. 89, 91.

Embrittlement factors determining fracture of steel at low temperatures are examined by Charpy V-notch, stress rupture and elastic modulus tests. (Q26s, Q-general, 2-63; ST)

822-Q. (Russian.) Hardness of Some Cb Base Alloys at High Temperatures. I. I. Kornilov and R. S. Polyakova. Atomnaya Energiya, v. 10, Feb. 1961, p. 170-172.

Pure Cb and five of its alloys containing 5% Mo, 0-5% Zr, 0-1% Si, 0-1% Al and 0-0.2% C are vacuum homogenized at 1600° C. for 10 hr. and structure tested. Hardness is measured at 20-1000° C. 3 ref. (Q29n, 2-61; Cb-b)

823-Q. Metallurgical Influences on Mechanical Properties of Induction-Furnace-Melted 13% Chromium-Steel Castings. Jaroslav Koutsky. Foundry, v. 110, Apr. 6, 1961, p. 430-434.

Effect of chemical composition, time of addition and particle size of ferrochromium added, deoxidation agent, casting temperature and pouring atmosphere on the notch impact strength and brittleness of 13% Cr steel melted in a high-frequency furnace. (Q6n, Q26, E25, D6; ST, Cr)

824-Q. Pressure-Die-Casting of Complicated Aluminum Alloy Castings. D. P. Tatanov and N. V. Kuranova. Foundry, v. 110, Apr. 6, 1961, p. 437-438.

Data given for tensile strength, elongation, notch-impact strength and Brinell hardness of a pressure-die-cast Al alloy. (Q27a, Q23p, Q6, Q29n; Al-b, 5-61)

825-Q. (Russian.) Effect of Surface Work Hardening on the Wear Resistance of Steel. G. A. Preis and B. M. Zinko. Trudy Kievskago Tekhnologicheskago Instituta Pishchevoi Promyshlennosti, no. 21, 1960, p. 143-152.

Numerous steels are normalized and hardened from 780-1050° C. with subsequent shot blasting or roll peening. Effect of strain hardening on the frictional wear and acid corrosion resistance. 18 ref. (Q9n, R6g, 2-64; ST)

826-Q. Review of Current Developments in the Metallurgy of High-Strength Steels. H. J. Hucek and A. R. Elsea. Defense Metals Information Center, Battelle Memorial Institute, DMIC Memo. 100, Apr. 20, 1961, 2 p. (Available as PB 161250 from U. S. Office of Technical Services, Washington 25, D. C.)

Effect of impurities, rolling rate, plate thickness and decarburization on ultimate tensile strength, yield strength, elongation, reduction of area, ductility, resistance to crack initiation and crack propagation and transverse toughness of Rocoloy 270 and high-strength steels used in rockets and missiles. 4 ref. (Q-general, T24e; ST, SGB-a)

827-Q. (Translation-Brutcher no. 5059.) Effect of Plastic Tension on the Fatigue Limit of Heat Resistant Alloys. M. I. Chernyak. Dopovidi Akademii Nauk Ukrainskoi RSR, Feb. 1961, p. 173-174.

Variation of fatigue limit of Ni-base alloys tested at room temperature and at 700° C. with the strain hardening effects resulting from the machining of the specimens eliminated. (Q7, 2-61; Ni-b)

828-Q. (Translation-Brutcher no. 5107.) Attack of Hydrogen on Oil Refinery Steels. M. Hasegawa and S. Fujinaga. Tetsu-to-Hagane (Iron and Steel Institute of Japan, Journal), v. 46, Oct. 1960, p. 1349-1352.

Study of hydrogen embrittlement at a Japanese oil refinery where all welded pipelines of plain carbon steel failed after four years of service. (Q26s, T26r; CN)

829-Q. (Translation-Brutcher no. 4953.) Relation Between Hardness and Resistance to Cold Welding (Antifriction Property). A.

D. Kuritsyna. Metallovedenie i Termicheskaya Obrabotka Metallov, Aug. 1959, p. 27-31.

Study of hardness of annealed Cu alloyed with various elements as related to strain hardening during plastic flow. (Q29n, N7e; Cu-b)

830-Q. (Italian.) Heat Resistant Chromium-Nickel Stainless Steel for Castings. Nickel, Dec. 1960, p. 8-12.

Physical and mechanical properties, composition and fabrication characteristics of HD and HE steel. (Q-general, F-general, G-general, P-general, 17-52; SGA-h, SS)

831-Q. Preventing Fatigue Failures. Pt. 1. Basic Factors. F. B. Stulen, H. N. Cummings and W. C. Schulte. Machine Design, v. 33, Apr. 27, 1961, p. 116-120.

Service load, critical stress and material behavior factors in designing steel components to withstand fatigue load. (To be continued.) (Q7k; ST)

832-Q. Review of Current Data on the Tensile Properties of Metals at Very Low Temperatures. J. E. Campbell. Defense Metals Information Center, Battelle Memorial Institute, DMIC Rept. 148, Feb. 14, 1961, 76 p.

Effect of temperatures from -423 to 78° F. on the ductility, yield strength, tensile strength and elastic modulus of Al, Cu, Mg, Ni, Co, Ta, Cb, Ti and Fe alloys. 29 ref. (Q27a, 2-63)

833-Q. Deflection of a Wohler Test Piece During Fatigue Cycling. T. R. G. Williams and D. H. Hughes. Engineer, v. 211, Mar. 31, 1961, p. 498-499.

Effect of varying amounts of fatigue cycling on the transition temperature of a notched fatigue test piece of mild steel. The change in vertical deflection of a Wohler test piece is used as a guide to crack initiation. Fatigue stressing raises the transition temperature of the steel. (Q23r, 3-66, Q7; CN)

834-Q. (German.) Nonmagnetizable Steels for High Stresses. Max Kroneis and Reinhold Gattringer. Stahl und Eisen, v. 81, Mar. 30, 1961, p. 431-445.

Mechanical testing of heat treated, age hardened and cold worked nonmagnetizable X 35 Mn 18, X 120 Mn 12, X 40 MnCr 18, X 12 MnCr 18 10, X 40 MnCr 18, X 20 CrNiMn 129 and X 55 MnNiCr 14 steel. Improvement of strength, with emphasis on yield strength, by aging and cold working. (Q-general, Q23b, 2-65, 3-66, 3-68; AY)

835-Q. (German.) Titanium Carbide Base High-Temperature Materials. Curt Agte and Gotthard Blum. Neue Hutte, v. 6, Mar. 1961, p. 139-146.

Review of pressing and subsequent sintering properties at up to 1200° C. including sealing resistance and bending, creep, impact and tensile strength and engineering applications such as for turbine blades and hot working tools of alloys of 80% TiC and 20% TaC or NbC with a NiCoCr alloy binder. Influence of TiB_2 (1%) and Cr_3C_2 (1.25-5.5%) additions on properties. (Q-general, 2-62; Ti-b, SGA-h, 6-69)

836-Q. (German.) Relations Between Microstructure and Strength Properties of Aluminum Alloyed Nitriding Steels. Herbert Tauscher and Eberhard Stecher. Neue Hutte, v. 6, Mar. 1961, p. 146-150.

Soft-annealed or normalized specimens of nitrided and nonnitrided K 38 CrAlMo 6 steel are hardened (850-950° C.) and annealed at 630° C. with subsequent tensile and fatigue testing for evaluating strength properties as influenced by amount of free ferrite in microstructure. (Q-general, J28k, M27, 2-60, 2-64; AY, Al)

837-Q. (German.) Use of High-Strength Steel Castings in Aircraft Construction. Herbert Tauscher and Heinz Fleischer. Neue Hutte, v. 6, Mar. 1961, p. 151-156.

Tensile and notch impact testing at -80 to 20° C., fatigue testing at room temperature and weld testing of CrMo 44-electrode welded specimens of Si-Mn-Cr-Mo alloyed and Cr-alloyed cast steel to determine weldability, susceptibility to heat treatment and temperature dependence of properties. Review of alloy development and applications in aircraft. (Q-general, T24, 2-60, 2-61, 2-64; AY, SGB-a, 5, 17-57)

838-Q. (German.) Stress-Rupture Strength of Heat Resistant High-Alloyed Chromium Steel. W. A. Stauffer and A. Keller. Schweizer Archiv, v. 27, Mar. 1961, p. 121-125.

Stress-rupture testing at 600° C. of heat treated 12 Cr + Z steel for various

times. Unsteadiness in the stress-rupture curves is observed at long testing times. (Q3m, 3-67; SS, Cr)

839-Q. Investigation of Creep Buckling of Columns and Plates. Pt. 2. R. Papirno and G. Gerard. New York University (Wright Air Development Division). U. S. Office of Technical Services, PB 171082, July 1960, 46 p. $1.50.

Creep buckling and short time buckling studies performed on columns of Ti alloy Ti-7Al-4Mo with simulated simple support and fixed and boundary conditions. Both end shortening and central deflection are recorded autographically during loading and during creep. (Q3c; Ti-b, Al, Mo)

840-Q. An Investigation of Column Action During Creep Buckling. R. L. Carson. Battelle Memorial Institute (Aeronautical Research Laboratories). U. S. Office of Technical Services, PB 171149, June 1960, 50 p. $1.50.

Procedures for inspecting a creeping column for stability. An alternative inspection procedure is proposed and an analysis of the mechanics given. (Q3c)

841-Q. Creep Collapse of Long Cylindrical Shells Under High Temperature and External Pressure. T. Wah and R. K. Gregory. Aeronautical Research Laboratories. U. S. Office of Technical Services, PB 171152, Aug. 1960, 117 p. $2.75.

Results of theoretical and experimental work on the creep collapse of long cylindrical shells subjected to a uniform external pressure and high temperature (300-500° F.) (Q3, 2-61)

842-Q. Minimum Toughness Requirements for High-Strength Sheet Steel. J. A. Kies. U. S. Naval Research Laboratory. U. S. Office of Technical Services, PB 161786, Oct. 1960, 18 p. $.75.

Requirements are discussed in specific terms of an assumed through flaw (or crack) twice the sheet thickness in length. Tests measuring the critical driving force, or work per unit area, required for specimen fracture at the point of crack growth instability show that a test specimen width of at least 3 in. is required for most materials to guarantee a strength equal to or above the yield strength in a pressure vessel with the largest crack 2t or less in length. (Q23r; ST, SGB-a, 4-53)

843-Q. (Japanese.) The Wear Resistance of High Phosphorus Brake Shoes Containing Added Alloying Elements. Minoru Nakai, Seizo Saito and Kunio Okabayashi. Imono (Japan Foundrymen's Society, Journal), v. 33, Jan. 1961, p. 24-29.

Effect of 0.4-1.0% Cu and 0.2-0.7% Cr additions on the wear properties of 0.5% phosphorus cast iron brake shoe castings. Influence of pearlite matrix strengthening as a function of composition on hardness and microstructure. 3 ref. (Q9, Q29n, N8h, T23s, 2-60; CI, P, Cu, Cr)

844-Q. (Japanese.) Generating Process of Residual Stress in Bronze Castings. Toshiro Owadano. Imono (Japan Foundrymen's Society, Journal), v. 33, Jan. 1961, p. 30-34.

Relation of temperature difference during cooling, as a function of cross sectional area, to tensile and compressive stress development and resultant plastic deformation and stress relaxation phenomena. 4 ref. (Q25, E25n, 2-61, 3-73; Cu-s, 5)

845-Q. Formability of Chromium and Chromium-Tungsten Alloys. S. T. M. Johnstone, F. Henderson and H. L. Wain. Industrial Heating, v. 28, Apr. 1961, p. 736-737.

Report on the effect of tungsten content on the workability and ductility of Cr through an extrusion process. Results indicate that W-Cr alloy with 10-17% W has superior creep properties (at 950-1000° C.) provided the alloy is in a cold worked condition. (Q23q, Q3, 2-60; Cr-b, W)

846-Q. Effect of Creep Testing on the Hydrogen Embrittlement of a Titanium Alloy Containing 2% Aluminum and 2% Manganese. L. M. T. Hopkins, M. F. Grimwade, A. I. Smith and M. F. Day. Industrial Heating, v. 28, Apr. 1961, p. 738.

Investigation to determine the effects of creep deformation on hydrogen induced brittlement in Ti-Al-Mn alloys. Impact test results indicate that embrittlement is not aggravated by creep and that short time tensile and creep properties are not affected by hydrogen. (Q26s, Q3; Ti-b, Al, Mn)

847-Q. Effect of Hardenability on Development of Cracks in Tools. E. I. Malinkina. Metal Treating, v. 12, Apr-May 1961, p. 12-14, 35.

Formation of cracks in shank tools of 1.0 and 1.2% carbon steels as affected by cross sectional areas and hence hardenability of tools. Data are given for effect of quenching temperature on number and shape of cracks, conditions favoring bow-shaped cracks and core hardness as function of quenching temperature and cross sectional area of tools. (Q26q, J5, T6; CN, 17-57)

848-Q. Some Results of the Examination of Aluminum Alloy Specimen Fracture Surfaces. P. J. E. Forsyth and D. A. Ryder. Metallurgia, v. 63, Mar. 1961, p. 117-124.

Fatigue, stress-corrosion and tensile fracture surfaces of aluminum alloy specimens are examined by optical and electron microscopy. Fatigue crack growth is observed as an irregular process dependent on the shape of crack front developed. (Q7, R1d, Q27, M21; Al-b)

849-Q. Special Purpose Brazing Alloys. Metallurgia, v. 63, Mar. 1961, p. 142-144.

Brazing alloys containing combinations of Ag-Cu-Au-Ni-Pd-Mn are compared with conventional brazing materials as to strength, hardness and corrosion resistance. (Q27, Q29n, R-general; Ag, Au, Cu, Mn, Ni, Pd, SGA-f, 17-57)

850-Q. (German.) Impact and Bursting Tests With Containers of Cold Tough 9% Nickel Steel at -196° C. F. W. Strassburg. Stahlbau, v. 30, Mar. 1961, p. 75-80.

Impact testing of rectangular and cylindrical 9% Ni-steel containers of 10 mm. wall thickness by a pendulum impact device (11400 m-kg.) and bursting tests at -196° C. (cooled by liquid nitrogen). Bursting pressure, non-brittle fracture. (Q6, Q10b, T26q; ST, Ni)

851-Q. (German.) Table of Characteristic Torsion Data for Structural Shapes According to Standards DIN 1025-1027. F. W. Bornscheuer and L. Anheuser. Stahlbau, v. 30, Mar. 1961, p. 81-82.

Following torsion data are computed for eight different structural shapes according to DIN 1025-1027: torsion resistance, arch resistance, section modulus, torsion stiffness, arch stiffness. (Q1a; 4-57)

852-Q. (French.) Malleable Pearlitic Castings. Laurence W. Collins, Jr. Machine Moderne, v. 55, Mar. 1961, p. 17-20.

Thermal treatment for producing globular structure. Tensile strength, wear resistance and hardness of material. Application in the automobile industry. (Q27a, Q9n, Q29n, T21; CI-s, 5)

853-Q. The Pitting of Lubricated Gear Teeth and Rollers. Pt. 1. P. H. Dawson. Power Transmission, v. 30, Apr. 1961, p. 208-217.

Experiments using 0.3% carbon steel and 3 1/2% Ni steel disks in a 6 in. center disk machine to determine process of crack initiation and pitting. Examination of Way theory of mechanism of crack propagation. 13 ref. (Q26, R2j, T7a; CN, ST, Ni)

854-Q. The Distribution of Deformation in Lead Fatigued in Vacuum. K. U. Snowden. Philosophical Magazine, v. 6, Mar. 1961, p. 321-327.

Nature of the deformation, hardening and recrystallization in polycrystalline specimens of high-purity Pb fatigued in reverse-plane bending in vacuum. Slip is induced by fatigue straining with grain boundaries migrating to more stable positions. Recrystallization and grain growth are observed in hardened zones formed by slip and grain boundary interaction. 24 ref. (Q24, N3, N5)

855-Q. Deformation Twinning in Face-Centered Cubic Metals. J. A. Venables. Philosophical Magazine, v. 6, Mar. 1961, p. 379-396.

Deformation twinning in f-c-c. metals is explained in terms of an extension of the "prismatic" source mechanism of Cottrell and Bilby (1951). Suitable prismatic dislocation sources are thought to be long jogs in the dislocations of the two conjugate slip systems in a work-hardened metal and prismatic dislocation loops produced by vacancy condensation in a neutron-irradiated metal. 14 ref. (Q24a, M24b, 2-67, 3-68)

856-Q. The Influence of Atmospheric Corrosion on the Fatigue Limit of Iron-0.5% Carbon. N. J. Wadsworth. Philosophical Magazine, v. 6, Mar. 1961, p. 397-401.

Specimens are fatigued in air and in vacuum with a knee in the S-N curve at the fatigue limit occurring at about the

same number of cycles in vacuum as in air but at a higher strain. Slip is observed with crack initiation and growth near the fatigue limit. 8 ref. (Q7, Q26, R3; Fe-b, C)

857-Q. Observation of de Haas-Van Alphen Type Oscillation in the Acoustomagnetic Attenuation of Zinc. D. F. Gibbons. Philosophical Magazine, v. 6, Mar. 1961, p. 445-447.

Oscillations observed in the acoustomagnetic attenuation of single crystal specimens as a function of temperature at 1.0-4.2° K., orientation mode, direction of shear wave propagation and magnetic field strength. 8 ref. (Q21f, P16; Zn, 14-61)

858-Q. (Ukrainian.) Fatigue Strength Characteristics as Influenced by Previous Stressing. M. I. Chernyak. Dopovidi Akademii Nauk Ukrainskoi RSR, Nov. 1960, p. 1492-1494.

Heat treated structural steels are subjected to minor plastic deformation by tensile stressing, bending or torsion. Changes of the fatigue limit as a function of degree of deformation. 11 ref. (Q7a, 3-66; ST, SGB-s)

859-Q. (Russian.) Effect of Hydrostatic Pressure on the Elasticity Characteristics in Cerium. I. I. Voronov, L. F. Vereshchagin and V. A. Goncharova. Doklady Akademii Nauk SSSR, May 1960, p. 1104-1107.

Measurement of the rate of ultrasonic wave emission in Ce undergoing polymorphic transformation at 16.0 + 0.1° C., while exposed to a high hydrostatic pressure. Young modulus, Poisson's ratio and shear modulus are determined at various pressures. 15 ref. (Q21, 3-74; Ce)

860-Q. (Dutch.) Plastic Flow in Various Deformation Processes. Pt. 2. P. Landberg. Metaalbewerking, v. 26, Mar. 16, 1961, p. 374-383.

Deformation in direct and impact extrusion is tested by extruding a block composed of horizontal layers of white and dark plasticine. Flow tests in impact extrusion are also performed by using slugs composed of Al laminations or cutting the slug in half and engraving a line net on the cut surface. Deformation macrostructure. Force-way diagram. (Q24, F24, G5; Al, NM-d30, NM-d31)

861-Q. An Adhesion Test for Aluminum Spray Coatings and Other Metallized Surfaces. R. S. Smith and N. Stephenson. British Welding Journal, v. 8, Apr. 1961, p. 161-165.

Development of laboratory and field techniques for measuring deposit adhesion strength of snythetic resins utilized, in conjunction with Al spray coating, to bond steel buttons to grit-blasted mild steel plates. Subject to limitations, non or semidestructive tests are applied. 5 ref. (Q10c; CN, 8-67)

862-Q. Influence of Storage Time on Weld Metal Ductility. Claes Pfeiffer. British Welding Journal, v. 8, Apr. 1961, p. 172-175.

Determination of the effect of storage time on the ductility of all-welded metal test bars. Results indicate that fisheye formation is related to length of storage, metal hydrogen content and type of electrode utilized. 12 ref. (Q23p, 3-67; 7-51)

863-Q. (German.) Investigation of Decrease of Deformability of an Unalloyed Structural Steel in the Temperature Range 150-300° C. Franz Lihl and Alexander Sommerfeld. Archiv fur das Eisenhuttenwesen, v. 32, Mar. 1961, p. 165-167.

Tensile testing of unalloyed 0.21% carbon steel at -70 to 500° C. and X-ray measurement (Co-K-alpha radiation) of lattice deformation as influenced by elongation and temperature. Stress-strain diagrams in the 100-400° C. temperature range. (Q23q, M26, Q27; ST, SGB-s)

864-Q. (German.) Production of "Fish Eyes" on Steel by External Effect of Hydrogen at Room Temperature. Wilhelm Hofmann and Walter Rauls. Archiv fur das Eisenhuttenwesen, v. 32, Mar. 1961, p. 169-171.

Tensile testing of normalized unalloyed Ck 22 steel specimens at room temperature in hydrogen atmosphere of up to 150 atm. pressure and in Ar atmosphere of up to 100 atm. pressure. Hydrogen embrittlement, formation of "fish eyes". (Q26s, Q27; ST)

865-Q. (Italian.) Properties of Spheroidal Cast Iron at High Temperatures. A. Plesinger. Termotecnica, v. 15, Jan. 1961, p. 43-48.

Chemical composition, elongation, resiliency, elastic modulus and oxidation resistance of various spheroidal cast irons at temperatures to 450° C. Comparison with gray cast iron, carbon steel and other types of cast iron. (Q23p, Q21, R1h, 2-61; CI-r)

866-Q. Residual Static Strength of Aluminum-Alloy Box Beams Containing Fatigue Cracks in the Tension Covers. Herbert A. Leybold. NASA Technical Note D-796, Apr. 1961, 25 p. (Available from National Aeronautics and Space Administration, Washington, D. C.) $.75.

Static testing of 31 box beams constructed of 2024 and 7075 Al alloys and employing stringers that are bonded, united or an integral part of the skin. Beams with stringers bonded to the skin had the highest residual static strength. 4 ref. (Q27, Q26q; Al-b, 4-57)

867-Q. Fatigue Investigation of Full-Scale Wing Panels of 7075 Aluminum Alloy. Claude B. Castle and John F. Ward. NASA Technical Note D-635, Apr. 1961, 31 p. (Available from National Aeronautics and Space Administration, Washington, D. C.) $1.

Constant amplitude testing of 7075 Al alloy wing panel using the resonant frequency method at three different alternating load levels. Data given for crack location, cycles to crack initiation, crack propagation and residual static strength. (Q7, Q26q, T24a; Al-b)

868-Q. Selecting the Right Spring Material. V. A. Stanton. Design Engineering, v. 7, May 1961, p. 39-42.

Data given for the composition, heat treatment and tensile strength of NS-1000, 17-7 PH, PH 15-7Mo and A 286 steels, Inconel X, Refractaloy 26, Rene 41, Waspalloy and L 605 alloy to be used as spring materials. (Q27a, J-general; SGA-b)

869-Q. The Effect of Grain Size on the Stress-Strain Curve of Alpha-Iron and the Connection With the Plastic Deformation of the Grain Boundaries. H. H. Tjerkstra. Acta Metallurgica, v. 9, Apr. 1961, p. 259-263.

Experimental data for grain size dependence of yield stress under uniaxial load is correlated with dislocation theory to determine grain boundary stresses in denitrided and decarburized steel (alpha Fe solid solution) under uniaxial load. The magnitude of these stresses suggests that dislocations do not stop at grain boundaries during plastic deformation but slip across into adjacent grains. 4 ref. (Q7, Q23b, Q24c, M26b, M27f, 2-59, 3-66; Fe-a)

870-Q. The Dependence of the Flow Stress of Fe_3Al on Crystallographic Order. A. Lawley, E. A. Vidoz and R. W. Cahn. Acta Metallurgica, v. 9, Apr. 1961, p. 287-296.

Polycrystalline tensile samples of Fe alloys containing 24.8-27.8% Al are equilibrated and quenched from various temperatures into oil or water with subsequent isothermal annealing. Flow stress is determined as a function of heat treatment time and temperature, order hardening, strain and dislocation climb. 27 ref. (Q24, M26b, N10, 2-64, 3-72; Fe-b, Al)

871-Q. Unloading Effects in Crystals. Pt. 1. The Unloading Yield Point Effect. H. K. Birnbaum. Acta Metallurgica, v. 9, Apr. 1961, p. 320-326.

The orientation dependence of the "unloading field effect" and the role of secondary slip systems in the mechanisms are investigated in Cu single crystals, utilizing combined tensile-torsion deformation. Increase in flow stress due to unloading is found to be independent and the variation of the unloading yield dependent on orientation. A mechanism is proposed for the effect based on forest dislocation interaction. 12 ref. (Q24c, M26b, 3-72; Cu-a, 14-61)

872-Q. Twinning in Zirconium. D. G. Westlake. Acta Metallurgica, v. 9, Apr. 1961, p. 327-331.

Models are proposed for the dislocation mechanism of twinning in Zr on (10.2), (11.2) and (11.1) planes with experimentally determined twin elements and thickness for various twin modes in specimens deformed in compression at 300° K. Critical resolved shear stress is considered as a determining factor if twinning is by a Cottrell-Bilby mechanism. 10 ref. (Q24b, M26b, 3-66, 3-72; Zr)

873-Q. Zigzag Configurations of Twins in Alpha-Iron. A. W. Sleeswyk and J. N. Helle. Acta Metallurgica, v. 9, Apr. 1961, p. 344-351.

Configuration of twin bands in alpha Fe obtained after 9.2% strain in tension or compression at -183° C. The zigzags are explained in terms of the geometrical and mechanical compatibility of the twelve possible (211) (111) twin systems. 11 ref. (Q24b, Q24c, 2-63, 3-68, 3-72; Fe-a)

874-Q. The Formation of Fatigue Cracks in Aluminum Single Crystals. T. W. Alden and W. A. Backofen. Acta Metallurgica, v. 9, Apr. 1961, p. 352-366.

Pure Al single crystals of a fixed orientation are cycled at constant deflection in reverse pure bending with observation of strain hardening and slip-band formation. Fatigue cracks forming in the resulting slip bands are attributed to active cross slip in the presence of free surface. 24 ref. (Q7, Q24, Q26p, N7e, 3-68, 3-72; Al-a, 14-61)

875-Q. On the Rate-Controlling Mechanism for Plastic Flow of Mg Crystals at Low Temperatures. H. Conrad, L. Hays, G. Schoeck and H. Wiedersich. Acta Metallurgica, v. 9, Apr. 1961, p. 367-378.

The plastic flow of a Mg single crystal is investigated by "differential type creep and constant strain rate tests at 78-364° K. The deformation rate is given by an equation in terms of activation energy, activation volume and effective stress. The rate-controlling mechanism is determined as the intersection of dislocations. 21 ref. (Q3, Q24, M26b, 2-63, 3-66; Mg, 14-61)

876-Q. On the Yield Stress in B.C.C. Metals. G. Schoeck. Acta Metallurgica, v. 9, Apr. 1961, p. 382-384.

The temperature dependence of the yield point in b-c-c. metals such as alpha Fe and SiFe as a function of frictional stress acting on unpinned dislocations. The friction force is related to jog concentration, with the deformation rate being controlled by thermal activation. 17 ref. (Q23b, M26b, 2-61, 3-66; Fe-b)

877-Q. Concerning Delayed Yielding in Body-Centered Cubic Metals. H. R. Peiffer. Acta Metallurgica, v. 9, Apr. 1961, p. 385-387.

The time delay before sharp yield occurs when a constant stress is applied to specimens of Fe or Mo is determined to be a linear function of stress. 8 ref. (Q24c, 3-66, 3-67; Fe, Mo)

878-Q. (Japanese.) The Influence of Cold Working on Frictional Characteristics of Mild Steel Strip. Kenichi Nakamura and Susumu Aono. Journal of Mechanical Laboratory (Japan), v. 15, Jan. 1961, p. 20-31.

Electron diffraction study of the rubbing surfaces of cold rolled and annealed strip specimens lubricated with boundary films of light oil, benzoic, capric, oleic and stearic acid. Surface scratching and orientation of the absorbed lubricant surface layer are affected aversely by cold work, with accompanying stick slip friction. 7 ref. (Q9p, 3-68, 18-73; ST, 4-53)

879-Q. (Japanese.) Research on the Mechanism of Mechanical Wear. Government Mechanical Laboratory Report no. 41, 1961, 81 p.

Effect of temperature of rubbing surface, mode of contact during wearing and localized hardening on wear mechanism for carbon steels. Applications of metal transfer theory. 72 ref. (Q9; CN)

880-Q. Uranium Ups Steel Strength. Question: How Much Needed? Canadian Chemical Processing, v. 45, Apr. 1961, p. 70, 108.

Report on the addition of uranium to carbon steel. Test results indicate that 0.23% uranium added to 1040 steel lowers corrosion rate from 1/2 to 1/4 and an addition of 0.02% uranium increases endurance limit from 29,000 to 36,000 psi. (Q7a, R-general, 2-60; CN, U)

881-Q. Notch Sensitivity of Refractory Metals. A. G. Imgram. Battelle Memorial Institute (Wright Air Development Division). U. S. Office of Technical Services, PB 171198, Sept. 1960, 115 p. $2.50.

Tensile and notch tensile properties of Mo, W, Cb and Ta and one alloy, Mo-0.5Ti, investigated at five temperatures selected to encompass the brittle-to-ductile transition. All specimen failures are classified according to fracture mechanism. (Q23s, Q27a, 2-61; Cb, Mo-b, Ti, Ta, W)

882-Q. Effects of Temperature-Time-Stress Histories on the Mechanical Properties of Aircraft Structural Materials. Pt. 2. Stressed Exposure of 7075-T6. C. D. Brownfield and D. M. Badger. Northrop Corporation (Wright Air Development Division). U. S. Office of Technical Services, PB 171328, Sept. 1960, $2.50.

Investigation of the problem of predicting strength of a hardened metal alloy after subjection to variable thermal and stress environments severe enough to cause permanent loss of properties. Methods for predicting tensile ultimate, tensile yield and compressive yield strengths of 7075-T6 Al alloy after single or multiple exposure to various temperature and stress exposure conditions. (Q27a, Q28g, 2-61, 3-66, T24a; Al-b)

883-Q. Fatigue and Stress Rupture Properties of Inconel 713C, V-57C and Titanium Alloys 7Al-3Mo-Ti and MST 821 (8Al-2Cb-1Ta-Ti). A. E. Cers and A. A. Blatherwick. University of Minnesota (Wright Air Development Division). U. S. Office of Technical Services, PB 171064, July 1960, $2.25.

Fatigue, rupture and creep data at various temperatures obtained at various alternating and mean stress combinations. Data are presented as S-N curves and stress-range diagrams to show the effect of temperature, ratio of alternating-to-mean stress, stress magnitude and specimen notch on the fatigue and rupture properties. (Q7, Q3m; Ni-b, Ti-b)

884-Q. Toughness of Steel Sheet: The Advantage of Laminating. S. Arnold. Watertown Arsenal Laboratories. U. S. Office of Technical Services, PB 171044, Oct. 1960, 25 p. $.75.

Impact tests of simulated sheet prepared in various gages by machining and grinding steel bar stock quenched and tempered to 210,000 psi. and 165,000 psi. tensile strength values to show the relation of impact energy to temperature, gage and strength level. Resulting data demonstrated a behavior pattern whereby sheet of appropriate gage and strength may be selected to assure ductile fracture in tearing under impact loads. (Q23r, Q6; ST, 4-53)

885-Q. High-Frequency Surface Thermal Fatigue Cycling of Inconel at 1405° F. J. J. Keyes, Jr., and A. I. Krakoviak. Nuclear Science and Engineering, v. 9, Apr. 1961, p. 462-474.

Surface thermal fatigue, cracking and intergranular corrosion as influenced by temperature fluctuations, frequency, exposure time, thermal and transient stress and environment investigated for specimens under high-frequency thermal oscillations at 1150-1405° F. 11 ref. (Q7j, Q26q, R2h, 2-62, 3-66; Ni-b)

886-Q. Mechanical Properties of Four Austenitic Stainless Steels at Temperatures Between 300 and 20° K. C. J. Guntner and R. P. Reed. Paper from "Advances in Cryogenic Engineering". v. 6. Plenum Press, Inc., New York, 1961, p. 565-576.

Data are given for tensile and notch-tensile properties and impact strength of USS Tenelon, AM 350, AISI 202 and AISI 304 stainless steels, all of which undergo strain induced transformation at low temperatures. 12 ref. (Q27a, Q6n, 1-67; SS-e)

887-Q. Low Temperature Mechanical Properties of 300 Series Stainless Steel and Titanium. T. S. DeSisto and L. C. Carr. Paper from "Advances in Cryogenic Engineering". v. 6. Plenum Press, Inc., New York, 1961, p. 577-586.

Instantaneous diameter measurements during tensile testing are obtained at -452° F. Data are given for strain at maximum load as a function of temperature. 6 ref. (Q27a, 2-63; SS, Ti)

888-Q. The Fatigue Properties of Aluminum Alloy 5083-H113 Plate and Butt Weldments at 75 and -300° F. Paper from "Advances in Cryogenic Engineering". v. 6. Plenum Press, Inc., New York, 1961, p. 590-603.

Data are given for ultimate tensile strength, yield strength, elongation and fatigue strength of Al alloy plate and weldments with bead-on and bead-off. 5 ref. (Q27a, Q23, Q7a, 2-63; Al-b, 4-53, 7-51)

889-Q. Properties of 7000 Series Aluminum Alloys at Cryogenic Temperatures. J. L. Christian and J. F. Watson. Paper from "Advances in Cryogenic Engineering". v. 6. Plenum Press, Inc., New York, 1961, p. 605-621.

Mechanical properties of high-strength Al alloys are correlated with composition,

impurity content, microstructure, primary working and heat treatment in order to study the mode of deformation and fracture characteristics at cryogenic temperatures. 11 ref. (Q-general, 2-63; Al-b)

890-Q. New Data on Aluminum Alloys for Cryogenic Applications. J. G. Kaufman and E. W. Johnson. Paper from "Advances in Cryogenic Engineering". v. 6. Plenum Press, Inc., New York, 1961, p. 637-649.

Data are given for tensile properties, elastic moduli, shear strength, fatigue strength, notch sensitivity and tear resistance as a function of temperature. 10 ref. (Q-general, 2-63; Al-b)

891-Q. Calculating Residual Stresses in Some Formed Parts. C. S. Yen. American Society of Mechanical Engineers, Paper no. 61-AV-38, 1961, 7 p.

Residual stresses for several Al alloy 7075 sections formed at 20° C. are given for various heat treated conditions. (Q25h, 2-64; Al-b)

892-Q. Evaluation of the Short-Time Mechanical Properties of Structural Beryllium. Eugene C. Bernett. American Society of Mechanical Engineers, Paper no. 61-AV-42, 1961, 13 p.

Evaluation of the conventional and rapid rate tensile properties and short time high-stress creep properties of Be at 75-1500° F. (Q27a, Q3; Be, SGB-s)

893-Q. Elevated Temperature Stress-Rupture and Fatigue Properties of Inconel and Inconel X in Ammonia Atmosphere. Mitchell H. Weisman. American Society of Mechanical Engineers, Paper no. 61-AV-21, 1961, 7 p.

Inconel and Inconel X sheet materials, both parent metal and fusion butt welded specimens, are tested in air and NH_3 atmospheres at up to 1330° F. (Q7, Q3m; Ni-b)

894-Q. Determination of the Mechanical Properties of Aircraft-Structural Materials at Very High Temperatures After Rapid Heating. J. B. Preston and J. R. Katus. Southern Research Institute (Wright Air Development Division). U. S. Office of Technical Services, PB 161893, Apr. 1960, 81 p. $2.25.

Tensile properties of unalloyed Be determined at test temperatures from ambient through 1500° F. The short-time elevated-temperature tensile properties are determined for 10 combinations of base materials and coating materials. (Q27a, 2-61, T24a; Be)

895-Q. Research on Properties of High-Strength Materials Suitable for High-Temperature Applications. H. N. Cummings. Curtiss-Wright Corp. (Wright Air Development Division). U. S. Office of Technical Services, July 1960, 61 p. $1.75.

High-temperature torsion tests of relaxation to study the suitability of two alloys (M-1 toolsteel and Inconel X) for springs at 1000° F. and two alloys (Waspalloy and Udimet 500) for springs at 1500° F. (Q1c; Ni-b, TS, SGA-h)

896-Q. Evaluation and Alloy Development of Hot Work Die Steels for Structural Purposes. M. Schneider and J. Sheehan. Armour Research Foundation of Illinois Institute of Technology (Wright Air Development Division). U. S. Office of Technical Services, PB 171008, May 1960, 94 p. $2.25.

Investigation of the tensile properties of three commercial hot work die steels show that in sheet form these materials are essentially equivalent and develop the following nominal peak properties when air cooled from 1850° F. and doubled tempered at 1000° F.; 295,000 psi. ultimate tensile strength; 233,000 psi. yield strength at 0.2% offset; and 7% elongation in 2 in. gage length. (Q27a; TS)

897-Q. (Swedish.) Fatigue Strength of Low-Carbon Steels for Welded Structures. C. Schaub. Jernkontorets Annaler, v. 145, Feb. 1961, p. 88-108.

Tensile fatigue testing of smooth, notched and welded test bars of various low-carbon steels and low-alloy steels that have been stress relieved, normalized, hardened, tempered, aged or stretched to determine relationship between fatigue strength and yield point. (Q7, Q24c; AY, CN-g, 7-51)

898-Q. Statistical Analysis of Tensile Properties of Heat-Treated Mo-0.5Ti Sheet. H. R. Ogden and G. H. Beatty. Defense Metals Information Center, Battelle Memorial Institute, DMIC Memo. 101, Apr. 24, 1961, 20 p. (Available as PB 161251 from U. S. Office of Technical Services, Washington 25, D. C.)

Longitudinal and transverse tensile testing of stress relieved sheets of Mo-0.5Ti alloy at room temperature. Statistical analysis by digital computer relates heat number and gage to ultimate strength, yield strength and elongation. (Q27, S12; Mo-b, Ti, 4-53)

899-Q. Preventing Fatigue Failures. F. B. Stulen, N. H. Cummings and W. C. Schulte. Machine Design, v. 33, May 11, 1961, p. 193-195.

Stress analysis is used to relate geometrical stress concentration factor, notch reduction factor, hardness, temperature, grain size, residual stress, notch sensitivity and notch form to fatigue strength. Fatigue testing of toolsteel and air and vacuum melted SAE 4340 steel. 15 ref. (Q7a, Q-general; ST)

900-Q. Strength of Refractory Metals. Al Donlevy and Jack K. Y. Hum. Machine Design, v. 33, May 11, 1961, p. 244-249.

Stress rupture testing of electron beam melted Scb 278 Cb-Ta-Mo alloy, Scb 291 Cb-Ta-W alloy, 90 Ta-10 W alloy, 90-10 MK II alloy, Mo and W forgings in vacuum at 1600-2200° F. to determine elongation, fracture mode, rupture stress and failure time. (Q3m; Cb-b, Mo-b, Ta-b, W-b)

901-Q. Metallurgy in Nuclear Power Technology. J. C. Wright. Metal Treatment and Drop Forging, v. 28, Apr. 1961, p. 153-156, 164.

Effects of irradiation on nonfissile materials, Cu, Zr, steel, Mo and other metals. Hardness, embrittlement, stress-strain relationship, creep characteristics and transmutation effects. (Q29, Q26s, Q25n, Q3, 2-67; Cu, Mo, ST, Zr)

902-Q. Stick-Slip Friction as a Cause of Torsional Vibration in Textile Drafting Rollers. H. Catling. Institution of Mechanical Engineers, Proceedings, v. 174, no. 17, 1960, p. 575-586.

Study of stick-slip frictional characteristics of sintered bronze, cast iron, white metal, phosphor bronze, carbon and phenolic bearing materials; bearing arrangement and lubricants utilized in fabricating textile drafting long rollers. 7 ref. (Q9p, T7d, T29q; SGA-c, NM-h)

903-Q. (Book.) Report on the Elevated Temperature Properties of Aluminum and Magnesium Alloys. Howard R. Voorhees and James W. Freeman. ASTM Special Technical Publication no. 291. 308 p. 1960. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. $7.

Data given for composition, tensile strength, yield strength, elastic modulus, reduction of area elongation; creep strength, creep deformation; rupture strength and stress to rupture time of cast and wrought Al and Mg alloys tested at elevated temperatures. (Q-general, 2-62; Al-b, Mg-b, 4, 5)

904-Q. (Pamphlet.) Impact Testing of Sintered Material. 1961. 4 p. Johnson & Co., Inc., 21 West St., New York 6, N. Y.

Test bars of 100% Fe and 2% Cu, 0.6% C steel are subjected to stress on a tension-impact machine. Results are graphed as effect of sintered density on tension impact strength, on tensile strength and on per cent elongation. (Q6, Q27a, Q23p; Fe, ST, 6-72)

905-Q. (Russian.) Investigation of the Occurrence of Reversible Annealing Brittleness by Micro-Emf. Methods. E. V. Panchenko and E. M. Strug. Izvestiya Vuz--Chernaya Metallurgiya, Sept. 1960, p. 157-159.

Measurements on 12KhN3A steel annealed at 1200° C. quenched and re-annealed at 100-600° C. Effect of heat treatment temperature and cooling speed on toughness, hardness, micro-emf. and electrical resistance. 5 ref. (Q26s, Q-general, S11m, 2-64; ST)

906-Q. (Russian.) Investigation of Processes of Working Metals by Pressure Using the Theory of Plasticity. V. L. Kolmogorov. Izvestiya Vuz--Chernaya Metallurgiya, Sept. 1960, p. 79-89.

Hot compression tests on steel cylinders to investigate resulting strain and plastic deformation as a function of direction and location of pressure. Mathematical examination of uniform and nonuniform tube deformation. 5 ref. (Q23p, Q24, Q28f, 3-74; ST)

907-Q. (Russian.) Neutral Zones in Flat-Parallel Upsetting. E. F. Sharapin. Izvestiya Vuz--Chernaya Metallurgiya, Sept. 1960, p. 90-94.

Investigation of neutral zones in the deformation of metals by cold working

of lead. Mathematical treatment regarding neutral line equations and deformation flow. 10 ref. (Q24, F22j, 3-72; Pb)

908-Q. (Russian.) The Question of the Third Stress Relaxational Period in Metals. Ya. S. Gintsburg. Izvestiya Vuz--Chernaya Metallurgiya, Sept. 1960, p. 116-119.

Investigation of relaxation in 880-950° C. annealed and 450-600° C. stress relieved Cr-Ni-Mn, Type 20 and 40 and Armco steels. Stress relaxation is related to temperature, time and type of steels. 13 ref. (Q3a, 2-60, 2-62, 2-64; ST)

909-Q. (Russian.) Improvement of Mechanical Properties of Steels With the Help of Thermo-Ultrasonic Working. E. A. Alftan. Izvestiya Vuz--Chernaya Metallurgiya, Sept. 1960, p. 160-166.

Toughness, microstructure and hardness of 40 KHNMA and 30KHGSA steels as affected by ultrasonic vibration. Relation of annealing characteristics to vibration power and location and annealing temperatures. (Q23r, Q29n, M27, 1-74, 2-64; AY)

910-Q. (Russian.) Effect of Phosphorus and Boron on the Reversible Brittleness of Low-Carbon Nickel Steel. L. S. Lyahovich and T. S. Shilkova. Izvestiya Vuz--Chernaya Metallurgiya, Sept. 1960, p. 167-168.

Toughness of 12.13% C, 1.17-1.30% Ni steels containing .012-.114 P and 0-0015% B after quenching and annealing at 450-650° C. Influence of composition, heat treatment temperature and cooling rate. (Q23r, 2-60, 2-64; AY, P, B)

911-Q. (Russian.) Hardness of Pig Iron. M. S. Drozd. Izvestiya Vuz--Chernaya Metallurgiya, Sept. 1960, p. 169-172.

Improved method of hardness measurement adapted to pig iron using a ball indenter with indenter force measured by postelastic recovery depth of penetration. 5 ref. (Q29b, 1-52; CI-a)

912-Q. Drilling Holes to Measure Residual Stresses. Arthur J. Bush. Metal Progress, v. 79, May 1961, p. 91-93.

In this method, a small hole is drilled into the test specimen to relieve the residual stresses. Drilling is stopped at specific intervals and the changes in stress are determined by strain gages which surround the hole. (Q25h, G25; ST)

913-Q. (Japanese.) Changes of Microstructure of Brake Shoes and Tires Caused by Braking. Minoru Nakai, Seizo Saito and Kunio Okabayashi. Imono (Japan Foundrymen's Society, Journal), v. 33, Feb. 1961, p. 25-31.

Martensitic and austenitic transformations, flow out of pearlite and granulation of graphite in the friction surface layers of cast iron brake shoe specimens in braking tests. Wear of the specimen is attributed to stripping of flake graphite from the friction surfaces and to the nature of the structure as a function of the tempering reaction caused by temperature rise (above 800° C.) during braking. 5 ref. (Q9, Q25m, M27, N8, T23, 2-62; CI, 17-52)

914-Q. (English.) Pressure Vessels Boilers and Pipe Lines. Lastechniek, v. 27, Mar. 1961, p. 55-62.

Effect of residual stress on brittle fracture, corrosion cracking and fatigue failure of boilers. Stress relief by heat treatment and mechanical treatment making use of the thermal expansion in local heating. (Q26s, Q7, R1d, 3-66, T26q)

915-Q. (Czech.) High-Strength Steels Used in Constructions. Jiri Fuchs. Zvaracsky Sbornik, v. 10, Jan. 1961, p. 89-99.

Tensile and yield strength of the low-alloy Cr steel 11523.9, 11583.1, 11483.1 steels and the low-alloy Mn-Ti steel 11603.1. Their relatively low fatigue limit and high notch sensitivity should be considered in the design of constructions exposed to dynamic loads. Reduction of brittle fracture tendency and stress relief is achieved by heat treating welded constructions. (Q27a, Q23b; AY, 4-57, 7-51)

916-Q. (Czech.) High-Strength Steels for Welded Construction Used in the CSSR. Frantisek Sicha. Zvaracsky Sbornik, v. 10, Jan. 1961, p. 100-108.

Composition of the low-alloy Mn-Cr-Si steel CSN 11523 and its notch impact strength at -60 to 20° C. Composition of rolled products from CSN 15223, 11483, 11583 and 11603 steels. Effect

of their thickness on mechanical properties. (Q6, 2-61, Q-general; AY, 4-57, 7-51)

917-Q. Effect of Basic Physical Parameters on Engineering Properties of Intermetallic Compounds. D. L. Wood and J. H. Westbrook. U. S. Office of Technical Services, PB 171393, Aug. 1960, 34 p.

Tensile test specimens of Bi2Tl and AgMg, produced directly by extrusion, provide information applicable to future studies of the properties of NiAl, a material whose melting point and oxidation resistance render it practical as an alloy base should a solution to the ductility problem be found. (Q27, R1h, Q-general; Ag, Al, Bi, Mg, Ni, Tl, 14-68)

918-Q. Effect of Temperature on the Creep of Polycrystalline Aluminum by the Cross-Slip Mechanism. N. Jaffe and J. E. Dorn. University of California (Wright Air Development Division). U. S. Office of Technical Services, PB 171360, June 1960, 21 p. $.75.

The apparent activation energy for creep of polycrystalline Al is determined at 273-350° K. by the effect of small abrupt changes in temperature on the creep rate. A constant activation energy of 27,400 ± 1000 cal. per mole was obtained over strains of 0.003-0.23, stresses ranging from 2250-6000 psi. and strain rates varying from 0.1145 x 10-5 to 29.5 x 10-5 per min. (Q3, 2-61; Al)

919-Q. Detection of Fatigue Damage With Rayleigh Waves. P. J. Brosens, N. A. G. Hakimi and G. R. Khabbaz. Massachusetts Institute of Technology (Air Research and Development Command). U. S. Office of Technical Services, PB 171099, Aug. 1960, 50 p. $1.50.

The detection of fatigue damage by ultrasonic means must be based on concentration of ultrasonic energy at the surface of the examined metal. Among the methods of achieving such focusing of ultrasonic energy, Rayleigh waves appear to be the most promising. They offer the possibility of detecting both fatigue damage prior to crack formation and the fatigue cracks present after crack formation. (Q7, 1-74)

920-Q. A Study of the Effects of Surface Films on the Mechanical Properties of Metals. I. R. Kramer. Martin Co. (Wright Air Development Division). U. S. Office of Technical Services, PB 171150, July 1960, 34 p. $1.

By removing the surface of Al single crystals while they are being deformed, the extent and slope of Stage I and Stage II are affected. The stress at which Stage III starts is also lowered. A dislocation pop-out phenomenon is observed when the rate of metal removed is suddenly increased during the tensile deformation. (Q-general; Al, 14-61)

921-Q. The Effect of Several Geometrical Variables in a Notch Tensile Strength of 4340 Sheet Heat Treated to Three Strength Levels. V. Weiss. Syracuse University (Wright Air Development Division). U. S. Office of Technical Services, PB 171396, Sept. 1960, 42 p. $1.25.

The stress concentration factor and relative stress gradient, which characterize the stress pattern at the notch root, are determined analytically from elastic theory. Results show that the effect of stress gradient on notch strength is identical with that of section width. For a brittle material the stress gradient is the primary factor that influences notch strength at a given value of stress concentration. (Q27a, 3-66; ST, 4-53)

922-Q. Beryllium Crack Propagation and Effects of Surface Conditions. C. O. Matthews. Lockheed Aircraft Corp. (Wright Air Development Division). U. S. Office of Technical Services, PB 171088, July 1960, 197 p. $3.

Investigation of the mechanical properties of Be sheet with various surface finishes shows that sheets etched to remove surface defects caused by machining have the best properties. The fatigue endurance limit, which is improved by etching, is as high as the static tensile strength. (Q26q; Be, 4-53)

923-Q. Effects of Interrupted Quenching Procedures on Properties of Type 410 Stainless Steel. J. Bressanelli and J. Hoke. ASME Transactions, Paper no. 61-Met-5, 1961, 6 p.

The impact strength of hardened 410 stainless is known to be adversely affected when the steel is tempered between 750-1050° F. The cooling rate through the martensite transformation range has a significant effect upon the impact properties after subsequent

tempering. Slow air cooling brings about a marked improvement. (Q6, 2-64; SS)

924-Q. Effects of Specimen Size and Notch Acuity on the Brittle Fracture Strength of a Heat Treated Steel. S. Yukawa and J. G. McMullin. ASME Transactions, Paper no. 61-Met-2, 1961, 4 p.

Effects of various methods of notch preparation on the notched slow bend fracture strengths of heat treated alloy steel specimens. Results indicate that several kinds of cracks result in about 35% lower strength than a machined 0.005 in. root radius notch. 10 ref. (Q26s; AY)

925-Q. An Energy Criterion for Low-Cycle Fatigue. D. E. Martin. ASME Transactions, Paper no. 61-Met-4, 1961, 7 p.

A criterion is developed which supposes that the segment of strain hysteresis associated with work hardening is a measure of damage. On the basis of this "damage" work criterion and assuming a linear work hardening law, the well known plastic strain-cycle life equation is derived. 31 ref. (Q7)

926-Q. An Analysis of the Time and Temperature Dependence of the Upper Yield Point in Iron. P. E. Bennett and G. M. Sinclair. ASME Transactions, Paper no. 61-Met-1, 1961, 8 p.

Torsion tests using strain rates of 12.5 per sec., 0.25 per sec. and 0.0001 per sec. over the temperature range 77-525° K. The upper yield point shows a rapid increase as the temperature is lowered; an increase in the strain rate also causes an increase in the yield point. 25 ref. (Q1, Q24c, 2-61; Fe)

927-Q. Circular-Patch Test for Evaluating Armor Crack-Susceptibility. L. E. Poteat and R. W. Jones. Watertown Arsenal. U. S. Office of Technical Services, PB 161822, May 1960, 39 p. $1.

Test procedure applied to several different heats of armor steel Evaluation by this procedure places the heats in the correct order of susceptibility as determined from the known fabrication history of the heats. (Q26; ST)

928-Q. Practical Evaluation of the Standard Stress-Strain Curves and Related Properties. R. H. Harrington. Watertown Arsenal. U. S. Office of Technical Services, PB 161896, July 1960, 27 p. $.75.

The yield strength can no longer be relied on, per se, for most economical or even safe use of the new high-strength steel, other new alloys and new esoteric treatments. The various properties derived from and associated with the standard stress-strain curve are evaluated and related to the behavior of alloys under stress. Several other properties, directly related to the stress-strain curve, are preferable to the 0.10 or 0.20% offset yield strengths for present applications and future developments. (Q25n)

929-Q. The Effects of Stored Energy and Recrystallization on the Creep Rupture Properties of Internally Oxidized Copper-Alumina and Copper-Silica Alloys. Masao Adachi and Nicholas J. Grant. Massachusetts Institute of Technology (Wright Air Development Center). U. S. Office of Technical Services, PB 161846, Dec. 1959, 30 p. $.75.

Cu-silica and Cu-alumina alloys of low-oxide content are produced by the internal oxidation and extrusion of Cu-Si and Cu-Al alloy powders. These alloys show normal behavior after recrystallization but with increasing amounts of recrystallization at temperatures up to 1050° C. the creep rupture strength at 450° C. decreases and the ductility increases. Cold work results in an increase in creep rupture strength and a decrease in ductility. (Q3, N5; Cu-b)

930-Q. Void Formation and Grain Boundary Sliding in Aluminum-Magnesium Solid Solution Alloys. A. W. Mullendore and N. J. Grant. Massachusetts Institute of Technology (Wright Air Development Division). U. S. Office of Technical Services, PB 171399, Sept. 1960, 37 p. $1.

Void formation and growth during creep are observed in Al-1.92% Mg and Al-5.10% Mg as a function of temperature, stress and time. The origin of voids is related to the development of an irregular (serrated) grain boundary and to grain boundary sliding. (Q3, M27; Al-b, Mg)

931-Q. Plastic Stress-Strain Relations and Yield Surfaces for Aluminum Alloys. H. J. Ivey. Journal of Mechanical Engineering Science, v. 3, Mar. 1961, p. 15-31.

Tensile and torsion testing of solid and tubular specimens of 218M, 226M, 19S and 24S-T4 Al alloys and a Si-Al alloy to determine relationship between shear and tensile stress and shear and tensile strain. 28 ref. (Q1e, Q2j, Q25, Q27; Al-b)

932-Q. Brittle Fracture Strength of Welded Steel Plates. A. A. Wells. British Welding Journal, v. 8, May 1961, p. 259-277.

Results of tensile tests on 60 steel plates, each 3 ft. wide by 1 in. thick. A mild steel, a semikilled higher Mn low-carbon steel and three fully-killed normalized steels are tested under conditions of loading at -60 to 20° C. Samples are previously artificially notched in edges prepared for butt welding, which is carried out along the plate centers in the direction of tension. Effect of electrode type on fracture strength. 16 ref. (Q26s, Q27; ST, 4-53, 7-51)

933-Q. Effect of Plastic Strains on Mechanical Properties of Five Steels. C. F. Tipper. British Welding Journal, v. 8, May 1961, p. 278-281.

Effects of plastic strain, aging and stress-relieving are studied by notch impact and tensile tests on five 1 in. mild steel plates. (Q6, Q27, 2-64, 2-65, 3-68; CN, 4-53)

934-Q. On the Ratio of Transverse to Axial Strain and Other Tensile Properties of a Cold Rolled Steel Alloy. A. Shelton. Journal of Mechanical Engineering Science, v. 3, Mar. 1961, p. 89-104.

Tensile testing of cold rolled 0.4% carbon steel alloy to determine effect of strain reduction on tensile stress, contraction ratio, plastic volume change, Poisson's ratio, Young's modulus and Vickers hardness. Photomicrographs of crystal structure. 17 ref. (Q27, Q-general, M-general, 3-68; CN-g)

935-Q. Sintered High-Temperature Alloys. V. A. Tracey, G. T. Poyner and J. F. Watkinson. Journal of Metals, v. 13, May 1961, p. 363-369.

Report on mechanical properties of alloys produced from atomized Ni-Cr-Co and Ni-Cr-Co-Mo powders including stress-rupture, fatigue, impact resistance, thermal shock, tensile and grain size characteristics. 11 ref. (Q-general; SGA-h, Ni-b, Co, Cr, Mo, 6-72)

936-Q. (Russian.) Development of Pearlitic Steel Composition to Increase Creep Strength at 580° C. T. I. Volkova. Metallovedenie i Termicheskaya Obrabotka Metallov, Feb. 1961, p. 11-16.

Phase and solid solution composition are varied to increase creep strength by additional alloying with Cr, W, Mo, V, Co or Si. (Q3m, 2-60; ST)

937-Q. (Russian.) Destruction in Austentic Steels. I. N. Laguntsov and V. F. Zlepko. Metallovedenie i Termicheskaya Obrabotka Metallov, Feb. 1961, p. 24-27.

Effect of prolonged aging at 600-650° C. on the nature of destruction in 1Kh18N12T, Ei257 and Ei695R steels. Intergranular fractures in long time tensile tested specimens are studied in relation to time and temperature of aging. 5 ref. (Q26, 2-65; SS-e)

938-Q. (Russian.) Medium Tungsten, Cobalt-Vanadium High Speed Toolsteel. A. N. Popandopulo and I. Z. Snegur. Metallovedenie i Termicheskaya Obrabotka Metallov, Feb. 1961, p. 35-40.

Effect of various heat treatments on the red hardness, magnetic permeability, impact strength, microhardness and embrittlement of R9F4K8M steel. Advantages compared with other high-speed toolsteel grades. 9 ref. (Q29, Q6n, Q26s, 2-64; TS-m)

939-Q. (Russian.) Cast Cobalt High-Speed Toolsteels. V. A. Kashchuk. Metallovedenie i Termicheskaya Obrabotka Metallov, Feb. 1961, p. 40-42.

Effect of Co and heat treatment on red hardness and service life of chill cast high-speed steel cutting tools. Development of suitable steel composition. 9 ref. (Q29n, 2-60, 2-64; TS-m, Co, 5)

940-Q. (Russian.) Anisotropy of Mechanical Properties of Rolled Structural Steels. K. M. Gel'fand and V. S. Markov. Metallovedenie i Termicheskaya Obrabotka Metallov, Feb. 1961, p. 53-55.

Plasticity, impact strength, elongation and compression strength in the area transverse to the rolling direction vary with steel composition and heat treatment parameters. Properties of numerous steels are analyzed in both transversal and longitudinal directions. (Q23, Q6n, Q28g; ST, 4-57)

941-Q. The Application of Rabotnov's Creep Parameter. Robert M. Goldhoff. ASTM Preprint no. 75, 1961, 13 p.

Results of calculations are compared with known data for a low-alloy steel, 17-7PH alloy steel, Type A286 steel, Mg, Crucible Type 422 steel, canvas laminate and nylon. 6 ref. (Q3; AY, Mg, SS)

942-Q. Creep and Rupture Properties of Five Copper Base Casting Alloys. Donald P. Moon and Ward F. Simmons. ASTM Preprint no. 78, 1961, 18 p.

Elevated temperature (250-550° F.) testing of alloys ranging from 61.9-80.7% Cu, 6.6-39% Zn, 0-4% Sn, 0-5.6% Pb, 0.11-3.1% Fe, 0-0.14% Sb, 0.01-20.4% Ni, 0-5.8% Al, 0-3.8% Mn, 0-4.12% Si and 0-0.05% S. 6 ref. (Q3, 2-61; Cu-b, Zn)

943-Q. Properties of Hardened Copper-Beryllium Strip After Exposures to Elevated Temperatures. K. G. Wikle and N. P. Sarle. ASTM Preprint no. 79, 1961, 20 p.

Testing at room temperature up to 1150° F. to determine tensile and yield strength, proportional limit, elongation and modulus values. 5 ref. (Q-general; Cu-b, Be, 4-53)

944-Q. Some Effects of Section Size and Testing Condition on Tensile Properties of Zircaloy 2 at 600° F. S. L. Ames. ASTM Preprint no. 84, 1961, 10 p.

Hot rolled strip, sheet and rod, cold rolled strip and forgings tested in the annealed, sandblasted and pickled condition. (Q27; Zr-b, 4-51, 4-53)

945-Q. Vanadium Improves Cold-Heading Die Life. Robert S. Hodder. Metalworking Production, v. 105, Apr. 26, 1961, p. 59-60.

Addition of 3 1/2% vanadium to 0.90% carbon water-hardening toolsteel used in the fabrication of cold heading dies increases wear resistance and stabilizes fine grain over the normal hardening range. (Q9, J5, M27c, W24n, 2-60; TS, V, 17-57)

946-Q. Effect of Surface Condition on Ductile-to-Brittle Transition Temperature of Tungsten. Joseph R. Stephens. NASA Technical Note, D-676, Feb. 1961, 31 p.

Effect of surface finish on yield strength, ultimate tensile strength, elongation, reduction in area and ductile-to-brittle transition temperature of commercially pure sintered tungsten rod. 6 ref. (Q23, Q27, 9-71; W, 6-72)

947-Q. (Japanese.) Fractographic Study of Plain Carbon Steel With an Electron Microscope. Shoichi Nakanishi and Akio Takemasa. Tetsu-to-Hagane (Iron and Steel Institute of Japan, Journal), v. 47, Apr. 1961, p. 581-585.

Crack initiation and propagation, fracture patterns and deformation microstructures observed in 0.17% carbon steel fractured in tension at -60 to 80° C. Relation of phenomena to grain boundary migration and absorption of fracture surface energy and to influence of pearlite structure, deformation banding and nonmetallic inclusions. 7 ref. (Q26q, M21e, M23p, N3, 3-68, 3-71; CN-g)

948-Q. (Japanese.) Study of High Strength Structural Steel. Pt. 2. Effect of Addition of Beryllium and Molybdenum on Si-Mn and Si-Mn-Cr Steel. Eiichiro Asano and Toru Ishida. Tetsu-to-Hagane (Iron and Steel Institute of Japan, Journal), v. 47, Apr. 1961, p. 585-591.

Tensile and yield strengths, Vickers hardness and hardenability of low alloy steel specimens after rolling and forging deformation and after tempering, quenching and furnace and air cooling treatments as a function of 0-.86% Mo and 0.0100% B additions. 5 ref. (Q27, Q29, J5, 2-60, 2-64, 3-68; AY, B, Mo)

949-Q. (Japanese.) Effect of Carbon, Chromium, Molybdenum and Vanadium on Properties of 3% Chromium Heat Resisting Steel. Sadao Koshiba and Tsuneo Kunou. Tetsu-to-Hagane (Iron and Steel Institute of Japan, Journal), v. 47, Apr. 1961, p. 599-603.

Rockwell C hardness after heat treatment, tensile properties at 600-700° C., rupture strength, microstructure and deformation ratio of specimens as a function of alloying elements after various tempering, quenching and cooling treatments. 8 ref. (Q-general, 2-60, 2-62, 2-64; AY, Cr, C, Mo, V)

950-Q. (Japanese.) The Influence of Different Melting Methods on High Temperature Properties of Heat Resisting Steel. Masao Kawahata. Tetsu-to-Hagane (Iron and Steel Institute of Japan, Journal), v. 47, Apr. 1961, p. 604-611.

Mechanical properties, age hardening characteristics and microstructures for vacuum induction melted and air melted A-286 and Incoloy T heat resisting alloy specimens are compared by short time tensile, rotating bending fatigue and high temperature (650-815° C.) creep rupture tests and by electron microscopy and X-ray examination. 4 ref. (Q-general, M-general, N7a, 2-60, 2-62; SGA-h, Fe-b, Ni-b)

951-Q. (Czech.) Impact Strength of Mn-Si-Cr Steels. Roman Sejnoha and Frantisek Pavelka. Hutnicke Listy, v. 16, Mar. 1961, p. 153-158.

Steels with 0.14-0.33% C, 0.95-1.61% Mn, 0.32-1.20% Si, 0-1.89% Cr, 0.018-0.029% P and 0.023-0.036% S are quench hardened and tempered at 200-650° C. for 30 min. to determine effects of C, Mn, Si and Cr on the notch impact strength and on the range of temper brittleness for moderate annealing temperatures. 11 ref. (Q6n, Q26s, 2-60; ST)

952-Q. (Japanese.) Improvement of Cadmium Copper. Yoshitsugu Mishima and Noboru Makino. University of Tokyo, Engineering Research Institute, Annual Report, v. 19, Mar. 1961, p. 77-84.

Effect of 0.1-0.4% Be and 0.4-0.16% Ag additions on the heat resistance, electrical conductivity, microstructure and hardness (Rockwell B) of Cu alloys containing 0.3-1.5% Cd after cold rolling and aging, annealing and solution treatments. 3 ref. (Q-general, M27, P15g, 2-60, 2-62, 2-64; Cu-b, Cd, Be, Ag)

953-Q. (Japanese.) Cu-NiBe and Cu-Ni-Sn Alloys. Yoshitsugu Mishima and Hitoshi Shitara. University of Tokyo, Engineering Research Institute, Annual Report, v. 19, Mar. 1961, p. 85-89.

Intermetallic compounds of Ni with Al, Be, Sn, Sb, P, Ti and Si are alloyed with Cu in tests to find new high-strength, high-conductivity alloys similar to low Be-Cu alloy. Electrical conductivity, tensile properties and age hardenability data are given for the alloys which show most promise, Cu-NiBe and Cu-Ni-Sn. (Q27, N7a, P15g, 2-60; Cu-b, Ni, Be, Sn, 14-68)

954-Q. (Japanese.) Preliminary Tests on Japan Made Hafnium Metal. Yoshitsugu Mishima and Naoaki Takahashi. University of Tokyo, Engineering Research Institute, Annual Report, v. 19, Mar. 1961, p. 115-119.

Mechanical and physical properties of Hf plate and sheet specimens produced from Kroll process sponge by nonconsumable Ar arc and vacuum electron beam melting are compared with those of crystal bar Hf. Data are given for tensile tests, Vickers hardness and electrical resistance measurements and gas analysis of annealed and hot and cold worked specimens with attention to ductility, work hardening effects and purity. (Q-general, C5h, C25, P-general, 2-60; Hf)

955-Q. Bursting Strength of Tubes, Cylinders and Spheres. Mechanical World and Engineering Record, v. 141, May 1961, p. 167-169.

Bursting and working strengths are calculated from formulas in terms of the geometry of the tube, internal pressure carried and material stress. Modifications which take into account the presence of stress raisers. (Q10; 4-60)

956-Q. Structural Behaviour of a Spherical Pressure Vessel. D. S. Houghton and G. A. Ackroyd. Engineer, v. 21, Apr. 28, 1961, p. 686-691.

Stress and strain distribution at the junction of a spherical Al reactor vessel and its supporting skirt is measured using electrical resistance strain gages. (Q25, T26q; Al, 17-57)

957-Q. The Friction of Solids. E. H. Freitag. Contemporary Physics, v. 2, Feb. 1961, p. 198-216.

Study of elastic and plastic deformation and the friction mechanism in metals and nonmetals. Determination of the coefficient of friction for steel sliding on Cu and Bi; Cb carbide sliding on vanadium carbide and graphite sliding on Cb carbide from 0-2000° C. Nonmetals studied are polymers, diamond, rock-salt, rubber, graphite and mica. 23 ref. (Q9p)

958-Q. (German-French.) Assemblies in Aluminum Construction. O. Steinhardt. Schweisstechnik-Soudure, v. 51, Feb. 1961, p. 34-36.

Mechanical testing of smooth, riveted, perforated, screwed and welded light alloy rods to determine tensile strength, fatigue limit and other properties. (Q-general; Al-b, 7)

959-Q. The Phenomenon of Seizure and Its Investigation. A. P. Semenov. Wear, v. 4, Feb. 1961, p. 1-9.

Study of seizure in sheet specimens of Al, Ag, Cu and Cu alloys. Influence of temperature on specific pressure of seizure and upon the seizure deformation. Determination of the relation between atomic concentration of alloying elements in Cu and parameters of crystal lattice and specific pressure of seizure. 17 ref. (Q9q; Ag, Al, Cu-b)

960-Q. A Crossed-Cylinder Wear Machine and Its Use in the Study of Severe Wear of Brass on Mild Steel. J. Halling. Wear, v. 4, Feb. 1961, p. 22-31.

Description of wear machine designed for use in conjunction with a standard center lathe. This machine is used in the study of severe wear of 60/40 brass rubbing on mild steel to determine the variation in wear rate and coefficient of friction with rubbing velocity. 5 ref. (Q9; CN, Cu-n)

961-Q. Theoretical and Experimental Residual Stresses in Quenched Steel Cylinders. H. G. Landau, E. H. Hess and E. E. Zwicky, Jr. American Society of Mechanical Engineers, Paper no. 61-Met-6, 1961, 4 p.

Residual stresses in a quenched cylinder are determined on the basis of previously developed equations assuming an elastic perfectly plastic material with temperature-dependent yield stress. These are compared with measured stresses in tests on subcritically quenched cylinders using the boring out technique and very satisfactory agreement is obtained. (Q25h; ST)

962-Q. Structural Characteristics of Fasteners for Honeycomb. Jack Cherne. American Society of Mechanical Engineers, Paper no. 61-AV-57, 1961, 5 p.

Core material selected is Al honeycomb, the skins are 2024 ST Al and the fasteners used are Shur-Lok SL78 potted-in inserts. Results of the tests are presented as a plot of ultimate strength versus panel thickness for various combinations of skin and core densities. (Q27a; Al-b, 4-57, 7)

963-Q. Segregated Structures in Highly Alloyed Ferritic Gas-Turbine Wheel Forgings. G. R. Heckman and A. W. Herbenar. American Society of Mechanical Engineers, Paper no. 61-GTP-9, 1961, 16 p.

Segregates present in highly alloyed materials, particularly in modified 12% Cr steels, can have very adverse effects on the physical and mechanical properties. Such inhomogeneities can act as inherent notches or stress risers which contribute to or cause premature failures. The fact that such segregation cannot be detected by nondestructive magnetic particle or sonic tests dictates the use of alternate inspection and process methods. (Q-general, 9-69, W11m; SS-d, 5)

964-Q. Hydrogen Embrittlement of Titanium Alloys. A. E. Riesen and D. H. Kah. Wright Air Development Division. U. S. Office of Technical Services, PB 171394, Oct. 1960, 49 p. $1.25.

To establish hydrogen toleration limits in structural Ti sheet alloys, the effect of various hydrogen interstitial contents between 60 ppm. and 312 ppm. on the notch sensitivity and low-strain rate embrittlement of four Ti alloys is investigated at room temperature. The materials investigated included three alpha-beta alloys and one all alpha alloy. (Q26s; Ti-b, SGB-s, 4-53)

965-Q. Study of Fracture Toughness. R. W. Boyle, J. M. Krafft and A. M. Sullivan. Report of NRL (Naval Research Laboratory) Progress, Apr. 1961, p. 29.

The Irwin hypothesis for fast fracture instability as the tangency rather than the intersection of crack driving force and resistance curves is examined for crack growth and its resistance in 7075-T6 Al sheets. From the general shear lip shape characteristics and by measurement of plastic strain energy density for the lip from tests at a given thickness, the initial portion of resistance curves and related crack extension and toughness are predicted. (Q23r, Q26s, 3-68; Al-b)

966-Q. Development of High-Strength Sheet Materials. R. W. Boyle. Report of NRL (Naval Research Laboratory) Progress, Apr. 1961, p. 29-30.

Evaluation of fracture toughness in high-strength materials by measurement of crack length and velocity with a calibration curve having corrections for plastic zone effects using an adaptor with the ink stain method on notched plate specimens. (Q23r, Q26q, 1-54; SGB-a)

967-Q. Properties of Iron Alloys. J. E. Srawley. Report of NRL (Naval Research Laboratory) Progress, Apr. 1961, p. 30-31.

Room temperature tensile and crack propagation tests on low-alloy steel sheet specimens after austenitizing at 1600° F. with subsequent oil quenching and tempering. Data are given for crack propagation resistance and ratio of yield strength to fracture stress. (Q26s, Q27, 2-64, 3-66; AY)

968-Q. Metals and Alloys at Elevated Temperature. P. Shahinian and M. R. Achter. Report of NRL (Naval Research Laboratory) Progress, Apr. 1961, p. 33-34.

Influence of cold work on the strength of a low-alloy steel, AISI 4140, at elevated temperature is investigated by hardness, tensile and creep-rupture tests with optical and electron microscopy and X-ray diffraction examination. An anomalous behavior is observed of alloy strengthening by hardness through lattice strain and strain aging at large amounts of deformation and weakening by small amounts of deformation as a function of softening due to microstructural change. (Q3, Q23a, Q27, M-general, 2-61, 3-68; AY)

969-Q. Metals and Alloys at Elevated Temperature. T. Reuther, P. Shahinian and M. R. Achter. Report of NRL (Naval Research Laboratory) Progress, Apr. 1961, p. 34-35.

Effect of prior creep at constant elongation rate, at 1200° F., in air, nitrogen and vacuum, on the low temperature tensile properties and grain boundary crack propagation of Ni specimens. Investigation of oxidation hardening mechanisms and other environmental phenomena as influencing factors on residual strength and crack number and growth. (Q3, Q26s, Q27, R1h, 2-61, 2-66; Ni-a)

970-Q. The Slow Growth and Rapid Propagation of Cracks. ASTM Bulletin, Materials Research & Standards, v. 1, May 1961, p. 389-393.

Influence of dimensions of the crack, elastic stress field in the vicinity of the crack and stability of the material on speed of crack growth. Application of theory to sheet steel. (Q26q; ST)

971-Q. The Tensile Properties of High-Purity Low-Carbon Iron and Iron-Manganese Alloys. W. C. Leslie, G. B. Williams and D. S. Hutton. Iron and Steel Institute, Journal, v. 198, May 1961, p. 21-29.

Fe-C and Fe-C-Mn alloys containing C(0.0025-0.066), Mn(0.005-0.45), O_2(0.0015-0.003), N_2(0.0009-0.0014) are prepared by vacuum melting and casting. After establishing a constant ferrite grain size, the alloys are treated to vary the carbide particle size and distribution without altering grain size. Tensile properties and deformation are observed to be relatively unaffected. 14 ref. (Q27a, 3-71; Fe-b, C, Mn)

972-Q. Introduction to the Technical Program. E. P. Klier. Paper from "Symposium on the Testing and Evaluation of Materials for Solid Propellant Rocket Motor Casings". Report no. MAB-156-M. National Academy of Sciences, Washington 25, D. C., 1959, p. 5-7.

Analysis of stress conditions in rocket motor cases with attention to materials selection and importance of flaw detection. (Q25, S13, T2p)

973-Q. Fracture Mechanics Theory and Its Application to Analysis of Fractures of Rocket Chambers. George R. Irwin. Paper from "Symposium on the Testing and Evaluation of Materials for Solid Propellant Rocket Motor Casings". Report no. MAB-156-M. National Academy of Sciences, Washington 25, D. C., 1959, p. 24-58.

Theoretical analysis of elastic stress field and plastic strain near the crack edge and of requirements essential to measurement of fracture strength. Application of fracture mechanics analysis to welded AMS 6434 steel. Critical crack extension force values and modes of fracture of 17-7PH stainless steel; B-120 VCA Ti alloy; 7075-T6, 2024-T4 and 2024-T3 Al alloys; SAE 4340, SAE 6150, Tricent, X-200 and Vasco X-3G' steel sheets. 6 ref. (Q26, Q25, T2p, 3-68; SGB-a, ST, Al-b, Ti-b, 4-53, 7-51, 17-57)

974-Q. Summary of U. S. Steel's Experience With Crack Propagation Testing. J. M. Hodge. Paper from "Symposium on the Testing and Evaluation of Materials for Solid Propellant Rocket Motor Casings". Report no. MAB-156-M. National Academy of Sciences, Washington 25, D. C., 1959, p. 59-70.

Importance of protection against susceptibility to rapid crack propagation in the development of ultra-high strength steels for aircraft and missile applications. Evaluation of crack extension force for the onset of rapid crack propagation and of the tensile properties for sheet specimens of 12 MoV steel and Airsteel X-200. Effects of tempering at 450-1000° F., direction of testings, notch radius and transition temperature. (Q26q, Q27, T2p, 2-62, 2-64, 3-66; SGB-a, ST, 4-53, 17-57)

975-Q. Fracture Toughness Tests of High Strength Sheet Metals. Harold Bernstein. Paper from "Symposium on the Testing and Evaluation of Materials for Solid Propellant Rocket Motor Casings". Report no. MAB-156-M. National Academy of Sciences, Washington 25, D. C., 1959, p. 71-92.

Critical crack extension force and net section stress values of sheet and weld specimens of AISI 6150, AMS 6434, Airsteel X-200, Vascojet 1000 steels and B-120 VCA Ti alloys. Effects of temper conditions, thickness, test direction, test temperature, welding, slot configuration and crack starter techniques on fracture toughness. (Q26q, Q23s, T2p, 2-62, 2-64, 3-66, 3-73; SGB-a, ST, Ti-b, 4-53, 7-51, 17-57)

976-Q. Sharp Notch and Smooth Tensile Characteristics for a Number of Ultra-High Strength Steel Sheet Alloys. G. B. Espey, M. H. Jones and W. F. Brown, Jr. Paper from "Symposium on the Testing and Evaluation of Materials for Solid Propellant Rocket Motor Casings". Report no. MAB-156-M. National Academy of Sciences, Washington 25, D. C., 1959, p. 93-157.

Room temperature, sharp notch and smooth tensile properties of SAE 4340, AMS 6434, UHS 280, 300M, X-200, Vascojet 1000, AISI 410, 12 MoV, AM 350, 17-7 PH, PH-15-7Mo, AISI 304L and AISI 3-1 alloy steels. Influence of tempering temperatures, test direction and cold rolling on tensile characteristics. Notch sensitivity of the alloys at various tensile strength and yield strength levels. 31 ref. (Q23s, Q26, Q27, 2-61, 2-64, 3-66, 3-68; SGB-a, SS, 4-53)

977-Q. Preliminary Investigation of Brittle Fracture in Sheet Metals. Alfred J. Brothers and Howard E. Martens. Paper from "Symposium on the Testing and Evaluation of Materials for Solid Propellant Rocket Motor Casings". MAB-156-M. National Academy of Sciences, Washington 25, D. C., 1959, p. 158-188.

Notch tensile properties of mild steel and Ti-75A Ti alloy sheet at -325 to 450° F. under conditions of slow and impact loading. Effect of notch depth and sheet thickness on ductile to brittle transition temperature. Review of testing procedures for evaluating susceptibility to brittle fracture in high-strength sheet materials. 8 ref. (Q23s, Q26s, Q27d, 2-61, 3-68, 3-73; CN, Ti-b, 4-53)

978-Q. Current Position of Crack Propagation Testing of High-Strength Sheet Steels in the Physical Metallurgy Branch at N. R. L. John E. Srawley. Paper from "Symposium on the Testing and Evaluation of Materials for Solid Propellant Rocket Motor Casings". Report no. MAB-156-M. National Academy of Sciences, Washington 25, D. C., 1959, p. 189-201.

Tensile tests at -250 to 500° F. on sheet specimens provided with centrally disposed transverse cracks. Fracture appearance and net fracture stress transition temperatures and their relationship to room temperature yield strength. Effect of specimen thickness and crack dimensions. (Q23, Q26, Q27, 2-61, 3-73; SGB-a, AY, 4-53)

979-Q. Notch Sensitivity and Resistance to Tearing of Titanium Alloy Sheet. S. V. Arnold. Paper from "Symposium on the Testing and Evaluation of Materials for Solid Propellant Rocket Motor Casings". Report no. MAB-156-M. National Academy of Sciences, Washington 25, D. C., 1959, p. 202-220.

Tensile properties and notch strength of Ti sheet alloys Ti-5%Al-2.5%Sn, Ti-8%Al-2%Cb-1%Ta, Ti-6%Al-4%V and Ti-4%Al-3%Mo-1%V at -196 to +400° C. Brittle, intermediate ductile and super ductile modes of fracture are examined by tests on laminated Charpy specimens. Effect of sheet thickness on ductile to brittle transition temperatures and notch sensitivity. 5 ref. (Q23s, Q26q, Q27, 2-61, 3-73; Ti-b, 4-53)

980-Q. The Fracture Sensitivity of Materials for High-Strength Applications. E.

P. Klier, C. P. Gazzara and Arthur MacDonald. Paper from "Symposium on the Testing and Evaluation of Materials for Solid Propellant Rocket Motor Casings". Report no. MAB-156-M. National Academy of Sciences, Washington 25, D. C., 1959, p. 222-237.

Tension, notch tension and bulge tests on Vascojet 1000, PH-17-7Mo, AISI 4135, 6Al-4V-Ti, MST 185, B120VCA sheet alloys. Comparative stress strain curves after heat treatment. Influence of low temperature on tensile and notch tensile strength. 3 ref. (Q23s, Q26s, Q27d; SGA-b, ST, Ti-b)

981-Q. Simple Laboratory Bulge Tests for Sheet Metal Fracture Transition Studies and for Weldment Performance Evaluation. P. P. Puzak and J. Stoop. Paper from "Symposium on the Testing and Evaluation of Materials for Solid Propellant Rocket Motor Casings". Report no. MAB-156-M. National Academy of Sciences, Washington 25, D. C., 1959, p. 238-271.

Method and apparatus for crack starter and weld zone bulge tests for high-strength low alloy steels, toolsteels, AISI 410 steel and Ti-4Al-3Mo-1V alloy sheet. Influence of testing temperature and heat treatment condition on fracture characteristics. 8 ref. (Q10b, Q26, 2-61, 2-64; SGB-a, ST, Ti-b, 4-53, 7-51)

982-Q. A Suggested Code System for Low-Alloy Steels Relating Composition and Performance. Rafael Calvo Rodes. Society of Automotive Engineers, Preprint no. 292B, 1961, 9 p.

Definition of three parameters, the ideal critical diameter, temperature of the beginning of the martensite reaction and the potential hardness of tempering which define steels in such a manner that when the parameters are the same they have the same mechanical properties and performance. (Q-general, N8p, Q29n, 2-60; AY)

983-Q. Research on Light Metals in the Metallurgy Division, National Bureau of Standards. Thomas G. Digges. NML (National Metallurgical Laboratory) Technical Journal, v. 3, Feb. 1961, p. 22-28.

Testing of specimens of Ti, Ti alloys containing Al, Mn and V, single crystals of Al, Al alloys, Mg and AZ31 Mg alloy to determine effect of notch geometry and temperature on flow resistance, fracture resistance, notch strength and ductility and to determine effect of temperature on corrosion resistance, microhardness and microstructure. Nitriding of Ti and Ti alloy at 1800° F. 9 ref. (Q-general, 2-61, M27, J28k; Al-b, Mg, Ti-b)

984-Q. (German.) Transversely Ribbed Concrete Reinforcing Steel ST III a. Application and Current Status of Testing Results. W. Lierow. Technik, v. 16, Apr. 1961, p. 321-323.

Resistance spot, manual arc and autogenous pressure welding of ST III a steel bars; mechanical properties such as tensile strength, adhesive strength (between steel and concrete), fatigue strength of steel and of reinforced concrete bar; consideration for material selection. 6 ref. (Q-general, K-general; ST, 4-55, 17-57)

985-Q. (German.) Necking of Flat Parts Under Notch Stress. H. Motzfeld. Technik, v. 16, Apr. 1961, p. 324-325.

Tensile testing and observation of necking in flat parts of transparent and nontransparent plastics and of light metals. Necking angle as influenced by anisotropy of material. 6 ref. (Q27g, 3-72; EG-a39, NM-d37, 4-53)

986-Q. Strain Ageing and the Fatigue Limit of Steel. J. C. Levy and S. L. Kanitkar. Iron and Steel Institute, Journal, v. 197, Apr. 1961, p. 296-300.

Existence of definite fatigue limit of mild steel is explained in terms of ability of mild steel to undergo strenghening by strain aging. S-N curves are obtained for rimming steel specimens with strain aging ability exhausted previously by progressive under stressing. Data are given for effects of repeated strain aging on UTS and relationship between increases in fatigue strength and in UTS due to strain aging. 8 ref. (Q7, Q27, N7e, 3-68; CN)

987-Q. Influence of Local Temperature Increases on the Fretting Corrosion of Mild Steel. R. B. Waterhouse. Iron and Steel Institute, Journal, v. 197, Apr. 1961, p. 301-305.

Fretted and fatigued specimens of mild steel are examined by metallurgical microscope and back reflection X-rays to determine the conjoint action

between fretting corrosion and cyclic stressing and consequent effects on fatigue life. Recrystallization near the fracture surface accompanied by transformation of gamma Fe_2O_3 is noted as a function of temperature rise, caused by plastic deformation with resultant crack formation by surface fatigue. (Q7, Q26q, R1e, R1f, 2-61, 3-68; CN)

988-Q. (Russian.) Effect of Small Vanadium Additions on the Properties of Structural Carbon Steels. M. I. Gol'dshtein and S. G. Guterman. Stal', Dec. 1960, p. 1130-1134.

The vanadium of a steel containing 0.33-0.40% C, 0.23-0.41% Si, 0.66-0.92% Mn, 0.032-0.043% P, 0.028-0.048% S, 0.16-0.26% Cr, 0.06-0.09% Ni and 0-0.15% Cu is varied in the range from 0-0.093% V. Samples are quench hardened and subsequently heat treated at 400-650° C. for 1 hr. Effect of vanadium content and annealing temperature on hardness, tensile properties, impact strength and the vanadium present in precipitated carbides. 8 ref. (Q29n, Q27a, Q6n; CN, SGB-s)

989-Q. (Russian.) Plastic and Anticorrosive Properties of Cold Rolled Annealed Stainless Steel Sheet. V. K. Barzii. Stal', Dec. 1960, p. 1134-1135.

Kh18N9T sheet steel heat treated at 750-1100° C. is tested for mechanical properties, corrosion resistance in boiling 65% nitric acid for 144 hr. and intercrystalline corrosion. Effect of heat treatment, temperature and Ti concentration. (Q-general, R6g, R2h; SS, 4-53)

990-Q. Preventing Fatigue Failures. Pt. 3. Heat Treatment and Surface Hardening. F. B. Stulen, H. N. Cummings and W. C. Schulte. Machine Design, v. 33, May 25, 1961, p. 146-150.

Effect of heat treatment on tensile strength, grain size and residual stress of various steels. Results of nitriding and carburizing as case hardening methods. 9 ref. (Q7, Q27, Q25h, M27c, 2-64, J28; ST)

991-Q. The Importance of Internal Quality in Welding. I. G. Hamilton. Paper from "Conference on Internal Steel Quality and Methods of Its Assessment". West of Scotland Iron and Steel Institute, Journal, v. 68, 1960-1961, p. 41-60.

Study of internal flaws in welded joints including porosity, piping, nonmetallic inclusions and cracks and their effect on brittle fracture and fatigue. (Q26s, Q7, 9; 7-51)

992-Q. Induction Hardening and Fatigue Strength. Hiroshi Nakamura. Railway Technical Research Institute, JNR, Quarterly Report, v. 1, Dec. 1960, p. 17-27.

Strength tests and stress measurements are made on carbon steel to determine the effect of induction hardening on fatigue strength. Results indicate improved fatigue properties are dependent on carbon content and pretreatment. (Q7a, 2-64; CN)

993-Q. Heat-Treat and Shot-Peen Cycle Cuts Torsional Stresses. Iron Age, v. 187, June 1, 1961, p. 70-71.

Factors responsible for the improved torsional stress progress in power shafts. (Q1a, 2-64, G23n)

994-Q. (Japanese.) The Damping Capacity and Fatigue of Cast Al-Cu Alloys. Takuichi Morinaga and Shigeo Zaima. Imono (Japan Foundrymen's Society, Journal), v. 33, Mar. 1961, p. 182-189.

Torsion fatigue, tensile and hardness tests on specimens containing 3.2-18.6% Cu. An increase in fatigue strength is noted as the damping capacity in torsional oscillation increases, both occurring as a function of Cu content. Data are given for tensile strength, Knoop ratio, Vickers and Knoop hardness, elongation and phase composition. 8 ref. (Q8g, Q7h, Q-general, 2-60; Al-b, Cu)

995-Q. (Japanese.) The Strength of Malleable Iron at Low Temperatures. Nobuhisa Tsutsumi. Imono (Japan Foundrymen's Society, Journal), v. 33, Mar. 1961, p. 202-209.

Tensile, bending, impact and hardness tests on blackheart malleable cast iron at -196 to 0° C. to determine applicability in vehicles operating at low-temperature. 11 ref. (Q27, Q6, Q5, 2-63; CI-s)

996-Q. (Japanese.) Effects of Addition of Phosphorus on Wear Resistance and Braking Effect of Nodular Cast Iron Brake Shoes. Minoru Nakai, Kunio Okabayashi and Masakazu Okami. Imono (Japan Foundrymen's Society, Journal), v. 33, Mar. 1961, p. 209-216.

Improvement of the friction coefficient in wear resistant cast iron for railway brake shoe application by addition of 0.8% phosphorus. 5 ref. (Q9p, T23s, 2-60; CI-r, P, 17-57)

997-Q. Tensile Properties of 17-7 PH and 12 MoV Stainless-Steel Sheet Under Rapid-Heating and Constant-Temperature Conditions. Charles R. Manning, Jr., and Howard L. Price. NASA Technical Note D-823, May 1961, 28 p. (Available from National Aeronautics and Space Administration, Washington, D. C.)

Yield and rupture strengths of 17-7 PH and 12 MoV stainless steels sheet heated to failure at temperature rates from about 1 to 170° F. per sec. under constant load conditions are compared with yield and tensile strengths obtained from short-time elevated-temperature tensile tests. 5 ref. (Q3, Q23b, Q27, 2-62; SS-e)

998-Q. (Japanese.) Effect of Pre-Straining on the Ductility of Pure Chromium. Susumu Yoshida, Yukio Ohba and Norio Nagata. Japan Institute of Metals, Journal, v. 25, Feb. 1961, p. 93-96.

Room temperature ductility of specimens containing 0.004% nitrogen as improved by rolling at 400-500° C. with consequent nitride precipitation which controls the distribution of lattice defects. The solubility and diffusion of solute nitrogen atoms are controlled by the rolling temperature. 8 ref. (Q23p, N7, 2-61, 3-68; Cr-a)

999-Q. (Japanese.) The Brittleness of Annealed Nickel. Pt. 2. The Brittleness of Nickel for Electron Tubes. Satoru Mito. Japan Institute of Metals, Journal, v. 25, Feb. 1961, p. 96-100.

Effect of oxygen content, heat treatment time and temperature, hydrogen pretreatment and cooling rate on embrittlement phenomena and tensile properties of Ni wire specimens containing various amounts of oxygen and carbon after vacuum annealing at 200-1400° C. Embrittlement is attributed to grain boundary precipitation of oxides by a carbon reduction mechanism. 15 ref. (Q26s, Q27, N7, 2-60, 2-64; Ni, 4-61)

1000-Q. (Japanese.) Hydrogen Embrittlement of Nickel. Pt. 3. Brittleness in Nickel for Electron Tubes. Satoru Mito. Japan Institute of Metals, Journal, v. 25, Feb. 1961, p. 101-104.

Brittleness caused by heating in hydrogen is investigated by tensile and bending tests on Ni wire specimens annealed in vacuum and hydrogen at 200-1000° C. and aged at room temperature. Mechanisms of brittleness recovery and delayed failure phenomena are studied as a function of oxygen contents. 10 ref. (Q26s, Q-general, 2-60, 2-64; Ni, 4-61)

1001-Q. (Japanese.) Effect of the Form of Graphite on Mechanical Properties. Hiromu Tanimura and Kiichi Taniguchi. Japan Institute of Metals, Journal, v. 25, Feb. 1961, p. 116-120.

Tensile and Charpy impact tests on 2.53-3.70% carbon specimens having flake and eutectic graphite structures. Influence of graphite structure, carbon content and notch dimension on resilience, tensile strength, elongation, stress-strain curves and slip deformation characteristics. 10 ref. (Q-general, 3-71; CI-b)

1002-Q. What Is Steel-Bonded Carbide? K. J. A. Brookes. Metalworking Production, v. 105, May 10, 1961, p. 65-67.

Development and testing of Ferro-Tic, a steel-bonded carbide, produced by conventional liquid-phase sintering in vacuum of TiC (33% by weight) and chrome-molybdenum alloy steel (67% by weight). Effect of tempering temperature on hardness and transverse rupture strength determined at 100 to 1100° F. (Q-general, H16, 2-60, 2-62, 2-64; ST, Ti, C, 6-69)

1003-Q. Ductility of Beryllium Single Crystals Oriented for Basal Slip and Tested in Tension. M. Herman and G. E. Spangler. Franklin Institute, Journal, v. 271, May 1961, p. 421-422.

Influence of impurities in Be on ductility as observed by determining the amount of basal plane glide during tensile testing of Be single crystals. 3 ref. (Q23p, Q24a, Q27, 3-72; Be, 14-61)

1004-Q. Research Adds to Service Life of Superalloy Castings. Steel, v. 148, May 29, 1961, p. 74-75.

Review of properties of superalloy WI-52 as a function of composition and production. Emphasis on stress-rupture life and rupture elongation. Applications

in jet turbine blades and vanes and in automotive gas turbine engine parts. (Q3m, Q23p, 2-60; SGA-h, Co-b, W, Cr, 17-57)

1005-Q. Influence of Impurity Elements, Structure and Prestrain on Tensile Transition Temperature of Chromium. B. C. Allen, D. J. Maykuth and R. I. Jaffee. NASA Technical Note D-837, Apr. 1961, 48 p. (Available from National Aeronautics and Space Administration, Washington, D. C.)

Iodide chromium is fabricated into subsize buttonhead specimens and subjected to an impurity analysis. Resulting tensile transition temperature is -10° C. for wrought chromium, 300° C. for recrystallized material with a 3° C. per min. cool after annealing and 390° C. for recrystallized material with an oil quench. Hardness, recrystallization and grain-growth behavior of Cr with and without impurity additions is investigated. 26 ref. (Q23r, N5, Q29, N3, 3-69, 3-71; Cr)

1006-Q. The Influence of Surface Preparation of Stainless Steel on Enamel Adherence. A. E. Farr. Porcelain Enamel Institute Forum, Proceedings, v. 22, 1960, p. 78-88.

Effect of various pickling solutions used to prepare 302 stainless steel prior to applying porcelain enamel coatings. Enamel adherence is found to be directly proportional to surface roughness. (Q10c, L27; SS)

1007-Q. Plastic Deformation of Uranium. Metal Industry, v. 98, Apr. 21, 1961, p. 318.

Creep testing of alpha-uranium to determine the effects of thermal cycling on creep rate, plastic strain and deformation of uranium under applied stress. The method of calculating "intermediate" and maximum "recovery" strain. (Q3, Q24, 2-64; U)

1008-Q. The Common Causes of Metal Failure in Service and Their Relative Incidence. J. Waring. Australian Institute of Metals, Journal, v. 6, Feb. 1961, p. 17-20.

Data indicate the incidence of corrosion, pitting, faulty lubrication and fatigue as factors in failure of shafts, baths, rolling bearings, castings and other products. (Q7k, T7)

1009-Q. (Russian.) Thermal Fatigue of Metals. Yu. F. Balandin. Metallovedenie i Termicheskaya Obrabotka Metallov, Mar. 1961, p. 2-8.

A Nimonic type alloy, Kh20N80 alloy and an 18-8 austenitic steel are exposed to thermal cycling at temperatures from 600-850° C. Thermal fatigue strength as a function of temperature, grain size, previous heat treatment and, in the case of notched sample, of the notch radius. 38 ref. (Q7j, 2-59, 2-61, 2-64; Ni-b, SS-e)

1010-Q. (Russian.) Stress-Strain Diagrams of a Steel Quenched From Ac_1, Ac_2 and Ac_3 Temperatures. G. I. Pogodin-Alekseev and B. A. Artamonov. Metallovedenie i Termicheskaya Obrabotka Metallov, Mar. 1961, p. 47-51.

A steel containing 0.24% C, 0.60% Mn, 0.37% Si and 0.83% Cr is heated for 40 min. in boric acid up to 700-880° C., water quenched and heat treated at 100° C. for 2 hr. Hardness, tensile strength, bend strength and resilience as functions of the quenching temperatures. 4 ref. (Q-general, 2-64; ST)

1011-Q. (Russian.) Mechanical Properties of Cu-V and Ni-V Alloys at Elevated Temperatures. E. M. Savitskii and U. K. Duisemaliev. Metallovedenie i Termicheskaya Obrabotka Metallov, Mar. 1961, p. 52-55.

Hardness, tensile strength and ductility of Cu containing 0-3.29% V and Ni containing 0-10% V is measured at 20-700° C. 4 ref. (Q29n, Q27a, Q23p; Cu-b, Ni-b, V)

1012-Q. (Russian.) Fatigue Strength of Surface Rolled Cylindrical Notched Samples. I. V. Kudryavtsev and L. M. Rozeman. Metallovedenie i Termicheskaya Obrabotka Metallov, Mar. 1961, p. 55-57.

Straight and notched samples of 45 steel containing 0.54% C, 0.70% Mn, 0.23% Si, 0.027% P and 0.021% S are rotating-beam tested. Effect of previous surface rolling on fatigue strength. Distribution of residual stress in a surface rolled notched sample. (Q7c, 3-68; ST)

1013-Q. Yield Strength of E9018 Weld Metal. W. L. Wilcox and H. C. Campbell. Welding Journal, v. 40, May 1961, p. 193s-196s.

Effect of using stringer beads and preheat and interpass temperatures on yield strength of weld metal in both as-welded and stress-relieved conditions. (Q23b, 2-61, 2-64, W29h; AY)

1014-Q. On Notch Sensitivity. F. A. McClintock. Welding Journal, v. 40, May 1961, p. 202s-209s.

Definition of load and deformation factors relating to actual behavior of notched sections to that predicted by plasticity theory for fully ductile materials. Tensile tests on notched specimens of pure Al, 7075 Al alloy and 4140 steel. Effects of size, notch angles and root radius on deformation behavior. 23 ref. (Q23s, Q27, Q24, 3-73; Al, ST)

1015-Q. (German.) Significance of Static Torsion Testing in Determination of Toughness for Very Hard Steels. Karl Bungardt, Otto Mulders and Werner Schmidt. Stahl und Eisen, v. 81, May 11, 1961, p. 670-675.

Torsion testing of annealed (180-400° C.) 90 MnV8 steel specimens of varying hardness using a mechanical and electrical measuring device. Evaluation of torsion yield point, torsion strength, elastic, plastic and total torsion angle and deformation work as influenced by annealing temperature and hardness of specimens. Comparison of toughness results with those obtained in static bending tests. (Q1, Q23r; ST, SGB-q)

1016-Q. (German.) Toughness Investigation on High-Speed Steels. Siegfried Wilmes. Stahl und Eisen, v. 81, May 11, 1961, p. 676-684.

Bend testing of heat treated (1170-1270° C. hardened and up to 620° C. annealed) high-speed steels containing 0.78-1.32% C, 0-10.30% Co, 3.72-4.39% Cr, 0.83-8.76% Mo, 1.27-3.77% V, 1.75-17.55% W. Bending strength and toughness as influenced by heat treatment (hardening time, hardening and annealing temperature) and shape of specimens. Role of form of carbides. (Q23r, Q5, 2-64; TS-m)

1017-Q. Stress/Strain Properties of Cast Iron and Poisson's Ratio in Tension and Compression. G. N. J. Gilbert. BCIRA Journal (British Cast Iron Research Assoc.), v. 9, May 1961, p. 347-363.

Variation of longitudinal and lateral strains is measured for cast iron bars loaded in tension and compression and also subjected to reversals of stress (unloading). Poisson's ratio is calculated. A new hypothesis is presented to explain the peculiar stress-strain properties of cast iron in terms of the volume change under stress of the spaces occupied by the graphite. (Q25n, Q21c; CI)

1018-Q. Effect of Carbon, Silicon and Phosphorus on Tensile and Impact Properties of Ferritic Blackheart Malleable Iron. C. T. Moore. BCIRA Journal (British Cast Iron Research Assoc.), v. 9, May 1961, p. 385-405.

Tensile properties of blackheart malleable Fe are improved by decreasing the C content or by increasing the Si and P contents. The best combination of impact and tensile properties is achieved with low P and C, and medium or high Si concentrations. Subcritical quenching and tempering treatments provide good impact ductility at 650 to -180° C. 4 ref. (Q27a, Q6, 2-60; CI-s)

1019-Q. (French.) Relaxation of Four Typical Heat Resistant Steels Subsequent to Torsional Deformation. P. Brozzo. Revue de la Soudure--Lastijdschrift, v. 17, Jan. 1961, p. 44-49.

Steels with 0.09-0.155% C, 0.44-0.54% Mn, 0.23-0.51% Si, 0.75-13.05% Cr, 0-0.20% Ni, 0-1.12% Mo, 0.01-0.021% S and 0.015-0.017% P are hardened at 910-980° C. for 25 min. to 3 hr. and air or furnace cooled. Two of the steels are tempered at 720° C. for 3 hr. Elastic limit and relaxation after torsion as functions of the testing temperature ranging from 35-750° C. (Q3, Q21, 2-61; SS, SGA-h)

1020-Q. (Italian.) Effect of Sulphur and Boron on the Properties of Malleable Cast Iron. A. Molaroni and V. Pozzesi. Fonderia Italiana, v. 10, Mar. 1961, p. 99-100.

Malleable iron containing 0-0.0015% B and 0-15% S is tested for its mechanical, hardness and machinability properties. Effect of the above additions on tensile strength, elongation, impact and bend strengths, hardness and machinability. (Q-general, Q29n, G17k, 2-60; CI-s, B, S)

1021-Q. How Hot Hardness Varies in Tool Steels. David P. Hughes. Metal Progress, v. 79, June 1961, p. 76-79.

With a Rockwell testing machine modified to operate up to 1200° F., Latrobe engineers rated the hot hardnesses of numerous grades of toolsteels and found that they varied according to heat treatment and room temperature hardnesses. (Q29p; TS)

1022-Q. Preventing Fatigue Failures. Pt. 4. Surface Treatment and Environment. F. B. Stulen, H. N. Cummings and W. C. Schulte. Machine Design, v. 33, June 8, 1961, p. 165-170.

Fatigue testing of steel and Al alloy specimens to determine the effect of environment, anisotropy of material and surface preparations such as grinding, shot peening, hammering and plating on fatigue failure. 28 ref. (Q7k; Al-b, ST)

1023-Q. Effects of Lubricants on Fatigue Life of Ball Bearings. E. A. Baniak and G. A. Kohl. Machine Design, v. 33, June 8, 1961, p. 190, 192, 194.

Fatigue testing of ball bearings to determine effects of various oil lubricants applied as flood or mist on bearing life. Design and operation of the fatigue life test assembly. (Q7k, T7d, 18-73)

1024-Q. Extraordinary Physical Properties Obtained With New Mar-Aging Alloys. Industrial Heating, v. 28, May 1961, p. 880.

Heat treatment of steel alloy with 18% Ni-7% Co-5% Mo develops yield strength of 250,000 psi. while maintaining a nil ductility temperature below -80° F. Heat treatment involves age hardening of martensite. Material can be cold formed and shaped with ease and welded by either manual or automatic methods. (Q23, K9s, J-general, N7a; AY)

1025-Q. (Spanish.) Relationship Between Mass and Mechanical Properties of Gray Cast Iron. Albert de Sy and Jan Van Eeghem. Instituto del Hierro y del Acero, no. 70, Oct-Dec. 1960, p. 847-860.

Literature review. Fe containing 0.2 to more than 0.5% phosphorous is cast into test bars of 7.5-90 mm. diameter and 100-1300 mm. length. Effect of shape and size, carbon equivalent and phosphorous content on hardness and tensile strength. (Q27a, Q29n; CI-n)

1026-Q (Spanish) Factors Improving the Modulus of Elasticity of Cast Iron. Alberto Sole Amat. Instituto del Hierro y del Acero, v. 13, Oct-Dec. 1960, p. 835-843.

Cast iron containing 2.90-3.59% C, 1.74-3.83% Si and 0.46-0.97% Mn is cast into test pieces of various diameter. Influences of carbon equivalent, graphite shape and quantity and cross section on the modulus of elasticity. (Q21a, Q21b; CI)

1027-Q. (English.) Mechanical Properties of Tellurium Single Crystals. R. J. Stokes, T. L. Johnston and C. H. Li. Acta Metallurgica, v. 9, May 1961, p. 415-427.

Deformation and fracture behavior of chemically polished specimens of various orientations strained in tension. Slip, crack growth, work hardening and orientation relationships are correlated with chemical bonding anistropy. Data are given for stress-strain, elongation and ductility values with discussion of dislocation interaction. 16 ref. (Q23, Q24, Q26s, 3-68; Te, 14-61)

1028-Q. (English.) On the Mechanism of Crack Initiation in Embrittlement by Liquid Metals. H. Nichols and W. Rostoker. Acta Metallurgica, v. 9, May 1961, p. 504-509.

Generation of brittle fracture by liquid metal wetting at grain boundaries on the surface of specimens and in the center of grains as a function of reduction of surface energy at the liquid-solid interface. Studies on Fe-3% Si alloy in molten Li at 200° C.; 70-30 brass, Al-6% Mg and Al-4% Cu alloys in Hg at 20° C. and Cu in liquid Bi at 300° C. 12 ref. (Q26s, Q26q, M27f, P13h; Al-b, Hg, Fe-b, Li, Cu-b, Bi, 14-60)

1029-Q. (English.) The Influence of Grain Size on the Energy Stored in Deformed Copper. M.H. Loretto and A.J. White. Acta Metallurgica, v. 9, May 1961, p. 512-513.

Power difference curves are obtained as a function of temperature for fine and coarse-grained specimens of 99.999% Cu annealed in vacuum at 6° C. per. min. to 300° C. after 30% strain in compression. Relation of energy release and recrystallization behavior to grain size and purity. (Q25h, N5, 2-59, 2-61, 3-68; Cu-a)

1030-Q. (English.) Cubic Slip in Aluminium Alloy Crystals. C. J. Beevers and R. W. K. Honeycombe. Acta Metallurgica, v. 9, May 1961, p. 513-515.

Temperature dependence and orientation relationships of cubic slip bands occurring in Al-5.3% Cu alloy single crystals tested in tension at 77-373° K. Relation of orientation to work-hardening characteristics, sessile dislocation and Lomer-Cottrell locking mechanisms affecting primary, conjugate and cross slip systems. 8 ref. (Q24, M26b, 2-61; Al-b, Cu, 14-61)

1031-Q. (Translation-ConBur.) Physicochemical Processes in the Surface Layers of Steel During Cyclic Deformation in Melts of Readily Fusible Metals. M. I. Chaevskii. Academy of Sciences of the USSR, Proceedings, Physical Chemistry Section, v. 134, Sept-Oct. 1960, p. 991-994.

Molten Sn and Pb-Bi eutectic as surface active media decrease fatigue strength of steel specimens containing stress concentrators and undergoing cyclic deformation. This decrease is attributed to the failure of intermetallic compounds to form and prevent development of microscopic cracks. 14 ref. (Q26s, Q7a; ST, 14-60)

1032-Q. The Evaluation of the Effects of Very Low Temperatures on the Properties of Aircraft and Missile Metals. L. P. Rice. Battelle Memorial Institute (Wright Air Development Division). U. S. Office of Technical Services, PB 171016, June 1960, 61 p. $1.75.

Tensile and hardness properties of Ti-Al-V, Ti-Mo-V and Type 301 XH stainless steels. Ti, Al-V and 4% Al-3% Mo-1% V Ti alloys and 301 XH stainless do not reveal a serious loss of ductility or fracture before reaching 0.2% offset strain at -253° C. (Q27a, Q29n, 2-63; SS, Ti-b)

1033-Q. Tensile and Impact Properties of Cast Stainless Steels at Cryogenic Temperatures. E. R. Hall. ASTM Preprint no. 80f, 1961, 9 p.

Tensile and notched-bar impact tests performed on production heats of cast chromium-nickel stainless steels at temperatures from 70-430° F. No ductile brittle transition is observed for any of the alloys including those having a small amount of delta ferrite dispersed in the microstructure. (Q27, Q6, 2-63; SS, 5)

1034-Q. Fracture of High-Strength Sheet Steel Specimens Containing Small Cracks. J. E. Srawley and C. D. Beachem. ASTM Preprint no. 80a, 1961, 12 p.

Introduction of small surface cracks into steel sheet specimens. Effect of crack size on tensile strength. Water and India ink are found to have a detrimental effect on fracture strengths of steels. (Q26; ST, SGB-a, 4-53)

1035-Q. Analysis of the Effects of Test Temperature on the Notch Strength of High-Strength Sheet Alloys. Volker Weiss and John G. Sessler. ASTM Preprint no. 80d, 1961, 15 p.

Notch properties of 300 M, Vascojet 1000, Ti-13% V-11% Cr-3% Al and Ti-4% Al-3% Mo-1% V are analyzed as a function of test temperature. Increasing stress biaxiality produces a loss in notch ductility. Notch ductility ration used to analyzed notch tensile strength data. (Q27a, Q23s, 2-61; ST, Ti-b, 4-53)

1036-Q. Influence of Sheet Thickness on Sharp-Edge-Notch Properties of a Beta Titanium Alloy at Room and Low Temperatures. A. J. Repko, M. H. Jones and W. F. Brown, Jr. ASTM Preprint no. 80b, 1961, 17 p.

Room temperature data for aged sheet are analyzed to yield the absolute effect of thickness on fracture toughness, percent shear and slow crack extension. Solution treated condition of B120VCA is very tough. 7 ref. (Q26, Q2, 2-61; Ti-b)

1037-Q. Basic Theories of Fatigue Failure and Their Design Implications. Charles D. Nash, Jr. American Helicopter Society, Inc. Seventeenth Annual National Forum, Proceedings, May 1961, 9-10.

Review of several basic theories of fatigue failure including the Machlin dislocation theory, the Shanley unbonding by reversed slip theory, the Yokobori dislocation theory, the Freudenthal-Weiner local thermal stress theory, the Oding dislocation theory and the Nash theory. Design and material implications of these theories. 10 ref. (Q7, 10-51)

1038-Q. (Translation-ConBur.) Creep in Hot Rolled Uranium. G. Ya. Sergeev and A. M. Kaptel'tsev. Soviet Journal of Atomic Energy, v. 7, Apr. 1961, p. 1023-1025.

Investigation of the resistance of hot rolled uranium to creep as affected by grain size, texture, temperature and stress. Tests were carried out in an atmosphere of purified He at 20-600° C. 4 ref. (Q3, 2-59, 2-61, 3-66; U)

1039-Q. Beryllium. M. K. McQuillan and T. W. Farthing. Nuclear Energy, May 1961, p. 195, 197.

A survey of the attempts of Be research workers to give the metal more room temperature ductility and to improve its workability at higher temperatures by eliminating minima in the ductility/temperature curve. This can be achieved through modification of the electronic structure by addition of metals which form solid solutions with Be or through purification by zone refining, electrolysis, iodide refining, distillation or electron beam melting. (Q23p; Be)

1040-Q. Design Properties of Aluminium Alloys at Elevated Temperatures. I. C. Taig. Aircraft Engineering, v. 33, May 1961, p. 131-135.

Development of a consistent method of data presentation for mechanical properties of Al alloys. Semi-empirical method takes into account realistic temperature conditions and provides a unified set of strength and stiffness properties for design. (Q-general, 17-51; Al-b)

1041-Q. (Spanish.) High-Strength Zinc Alloy. Alexandre Krupkowski and Wladyslaw Kajoch. Instituto del Hierro y del Acero, v. 14, Feb. 1961, p. 129-145.

Mechanical strength, elongation, hardness and corrosion and wear resistance of Zn-Mn-Cu alloys. Method for eliminating carbon from the alloys during preparation. 13 ref. (Q-general, R-general; Zn-b, Mn, Cu)

1042-Q. (Spanish.) Tests on Nodular Cast Iron Inoculated With Cu-Si-Mg Alloys. Francisco Rodriguez-Yufera and Joaquin Orland. Instituto del Hierro y del Acero, v. 14, Feb. 1961, p. 93-128.

Structure, impact strength, resistance to rotary bending load and Young's modulus of nodular graphite Fe cast from crucible, cupola or rotary furnace. Substitution of Cu for Ni and effect of substitution on mechanical and structural properties. 10 ref. (Q-general, M27, 2-60; CI-r, Cu, Si, Mg)

1043-Q. New Directions in Materials Testing. Strength, Stiffness, Ductility, Toughness. M. Spewock. Materials in Design Engineering, v. 53, June 1961, p. 118-124.

Problems of equipment and techniques involved in mechanical test methods. Improved apparatus, electronic technology and mathematical analysis as methods of increasing accuracy. (Q-general, 1-54)

1044-Q. New Directions in Materials Testing. Friction Properties, Wear Resistance. Malcolm Riley. Materials in Design Engineering, v. 53, June 1961, p. 130-134.

Mechanical, thermal and chemical causes of wear. Factors involved in simulating friction. Use of ranking tests. (Q9)

1045-Q. (Italian.) Fatigue Tests on Some Light Cast Alloys. A. Massa. Alluminio Nuova Metallurgia, v. 30, Mar. 1961, p. 131-135.

A particular type of blank-ribbed test piece is suggested for fatigue tests. Application of fatigue tests to selection of alloys, casting methods and quality control in production. (Q7, E25q; EG-a39)

1046-Q. (Rumanian.) Influence of Shape and Distribution of Graphite on Quality of Piston Segments From Alloyed Cast Iron. Traian Dumitrescu. Studii si Cercetari de Metalurgie, v. 5, Apr. 1960, p. 493-515.

Wear resistance, thermal stability, mechanical and physical properties of cast iron alloyed with Cu, Cr-Ni and Cr-V. Comparison of eutectic and lamellar graphite. 14 ref. (Q9n, Q-general, P-general, 3-71; CI, Cu, Cr, Ni, V)

1047-Q. Recent Developments in High Strength Steels. R. A. Lula. American Society of Mechanical Engineers, Paper no. 61-MD-7, 1961, 8 p. $1.

Mechanical properties and fabricating characteristics of newly developed precipitation-hardening stainless steels, cold rolled metastable austenitic stainless steels and low-alloy hardenable stainless steels. Tests are conducted at -400 to 1200° F. with stress of 40,000-280,000 psi. 12 ref. (Q-general; SS, SGB-a)

1048-Q. (Russian.) Constitutional Diagram of Titanium-Palladium System. A. A. Rudnitskii and N. A. Burin. Zhurnal Neorganicheskoi Khimii, v. 5, Nov. 1960, p. 2414-2421.

Determination of hardness, thermoelectromotive force, electrical resistance and its temperature coefficient, tensile strength, elongation, solubility and crystallization of high purity Ti and Pd by thermal and microstructural analysis from 620-1045° C. and 800-1000° C. respectively. (Q29n, Q27a, Q23, P15, M21, M23r; Pd, Ti)

1049-Q. (Russian.) Fatigue Strength of T5K10 Alloy. L. G. Kuklin. Stanki i Instrument, Apr. 1961, p. 30.

Investigation of fatigue properties of cutting tools made of hard alloys by cyclic, tensile and impact loading. Influence of surface condition and working methods on yield strength and subsequent performance characteristics. (Q7, T6n; SGB-q, 17-57)

1050-Q. (Spanish.) Increasing the Fatigue Limit by Localized Heat Treatment of Sheets and Beams With Welded Trusses. Ondrej Puchner. Ciencia y Tecnica de la Soldadura, v. 10, Nov-Dec. 1960, p. 14432, 1-7.

Effect of local heat treatment with oxy – acetylene flame on fatigue limit and local stresses. 6 ref. (Q7b, J2h, Q25; ST, 4-53, 4-57)

1051-Q. Axial-Load and Strain-Cycling Fatigue of Copper at Low Endurance. P. P. Benham. Institute of Metals, Journal, v. 89, May 1961, p. 328-338.

Annealed and cold worked specimens of OFHC Cu are tested in axial constant load and strain cycling to fracture. Cyclic creep strain and 5-N curves are given with data for tensile properties, hysteresis loop, fatigue crack mechanisms, deformation and fracture modes and hardening and softening effect. 9 ref. (Q7, Q-general, 3-68; Cu-a)

1052-Q. The Fracture Characteristics of Brass in Impact at Atmospheric and Elevated Temperatures. A. R. Bailey. Institute of Metals, Journal, v. 89, May 1961, p. 339-342.

Pure alpha, binary beta and ternary and quaternary alpha-beta and beta-gamma brasses containing 28-50% Zn, 0.5% Al, 0.2% Mn and 0.2.1% Fe are impact tested at 20-800° F. to determine effects of composition, structure and temperature on fracture mode. Intercrystalline cracking is influenced by brittleness. 16 ref. (Q26, Q6, 2-60, 2-61, 3-71; Cu-n)

1053-Q. Hot Hardness and Other Properties of Some Binary, Intermetallic Compounds of Aluminum. E. R. Petty. Institute of Metals, Journal, v. 89, May 1961, p. 343-349.

Binary specimens containing Co, Cr, Cu, Fe Mg, Mn and N are tested at 20-600° C. Data are given for microhardness, Knoop and VPN hardness, plasticity and embrittlement as a function of heat of formation, density, melting temperature, interatomic distance, atomic number of the second element, composition and temperature. Survey of literature covering physical properties of intermatallic compounds. 19 ref. (Q29p, Q-general, P-general, 2-60, 2-61; Al-b, 14-68)

1054-Q. (Book.) Handbook of Mechanical Wear. Charles Lipson and L. V. Colwell, Editors. 1961. 469 p. University of Michigan Press, Ann Arbor, Mich. $20.

Mechanisms of surface damage. Fundamental aspects of wear, pitting, scoring, spalling, corrosion and abrasive wear. Wear resistance materials and manufacturing processes. (Q9, R-general; SGA-m, 9)

1055-Q. Compatibility of Metal Pairs. Robert Davies. Chapter 1 from "Handbook of Mechanical Wear". University of Michigan Press, Ann Arbor, Mich., 1961, p. 7-15.

Scoring resistance of common metallic elements in sliding contact with Al, Cu, Ag and steel discs. Criteria for predicting which pairs of metallic elements slide with minimum scoring. 6 ref. (Q9)

1056-Q. Sliding Characteristics of Metals at High Temperature. M. B. Peterson and J. J. Florek. Chapter 2 from "Handbook of Mechanical Wear". University of Michigan Press, Ann Arbor, Mich., 1961, p. 16-34.

Coefficient of friction and surface damage of Cu, Co, Cr, Mo, Al, Zr, Ni, Ni alloys, pure Fe, carbon steel, tool-steel and stainless steels sliding against

themselves at temperatures up to 1600° F. Effects of temperature and various oxide lubricants on friction. 13 ref. (Q9b, 2-61; Cu, Co, Cr, Mo, Al, Zr, Ni, Fe, CN, TS, SS, 9-71)

1057-Q. Friction, Wear and Surface Damage of Metals as Affected by Solid Surface Films. Edmond E. Bisson. Chapter 3 from "Handbook of Mechanical Wear". University of Michigan Press, Ann Arbor, Mich., 1961, p. 35-55.

Function of solid surface films in friction and wear is considered in terms of the adhesion theory of friction. Effects of naturally formed and preformed oxide, chloride, sulphide and various other solid lubricant films on wear and friction of steel, and Ni and Cu alloys sliding against steel. Influence of sliding velocities and elevated temperatures on friction. 31 ref. (Q9, 2-62, 18-73; ST, Ni-b, Cu-b, NM-h)

1058-Q. Experimental Load-Stress Factors. W. D. Cram. Chapter 4 from "Handbook of Mechanical Wear". University of Michigan Press, Ann Arbor, Mich., 1961, p. 56-91.

Surface endurance limits of mating materials subjected to rolling or combined rolling and sliding action. Nature of contact and stresses in mating elastic cylinders. Experimental load stress factors and surface fatigue curves for cast irons, steels, bronze, Al and nonmetallic materials. Influence of cold working, conversion coatings, speed, lubrication and heat treatment. 13 ref. (Q25, Q7, 2-64, 3-67, 3-68; CI, ST, Cu-s, Al)

1059-Q. Subsurface Fatigue. Horace J. Grover. Chapter 5 from "Handbook of Mechanical Wear". University of Michigan Press, Ann Arbor, Mich., 1961, p. 95-107.

Stress conditions under which subsurface fatigue may occur. Examples of fatigue originating subsurface inclusion, subsurface fatigue of surface hardened parts and under rolling loads. 16 ref. (Q7, 3-66, 3-68)

1060-Q. Resistance of Materials to Rolling Loads. E.S. Rowland. Chapter 6 from "Handbook of Mechanical Wear". University of Michigan Press, Ann Arbor, Mich., 1961, p. 108-130.

Alloy steels used commercially in rolling contact bearings. Conditions for rolling fatigue and calculation of stress distributions. Effects of composition, heat treatment and other processing variables on bearing life. Development of steel and other alloys for high-temperature service. Advantages of vacuum melted steels. 24 ref. (Q7, 2-60, 2-64, T7d; AY, SGA-h, 17-57)

1061-Q. The Importance of Surface Temperature to Surface Damage. B.W. Kelly. Chapter 8 from "Handbook of Mechanical Wear". University of Michigan Press, Ann Arbor, Mich., 1961, p. 155-172.

Calculation of surface temperature resulting from frictional heating by rolling and sliding contacts. Scoring of lubricated and unlubricated surfaces. Behavior of lubricated films at elevated temperatures. Stress conditions in the contact area causing pitting. Calculation of thermal gradients on and below surface and effect of thermal stresses on stress system. 22 ref. (Q9, 3-66, 2-61, 18-73; 9-71, NM-h)

1062-Q. Wear Resistance. Howard S. Avery. Chapter 14 from "Handbook of Mechanical Wear". University of Michigan Press, Ann Arbor, Mich., 1961, p. 315-352.

Techniques for evaluation of wear resistance and wear conditions. Influence of impact, heat, corrosion, friction, abrasion and vibration. Method of surface protection. Merits of various ferrous and nonferrous materials. 26 ref. (Q9, 2-61)

1063-Q. Modern High-Carbon Ferrous Metals for Resistance to Surface Damage. F.B. Rote. Chapter 15 from "Handbook of Mechanical Wear". University of Michigan Press, Ann Arbor, Mich., 1961, p. 355-377.

Microstructure, composition, tensile properties, hardness and abrasion resistance of gray iron, malleable iron, pearlitic gray iron, nodular iron and white cast iron. Suitability for various applications. 5 ref. (Q27, Q29, Q9, M27, 2-60; CI, SGA-M, 17-57)

1064-Q. Wear Resistance of Cast-Iron Components. J.E. LaBelle. Chapter 16 from "Handbook of Mechanical Wear".

University of Michigan Press, Ann Arbor, Mich., 1961, p. 378-400.

Characteristics of frictional wear and scuffing. Structure of gray cast iron. Effects of graphite and matrix structures, chemical composition and surface finish on resistance of cast iron to normal wear and to scuffing. 9 ref. (Q9, 3-71, 2-60; CI)

1065-Q. (German.) Sintered Nickel Steels. Gerhard Findeisen. Zeitschrift fur Metallkunde, v. 52, Apr. 1961, p. 236-243.

Measurement of mechanical properties, density and microstructural investigation of pressed and sintered (1000-1200° C.) specimens of various concentrations: Fe powder, Ni carbonyl powder and graphite, carbon containing Fe and Ni powders, pulverized Ni-Fe alloy and lampblack, Fe powder and low-melting eutectic Ni-Si alloy. (Q-general, M27, P10a; ST, Ni, 6-72)

1066-Q. (German.) Residual Stresses Induced in Metallic Uranium by Improper Machining. Hans Duhler and Walter Schreiber. Zeitschrift fur Metallkunde, v. 52, Apr. 1961, p. 270-275.

Investigation of internal stress by measurement of elastic deformation using strain gages in uranium specimens containing 0.35% Cb after boring and combined boring and turning operations. Internal stress states as caused by plastic deformation. (Q25h, G17; U)

1067-Q. (German.) Mechanical Properties and Microstructure of Several Structural Materials After Neutron Irradiation. I. M. Voronin, V. D. Dmitriev, S. S. Ibragimov and V. S. Ljasenko. Kernenergie, v. 4, Feb. 1961, p. 129-132.

Measurement of mechanical properties and examination of microstructure of heat treated austenitic, ferritic and ferritic-martensitic steels and Mo after (0.9-3.4%) x 10^{20} neutron per cm. sq. irradiation at 450-650° C. and after annealing at 600-1250° C. (Q-general, M27, 2-64, 2-67; ST, Mo)

1068-Q. (Spanish.) Manufacture of Quality Castings From Bronze. Masataka Sugiyama. Instituto del Hierro y del Acero, v. 14, Jan. 1961, p. 1-9.

Bronze containing 83.86-94.34% Cu, 2.29-14.70% Sn, 1.80-3.76% Zn and 0.02-0.04% impurities is cast into test pieces which are X-ray tested. Effect of casting temperature on density, tensile strength, elongation and macrotincture and of the temperature gradient measured for various distances from the sample end and sample thickness on pipe, porosity and length of sound zone. (Q23p, Q27a, M28, P10a, 9; Cu-n, 5)

1069-Q. (Spanish.) Elastic Constants of Aluminum. Jose Ors Martinez. Instituto del Hierro y del Acero, v. 14, Jan. 1961, p. 46-57.

Poisson's coefficient, modulus of rigidity and Young's modulus of elasticity of sintered Al and cast 0.95-0.99% purity Al are determined by ultrasonic measurements to study the effects of various heat treatments, deformation and recrystallization. 41 ref. (Q21e, 2-64, 3-68; Al, 5, 6-72)

1070-Q. Slow Growth and Rapid Propagation of Cracks. J. E. Srawley. Report of NRL (Naval Research Laboratory) Progress, May 1961, p. 21. (Available as PB 171318 from U. S. Office of Technical Services, Washington 25, D. C.) $1.25.

Application of fracture mechanics to crack propagation testing and fracture of high-strength, thin-section materials is examined in relation to the development of a fracture failure from a small, semi-elliptical, surface crack origin as influenced by the fracture toughness for the thickness under consideration and the initial crack dimensions. (Q26q, Q26r, Q23n, 3-73)

1071-Q. Properties of Iron Alloys. W. S. Pellini and J. E. Srawley. Report of NRL (Naval Research Laboratory) Progress, May 1961, p. 21-22. (Available as PB 171318 from U. S. Office of Technical Services, Washington 25, D. C.) $1.25.

Evaluation of fracture toughness in high-strength steels for use in pressure vessels, submarine hulls, rockets and air frames. Relation of crack propagation and shear tearing to yield strength, density ratio and transition temperature. (Q26, Q23r, T-general, 17-57; ST)

1072-Q. Metals and Alloys at Elevated Temperatures. G.J. Danek, Jr., H.H. Smith and M.R. Achter. Report of NRL (Naval Research Laboratory) Progress, May 1961, p. 22-24. (Available as PB 171318 from U.S. Office of Technical Services, Washington 25, D.C.) $1.25.

Reverse bending tests at 5 cycles per sec. in air and vacuum at 1500° F. on 316 stainless steel, Ni and Inconel X to determine effects of environment on fatigue properties. Relation of oxidation and air strengthening mechanism and surface absorption of gaseous impurities to S-N curves and crack propagation. (Q26q, Q7, R1h, 2-62, 2-66, 3-69; SS-e, Ni-b, SGA-h)

1073-Q. Investigation of Refractory Metals Processing (Mechanical Properties of Refractory Alloys). R. W. Huber and E. J. Chapin. Report of NRL (Naval Research Laboratory) Progress, May 1961, p. 25-28. (Available as PB 171318 from U. S. Office of Technical Services, Washington 25, D. C.) $1.25.

Sheet and strip Cb-Ti alloy of 10-90% Ti are produced from vacuum arc melted high purity powder or by vacuum sintering with subsequent hot forging and cold rolling after vacuum annealing to determine effects of fabrication processes on mechanical properties. Data are given for tensile strength, VHN hardness and ductility, and alpha to beta martensite transformations, phase diagram grain size and recrystallization microstructures. 4 ref. (Q-general, F-general, H15, N-general, 2-64, 3-68; Cb-b, Ti-b)

1074-Q. Casting or Fabrication. Engineering Materials and Design, v. 4, June 1961, p. 364-365.

Stress concentration factors for steel castings and welded sections compared by strain measurement and photoelastic stress techniques. Data for yield strength and fatigue life indicating superior properties for castings. (Q25h, Q23b; ST, 5, 7-51)

1075-Q. (Italian.) Influence of Chemical Composition on Structure and Mechanical Characteristics of a 13% Chromium Martensitic Steel. Piero Virdis. Fonderia Italiana, v. 10, Feb. 1961, p. 43-47.

Phase diagrams, equilibrium structures and impact and Brinell hardness values are obtained for cast steels after heat treatment from 750-1150° C. 9 ref. (Q7, Q6, M-general, 2-60; 2-64; SS-e, Cr)

1076-Q. Stress Redistribution During Bending Fatigue. A. A. Blatherwick. Society for Experimental Stress Analysis, Proceedings, v. 18, Apr. 1961, p. 128-135.

Comparison of experimental and analytical results for Al and SAE 1020 steel specimens under cyclic stressing to determine relationship between stress, strain distribution, bending moment, fatigue life and modulus of static elasticity. 12 ref. (Q25, Q5m, Q7, 3-68; Al, ST)

1077-Q. (Russian.) Mechanical Tests Performed With NiAl Base Sintered Alloys. S. M. Astrakhantsev, E. I. Mozzhukhin and Ya. S. Umanskii. Isvestiya VUZ-Tsvetnaya Metallurgiya, Feb. 1961, p. 110-115.

Alloys composed of only the NiAl phase (i.e., containing 53-9% Ni and 44.4% Al) and alloys showing the phases NiAl and Ni_3Al, containing 58.9-64.4% Ni and 34.4-41.3% Al are tested at room temperature. Effect of composition on bend creep strengths from 800-850° C.; microhardness and microstructure. 12 ref. (Q5q, Q3m, Q29q, M27, 2-60; Al-b, Ni-b, 6-72)

1078-Q. Scuffing of Porous Chrome-Plated R-4360 Cylinders. George C. Lawrason, John F. Rainosek, Jr., and William P. Wisdom. SAE Paper no. 393A, 1961, p. 6 p.

Wear testing of malleable iron, alloyed cast iron and AMS7310 alloy piston rings to determine compatability with chrome-plated cylinder bores. Data given for scuff resistance of the bores and wear of the rings. (Q9, T21b; CI, 8-62, 17-57)

1079-Q. Effect of Engine Design Variables Upon Compression Ring Wear as Determined by Radioactive Tracer Technique. J. J. Martin and Hugh A. Williams. SAE Paper no. 362B, 1961, p. 11 p.

Cast iron and chromium plated compression rings for diesel engines are tested to determine the influence of design of fuel injector, fuel quality and oil control ring on wear rate. (Q9, T21b; CI, 8-62, 17-57)

1080-Q. A New Concept of Measuring Frictional Characteristics. G. R. Smith, V. J. Jandasek, S. R. Sprague and R. B. Singer. SAE Paper no. 363A, 1961, p. 17 p.

Development of a steady state wet friction test with testing points taken at fixed pressures, stabilized velocity and

with test oil flowing over the interface of grooved friction plate to control the temperature. Coefficient of friction curves are obtained on steel plates for various rates, time and temperatures. (Q9p; ST)

1081-Q. (German.) Investigation of Properties and Structure of Metals and Steels After Irradiation by Fast Neutrons. S.S. Ibragimov, V.S. Ljasenko and A.I. Zav'jalov. Kernenergie, v. 4, Feb. 1961, p. 117-122.

Measurement of mechanical properties, microhardness and electrical resistivity and examination of microstructure after irradiation of steel (0.14-1.12% C, 16-17% Cr, 9-17% Ni, 0-2.1% Mo, 0-0.6% Ti), Ni and Mo at 40-70° C. and after subsequent annealing at temperatures to 1100° C. (Q-general, M27, P16g, 2-64, 2-67; ST, Ni, Mo)

1082-Q. Microhardness Testing in Powder Metallurgy Research. H. Buckle. Paper from "Powder Metallurgy". Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 221-249.

Most typical applications are based on the principle of comparative studies of hardness variations which gives valuable information about the structure of heterogeneous or porous bodies. The determination of the intrinsic hardness of minor phases is less reliable, but satisfactory results are obtained by the use of specially developed microhardness test plates, the application of which is described in the identification of single phases (hard metals) and of the nondestructive determination of thickness and the nature of thin protective coatings. 6 ref. (Q29q, H-general)

1083-Q. Some Properties of Nickel Containing a Dispersed Phase of Thoria. D. K. Worn and S. F. Marton. Paper from "Powder Metallurgy". Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 309-342.

Data are presented correlating room temperature mechanical properties and elevated temperature stress-rupture properties with the characteristics of the oxide dispersion. The work hardening and recrystallization behavior of cold drawn nickel-thoria alloys is discussed in relation to the alloy structure. Effect of aging at temperatures up to 1400° C. of the dispersion. 16 ref. (Q-general, Q3m, N7a; Ni-b, Th, 14-68)

1084-Q. Recent Investigations of High Temperature Alloys of Molybdenum and Tungsten With Transition Metals of Groups IVa to VIIa of the Periodic Table. Horst Braun and Karl Sedlatschek. Paper from "Powder Metallurgy". Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 645-660.

Workability of sintered and arc melted W-Cb and W-Ta alloys is examined as well as the following properties of alloys with compositions across the entire binary systems: density, hardness at room and elevated temperatures, specific electric resistivity, thermoelectric force, hydridability and corrosion resistance against acids and alkali. Alloys of Mo with 0-100% Cb and Ta are also surveyed. 25 ref. (Q23q, Q29n, P10a, P15, R-general; Cb-b, Ta-b, W-b, 6-72)

1085-Q. Sintered High Temperature Alloys. G. T. Poyner, V. A. Tracey and J. F. Watkinson. Paper from "Powder Metallurgy". Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 701-729.

Properties obtained on material produced by vacuum sintering certain Ni-Cr-Co pre-alloyed powders. Results show that the stress-rupture properties obtained on sintered material can compare favorably with the stress-rupture properties of wrought materials of the same composition, although the hot fatigue and cold impact properties are generally lower. Stress-rupture properties of one particular composition are found to be variable, but in some instances notably improved properties over the wrought alloy are observed. 11 ref. (Q3m, Q7, Q6, H15, 1-73; Co-b, Cr-b, Ni-b, 6)

1086-Q. (Book.) Full-Scale Fatigue Testing of Aircraft Structures. F. J. Plantema and J. Schive, Editors. 1961. 426 p. Pergamon Press, Inc., 122 E. 55th St., New York 22, N. Y. $15.

Papers presented on aircraft component fatigue testing at a symposium in Amsterdam, Holland, June 9-11, 1959, sponsored by the International Committee on Aeronautical Fatigue. Subjects covered include current trends, random and constant-load amplitude testing, relationship of fatigue ratio, design, structure analysis methods, statistical approaches and testing of specific model aircraft. 133 ref. (Q7, T24)

1087-Q. Current Trends in Fatigue Tests of Aircraft. Pilot Lecture on the Planning and Interpretation of Full-Scale Aircraft Fatigue Tests. H. F. Hardrath. Paper from "Full-Scale Fatigue Testing of Aircraft Structures". Pergamon Press, Inc., New York 22, 1961, p. 1-13.

Review of metal fatigue factors in aircraft structures, including fatigue safe-life and fail-safe concepts and testing procedures. Effects of sonic excitation and elevated temperatures on fatigue. 6 ref. (Q7, T24)

1088-Q. The Significance of Constant-Load Amplitude Tests for the Fatigue Evaluation of Aircraft Structures. E. Gassner and W. Schutz. Paper from "Full-Scale Fatigue Testing of Aircraft Structures". Pergamon Press, Inc., New York 22, 1961, p. 14-40.

One-level tests for fatigue life evaluation of aircraft light alloys in the range of 5×10^3-10^5 cycles carried out at the maximum stress of the load spectrum. Program tests (8 load levels, arranged on ascending/descending order, logarithmic-binomial frequency distribution) for predicting higher degree of service life as affected by materials and design principles. 27 ref. (Q7k, T24; EG-a39)

1089-Q. Fatigue Ratio as Design Evaluation of Aircraft Structures--Some Results From Tests on the G 91. L. Locati and G. Sarzotti. Paper from "Full-Scale Fatigue Testing of Aircraft Structures". Pergamon Press, Inc., New York 22, 1961, p. 41-59.

Review of procedures for estimating aircraft component fatigue life by fatigue curve calculation, reduction of wing load spectrum to one load amplitude, then testing and periodic sequential testing of load spectrum of components. Endurance estimation based on program fatigue tests of 2024 T Alclad and 7075 T Clad. 17 ref. (Q7, T24; Al-b)

1090-Q. On the Relation Betwen Fatigue Lives Under Random Loading and Under Corresponding Programme Loading. J. Kowalewski. Paper from "Full-Scale Fatigue Testing of Aircraft Structures". Pergamon Press, Inc., New York 22, 1961, p. 60-75.

Differences between effect of random and program loading tests on fatigue life of aircraft components as related to distribution of peak values and load cycle arrangements. 8 ref. (Q7, T24)

1091-Q. Determination of the Fatigue Resistance of Aircraft Wings by Full-Scale Testing. A. O. Payne. Paper from "Full-Scale Fatigue Testing of Aircraft Structures". Pergamon Press, Inc., New York 22, 1961, p. 76-132.

Review of investigation into fatigue characteristics of full-scale aircraft wings under repeated loading and various types of loading sequences. Application of the fail-safe philosophy. 31 ref. (Q7, T24a)

1092-Q. Comparison of Constant-Level and Randomized-Step Tests of Full-Scale Critical Components. W. B. Huston. Paper from "Full-Scale Fatigue Testing of Aircraft Structures". Pergamon Press, Inc., New York 22, 1961, p. 133-147.

Summary of fatigue-critical area data obtained from tests of C-46 aircraft wings utilizing constant-level and randomized-step loadings. Comparison with fatigue sensitive areas found during flight operations. 4 ref. (Q7, T24a)

1093-Q. The Ultimate Strength of Damaged Structure-Analysis Methods With Correlating Test Data. W. J. Crichlow. Paper from "Full-Scale Fatigue Testing of Aircraft Structures". Pergamon Press, Inc., New York 22, 1961, p. 149-209.

Procedures for the strength analysis of aircraft structures in the presence of specified degrees of damage. Influence on ultimate strength of cracks and longitudinal splice as a crack arrestor. Tabulation of test correlation data. 14 ref. (Q27a, T24a)

1094-Q. The Fatigue Testing of Aircraft Structures. Pilot Lecture on Test Equipment and Test Procedures. W. J. Winkworth. Paper from "Full-Scale Fatigue Testing of Aircraft Structures". Pergamon Press, Inc., New York 22, 1961, p. 210-232.

Basic requirements for full-scale fatigue testing of aircraft structures, particularly wings, with reference to specimens and test loads, methods and equipment. (Q7, 1-54; T24a)

1095-Q. Fatigue Ratio as Design Evaluation of Aircraft Structures--Some Results From Tests on the G 91. L. Locati and G. Sarzotti. Paper from "Full-Scale Fatigue Testing of Aircraft Structures". Pergamon Press, Inc., New York 22, 1961, p. 345-363.

Determination of fatigue ratios, or the ratio of fatigue to tensile strength under load, of aircraft components under repeated load cycles and for life values of 10,000, 100,000 and 1,000,000 cycles. (Q7, T24)

1096-Q. (French.) Cobalt as an Alloying Element in Steel. D. Coutsouradis and L. Habraken. Revue de la Societe Royale Belge des Ingenieurs et des Industriels, Mar. 1961, p. 106-116.

Effect of Co in carbon, low alloy stainless heat resistant steels and tool-steels on phase composition, resilience, tensile strength, elastic limit, ductibility and hardness at room and elevated temperatures, transformations and the electrolytic potential. 37 ref. (Q-general, P-general, 2-60; ST, Co)

1097-Q. Effect of Irradiation Growth on the Creep of Uranium Under a Uniaxial Load. W. S. Blackburn. Philosophical Magazine, v. 6, Apr. 1961, p. 503-508.

Theories are developed from assumption of homogeneous deformation and uniform stress to calculate irradiation growth effects on the creep of uranium under a uni-axial applied stress when the temperature is sufficiently high for the internal stresses set up by the differential expansion of the individual crystals to the insufficient of themselves to cause plastic flow. 4 ref. (Q3, 2-62, 2-67, 3-66; U)

1098-Q. (German.) Comparative Study of Notch Impact Strength of Differently Heat-Treated Carbon Steels. Georg Altmeyer and Arnold Peiter. Materialprufung, v. 3, Apr. 20, 1961, p. 147-155.

Notch impact testing of differently heat treated (quenched or cooled from 700-900° C. and subsequently annealed) CK 67, CK 60 and CK·22 steel (0.74-0.17% C) to prove significance of a proposed method by which notch impact strength versus temperature curves may be evaluated. 7 ref. (Q6, 2-61, 2-64; CN)

1099-Q. (German.) Welding Deposits of Unalloyed Steel With Particular Reference to Phosphorus Content and Notch Impact Strength. Kurt Born and Otto-Ewald Goerdt. Archiv fur das Eisenhuttenwesen, v. 32, Apr. 1961, p. 225-236.

Investigation of notch impact strength from 20 to -100° C. as influenced by microstructure, nonmetallic inclusion, heat treatments and phosphorus content for welds obtained from unalloyed lime basic-coated electrodes and by welding with covered arc. (Q6n, 2-60, 2-64, 3-71, 9-69; ST, 7-51)

1100-Q. Experiments on the Postbuckling Behavior of Square Plates Loaded in Edge Compression. Noboru Yamaki. Journal of Applied Mechanics, Series E (American Society of Mechanical Engineers, Transactions), v. 28, June 1961, p. 238-244.

Determination of the relations of maximum deflection, stresses and strains at typical points in a square Al plate with applied loads under four different boundary conditions. 4 ref. (Q28k; Al, 4-53)

1101-Q. A Modification of the Coulomb-Mohr Theory of Fracture. Burton Paul. Journal of Applied Mechanics, Series E (American Society of Mechanical Engineers, Transactions), v. 28, June 1961, p. 259-268.

Failure of the Coulomb-Mohr theory to explain features of the simple torsion, tension and compression tests. Modification of the theory by tension cutoffs and friction angle to bring the theory into agreement with the above tests. Application of the theory for the general biaxial states of stress for gray cast iron. 22 ref. (Q26; CI-n)

1102-Q. (German.) Compression Strength of Copper Materials Used in Electrical Engineering. A. Keil. Metall, v. 15, May 1961, p. 421-422.

Measurement of compression strength, electrical resistance and hardness of cold worked cylindrical Cu, brass, Cu-Cr alloy and silver bronze specimens before, during and after 1/2 hr. annealing at 20-600° C. and subsequent air cooling. (Q28g, P15g, Q29n, 2-64; Cu-b)

1103-Q. (German.) Properties of Carbon Steel Building Ribs When Tensile Stressed. R. de Strycker. Draht, v. 12, Apr. 1961, p. 143-150.

Creep properties of temperatures from 20-100° C. Relaxation, fatigue and stress-corrosion testing of tensile stressed carbon steel wires (0.73-0.80% C) of given mechanical properties after various pretreatments (as-drawn, bath hardened, 200° C. aged and 400° C. stress-free annealed). (Q3, Q27c, Q7, R11s, 3-66, 2-61; CN, 4-61)

1104-Q. A Comparison of the Brittle Behavior of Metallic and Nonmetallic Materials. G. T. Hahn and R. I. Jaffee. Defense Metals Information Center, Battelle Memorial Institute, DMIC Memo. 107, May 16, 1961, 33 p. (Available as PB 171626 from U. S. Office of Technical Services, Washington 25, D. C.)

Basic influences on brittle behavior include electron bonding, crystal structure and degree of order. Properties of brittle materials important for design include elastic, plastic deformation, fracture, notch sensitivity, energy absorption, fatigue and thermal shock resistance. (Q26s)

1105-Q. The Stability and Properties of Alloy Steels at Elevated Temperatures. M. T. Simnad. General Atomic Division. U. S. Atomic Energy Commission, GAMD-1769, Nov. 21, 1960, 78 p. (Available from U. S. Office of Technical Services, Washington 25, D.C.) $2

Review of literature dealing with the formation of the sigma phase and its embrittling effect on the welds and properties of stainless steel including crystal structure and phase equilibria, fracture characteristics and corrosion resistance. Graphic and tabular presentations of phase and temperature effects on various properties of different types of steels. 49 ref. (Q26s, Q-general, M26q; AY)

1106-Q. Yield Strength of Machined Ring-Stiffened Cylindrical Shell Under Hydrostatic Pressure. M. E. Lunchick and J. A. Overby. Experimental Mechanics, v. 1, June 1961, p. 178-185.

Experimental investigation of the effects of initial imperfections and residual welding and rolling stresses of a machined and stress relieved high-tensile steel shell, at a pressure indicating agreement with calculation by maximum-shear-stress or Hencky-Von Mises criterion. Comparison of the collapse pressures of machined and welded models indicating that residual welding and rolling stresses do not adversely affect collapse pressure. 8 ref. (Q23b, 3-74; ST)

1107-Q. Contribution to the Theory of Superconducting Alloys With Paramagnetic Impurities. A. A. Abrikosov and L. P. Gor'kov. Soviet Physics JETP (Journal of Experimental and Theoretical Physics, v. 12, June 1961, p. 1243-1253.

In the framework of superconductivity theory the transition temperature is lowered in comparison with that of a pure metal when paramagnetic impurities are introduced into a superconductor. Determination of dependence of transition temperature on impurity concentration. Study is made of thermodynamic and magnetic properties of superconducting alloys in the concentration range close to critical. Concentration dependence of the energy spectrum gap. 17 ref. (Q23r, P12, P16, P15g, 3-69)

1108-Q. Improve Fatigue Strength With Abrasive Tumbling. Paper from "Grinding Stresses--Cause, Effect and Control". Grinding Wheel Institute, Cleveland 15, 1961, p. 53-55.

Annealed bars of Mn, oil-hardening toolsteel are ground and subjected to abrasive tumbling to illustrate the improvement in fatigue strength attainable because of the compressive stress induced on the metal surfaces during tumbling. (Q7a, G23, G18; TS)

1109-Q. Relief of Residual Grinding Stresses by Annealing. H. R. Letner and A. B. Sauvageot. Paper from "Grinding Stresses--Cause, Effect and Control". Grinding Wheel Institute, Cleveland 15, 1961, p. 57-60.

Oil-hardening toolsteels are cut, ground, austenitized in a NaCl-KCl salt bath at 1450° C. and quenched in agitated oil at 70° F. Half of the specimens are then tempered at 420° F. and allowed to cool in air. Results show effect of heat treatment on residual grinding stresses and hardness. (Q25h, G18, Q29n, 2-64; TS)

1110-Q. Controlling Grinding Stresses. A. L. Ball. Paper from "Grinding Stresses--Cause, Effect and Control". Grinding Wheel Institute, Cleveland 15, 1961, p. 63-67.

Residual grinding stresses in a workpiece can be controlled within limits. Examples demonstrate effects of wheel type, downfeed and coolant on stresses in hardened steel. Bath and quench also effectively reduce stresses. Critical effects of downfeed in grinding Ti. 4 ref. (Q25h, G18; ST, Ti)

1111-Q. Determination of Creep of Structural Joints From Simple Tensile Creep. Joseph Marin. ASTM Preprint, no. 77, 1961, 7 p. $.30.

Approximate method for theoretical determination of the creep deformation in single riveted or bolted butt type joints based upon simple tensile creep stress-strain-time relations for the material. 6 ref. (Q3, 10-51; 4-57, 7-53, 7-54)

1112-Q. Tensile Strength-Hardness Correlation for Titanium Alloys. Charles F. Hickey,

Jr. ASTM Preprint, no. 87, 1961, 9 p. $.30.

Tensile and hardness properties are obtained as a function of testing temperature, heat treatment and section size of material. The resulting correlation holds for stable alpha-beta alloys but does not apply to metastable alpha-beta alloys or all-beta alloys. 6 ref. (Q27a, Q29n; Ti-b)

1113-Q. Determination of Compressive, Bearing, and Shear Creep of Sheet Metals. H. R. Kattus and H. L. Lessley. ASTM Preprint, no. 76, 1961, 10 p. $.30.

Creep testing of a Ti-2.5Al-16V alloy at up to 1000° F. using specially designed loading fixtures containing cartridge heaters as integral parts to obtain temperature uniformity. (Q3; Ti-b, Al, V, 4-53)

1114-Q. Room-Temperature Creep Rate of Molybdenum and Effect of Strain Rate on Tensile Properties of Molybdenum. R. Q. Barr, M. Semchyshen and G. A. Timmons. ASTM Preprint, no. 85, 1961, 10 p. $.30.

The strain-rate sensitivity of unalloyed Mo is verified on stress-relieved and recrystallized specimens. Yield strengths are found to vary proportionately with elastic strain rate and tensile strength with plastic strain rate. 6 ref. (Q3, Q27a, 3-68; Mo)

1115-Q. A Method for Determining the Plastic Flow Properties of Sheet and Round Tension Test Specimens. J. Nunes and F. R. Larson. ASTM Preprint, no. 41, 1961, 13 p. $.30.

True stress-strain, true strain rate, mechanical anisotropy and "corrected" flow stress for 16V-2.5Al and 4Al-3Mo-1V Ti alloys, 301 and AMS 5548 stainless steels, H-11 steel and 24S-T4 Al alloy. 10 ref. (Q23; Ti-b, 4-53, 4-60)

1116-Q. Rapid-Rate Compression Testing of Sheet Materials at High Temperatures. E. C. Bernett and W. W. Gerberich. ASTM Preprint, no. 81a, 1961, 13 p. $.30.

Creep and yield strengths of 2024-T81 Al alloy, 17-7 PH stainless steel, 6Al-4V Ti alloy and N-155 Fe-base alloy from 600-2000° F. (Q29, Q3m, Q23b, 2-62; Al-b, Fe-b, SS, Ti-b, 4-53)

1117-Q. Elevated-Temperature Dynamic Moduli of Metallic Materials. W. H. Hill, K. D. Shimmin and B. A. Wilcox. ASTM Preprint, no. 74, 1961, 16 p. $.30.

Forty metals and alloys including Al, Be and Ti alloys, plain carbon and low-alloy steels, stainless steels, a Co alloy, Ni alloys and refractory metals are tested at temperatures up to 1800° F. Results are compared with static moduli in most cases. 8 ref. (Q21a, Q21b, 2-62; Al-b, AY, Be, CN, Co-b, Ni, SS, Ti-b)

1118-Q. Fatigue Properties of Uncoated and Coated Unalloyed Molybdenum at 1800° F., Room Temperature, and - 40° F. A. A. Mittenbergs, G. D. Haley and D. N. Williams. ASTM Preprint, no. 73, 1961, 17 p. $.30.

Fatigue behavior of unalloyed commercially pure arc-cast Mo is investigated in tension-tension loading on protected and unprotected, unnotched and notched sheet specimens. Three oxidation-resistant coatings are evaluated under fatigue loading. 5 ref. (Q7, 2-61; Mo, 8)

1119-Q. Welded Ferritic Steel Construction for Intermediate Low-Temperature Service. A. A. Wells. ASTM Preprint, no. 80c, 1961, 20 p. $.30.

Ductility and transition temperatures are determined by Charpy V-notch testing, drop-weight testing and tensile testing from 88 to -85° F. 28 ref. (Q23, Q27, 2-61; SS-d)

1120-Q. Friction and Wear of Metals in Gases Up to 600° C. D. F. Cornelius and W. H. Roberts. ASLE (American Society of Lubrication Engineers) Transactions, v. 4, Apr. 1961, p. 20-32.

Cu, mild steel and brass are rubbed against a hardened toolsteel in vacuum, dry helium, dry CO_2 and dry air. Several alloys with Cr content ranging from 10-30% including a series of four Co-Cr-W alloys are paired for rubbing at elevated temperatures up to 700° C. in gaseous environment. Specific wear rates and friction coefficients as a function of temperature. Lowest wear rates are observed with the nitrided steels. 26 ref. (Q9n, Q9p, 2-62; Cu, ST)

1121-Q. (German.) Quality of Hanger Tabs for Suspended Roof. H. Longin. Radex Rundschau, Apr. 1961, p. 561-565.

Investigation of failures occurring in 18/8 CrNi steel hanger tabs for open-hearth furnace roof suspension by chemical analysis of furnace dust and failed hanger tabs, microstructure investigation and by

annealing of 18/8 CrNi steel in containers filled with furnace dust at 1000° C. Elimination of failures by decreasing Ni and increasing Cr content in the steel. 4 ref. (Q7; SS, Cr, Ni)

1122-Q. Velocity of Sound in Liquid Lead-Tin Alloys. Robert B. Gordon. Paper from "Physical Chemistry of Process Metallurgy". Pt. 1. v. 7. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1959, p. 461-470.

A constant, linear decrease in the velocity of sound with increasing temperature is found with no indication of presolidification phenomena. An anomaly appears in the dependence of the sonic velocity, its temperature coefficient and the adiabatic compressibility on alloy composition. (Q21f; Pb-b, Sn-b, 14-60)

1123-Q. (Japanese.) Studies on Heat Treatment of TiC 50 Ni-Cr-Co-Mo Cermets. Masataka Sugiyama and Hisashi Suzuki. Japan Institute of Metals, Journal, v. 25, Mar. 1961, p. 167-170.

Vacuum sintered specimens of 50% TiC, 30% Ni, 10% Cr and 5-9.5% Co, with 0.5-5% Mo substituted for Co, are tested and examined metallographically after vacuum heat treatment and quenching from 950-1280° C. Data are given for creep rupture, Vickers hardness, density, Curie temperature, ductility, microstructure and phase dispersion and stability as a function of heat treatment time and temperature. 4 ref. (Q-general, J-general, 1-73, 2-62; Ti-b, Ni-b, C, Cr, Co, Mo, 6-70)

1124-Q. (Japanese.) Relation Between Heat Treatment and Hardness and Torsional Strength of Ni-Cr Structural Steel at Room and High Temperatures. Pt. 5. The Austempering of Structural Special Steels. Hideji Hotta. Japan Institute of Metals, Journal, v. 25, Mar. 1961, p. 174-177.

Isothermal transformation curves for 20-900° C. are constructed from microvickers hardness measurement, dilatometry and micro-examination of specimens after tempering to 860° C., quenching and austempering from 300-600° C. Torsional strength, Charpy impact value and Rockwell, Brinell and Taniguichi-Yeda impact hardness are determined with transformation microstructures as a function of heat treatment temperature. 4 ref. (Q-general, J26p, N8g, 2-62, 2-64; AY, Ni, Cr)

1125-Q. (Japanese.) Tensile Strength of Ni-Al-W Alloys at High Temperatures. Takeshi Miyazaki and Yuki Shirakawa. Japan Institute of Metals, Journal, v. 25, Mar. 1961, p. 188-191.

Measurement of tensile strength and specific electric resistance from 20-800° C. of vacuum annealed wire specimen of Ni alloy containing 0.73-4.15% Al and 0.89-5.10% W with Co additions. Tensile and resistance properties are improved with Al content increase of 3.50% and decrease with temperature increase. (Q27, P15g, 2-60, 2-62, 2-64, Ni-b, Al, W, Co, 4-61)

1126-Q. (Japanese.) Torsion Test as a Method for Measuring Toughness of Gray Cast Iron. Hiromu Tanimura, Kiichi Taniguchi and Yuji Nagamatsu. Japan Institute of Metals, Journal, v. 25, Mar. 1961, p. 198-201.

Comparative tensile, Charpy impact and torsion tests on gray iron specimens of various graphite structures and compositions for evaluating the agreement of the methods in measuring toughness as a function of resilience. Data are given for elongation, stress-strain relations, shear, elastic moduli impact values and tensile and torsional strength. 4 ref. (Q23s, Q1, Q-general; Ci-n)

1127-Q. (Czech.) Effect of Heat Treatment on the Fracture of Cast Steel. Adolf Lorenc. Slevarenstvi, v. 9, Apr. 1961, p. 132-138.

30KhN3MA steel and austenitic steel containing 12% Mn are cast into test pieces which are broken in the cast state, after austenitization followed by quenching, annealing at a temperature below the Ac_1 point or homogenization. Relationships between structure and fracture, previous heat treatment and ductility. 11 ref. (Q26, 2-64; ST, 5)

1128-Q. (Czech.) Effect of Molybdenum Sulphide on the Sliding Properties of Cast Iron Used in Thrust Bearings. V. Sevcik. Strojirenstvi, v. 11, Apr. 1961, p. 283-289.

Friction tests are carried out with the pair, cast iron-steel, using powdered MoS_2 or a suspension of MoS_2 as a lubricant. Effect of the lubricants on friction and wear of uncoated or phosphate coated cast iron. 12 ref. (Q9, 18-73, T7d; CI, ST, 17-57)

1129-Q. Stress Rupture Unit Uses Electron Beam Heating. Al Donlevy and Jack K. Y.

Hum. SAE Journal, v. 69, July 1961, p. 60-61.

Electron beam heating is used as a heat source in stress rupture testing of Cb, Mo, Ta, W and their alloys at 2400° F. Work must be done in a high vacuum and, at present, 2200° F. is the low test temperature limit. (Q3q, X24f; Cb, Mo, Ta, W)

1130-Q. (Japanese.) Influence of Temperature History on Creep. Shuji Taira, Masateru Ohnami and Mizune Sakato. Japan Society of Mechanical Engineers, Transactions, v. 27, Apr. 1961, p. 373-380.

Transient stage creep in 0.15% carbon steel as dependent on strain increment and change in internal yield stress, recovery or aging, as a function of fluctuation and related time intervals in thermal cycling tests in tension from 300-900° C. 13 ref. (Q3s, 2-62, 3-68; CN-g)

1131-Q. (Japanese.) Creep Under Step-Wise Temperature Cycling. Shuji Taira, Masateru Ohnami and Syoichi Sugioka. Japan Society of Mechanical Engineers, Transactions, v. 27, Apr. 1961, p. 380-386.

Creep curves are determined for low-carbon steel, 18-8 stainless and 13% chromium steel as a function of time, cycle and temperature for thermal cycling tests from 450-650° C. under fixed tensile stress. A theoretical analysis is made in terms of a "mechanical equation of state in solids". 5 ref. (Q3, 2-62, 3-66; ST)

1132-Q. (Japanese.) Accelerated Stage Creep and Creep Rupture Under Temperature Cycling. Shuji Taira and Masateru Ohnami. Japan Society of Mechanical Engineers, Transactions, v. 27, Apr. 1961, p. 387-395.

Influence of thermal cycling from 600-700° C. on creep and rupture life, embrittlement and elongation of 318 stainless steel specimens. 20 ref. (Q3s, 2-62; SS-e)

1133-Q. (Japanese.) Dynamic Creep and Fatigue of an 18-8 Molybdenum-Columbium Steel at Elevated Temperature. Shuji Taira, Ryoichi Koterazawa and Susumu Kaji. Japan Society of Mechanical Engineers, Transactions, v. 27, Apr. 1961, p. 396-402.

Creep and fatigue test data for specimens at 650° C. are correlated with data for rupture and hardness tests and electron microscopy examination. Precipitation hardening characteristics are related to strength values as a function of alternating stress. 11 ref. (Q3, Q7, Q-general, N7, 2-62, 3-66; SS-e)

1134-Q. (Japanese.) Effect of Notch on Fatigue Strength of Steel at Elevated Temperature. Minoru Kawamoto, Tsuneshichi Tanaka and Mitsunori Miyake. Japan Society of Mechanical Engineers, Transactions, v. 27, Apr. 1961, p. 403-410.

Rotating bending fatigue tests on 0.21% carbon steel with various circumferential notches to determine the effect of test temperature, strain rate and notch sharpness on the fatigue strength and notch factor. Relation of fatigue strength to temperature induced blue brittleness. 12 ref. (Q7c, Q23s, Q26s, 2-62, 3-68; CN-g)

1135-Q. (Japanese.) Effects of Holding Time on the Thermal Fatigue of 18-8 Columbium Steel. Noritada Kato. Japan Society of Mechanical Engineers, Transactions, v. 27, Apr. 1961, p. 410-423.

Effect of variation in the temperature cycle, holding time, stress amplitude and cyclic plastic strain on thermal fatigue strength of specimens tested at constant mean temperature of 350° C. for varied temperature ranges and times. Influence of composition on hot ductility. 5 ref. (Q7j, Q23p, 2-62, 3-67, 3-68; SS-e)

1136-Q. (Czech.) Heat Resistant 15Cr35Ni3W Steel. Josef Vodsedalek. Hutnicke Listy, v. 16, Apr. 1961, p. 270-275.

Steel containing 0.04-0.08% C, 0-1.23% Mn, 0-0.63% Si, 0-0.008% P, 0-018% S, 14.53-15.33% Cr, 33.49-37.16% Ni, 2.05-3.8% W, 0-1.24% Mo, 0.45-1.77% Ti, 0.12-6.88% Al and 0-0.21% B is mechanically tested at 20-800° C. after solution annealing at 1150° C. and subsequent aging at 700-750° C. for 20-2000 hr. Creep strength as a function of Ti and Al contents, microstructures. 7 ref. (Q3m, 2-60, 2-61, 3-71; SS, SGA-h)

1137-Q. (Swedish.) Yield Stress of Carbon and Low-Alloyed Tube Steels for Pressure Vessels From 20-500° C. B. Lofblad, E. Lowgren and L. Roslund. Jernkontorets, Annaler, V. 145, Mar. 1961, p. 143-172.

Investigation to obtain a basis for calculation of values for standardized carbon and low-alloyed tube steels including ST 35, ST 45, 1 Cr/0.5 Mo and 2.25

Cr/1 Mo. Results are plotted in diagrams where a minimum curve for the 0.2% proof stress has been plotted for each grade. (Q23b, 2-61; AY, CN)

1138-Q. (Translation.) Relaxation of Elastic Stresses Under Neutron Irradiation. S. T. Konobeevskii. U. S. Atomic Energy Commission, AEC-tr-4425, May 1961, 24 p. (Translation from Atomnaya Energiya, v. 9, 1960, p. 194-200.) (Available from U. S. Office of Technical Services, Washington 25, D. C.) $.50.

Effect of neutron irradiation on relaxation of elastic stresses in flat springs of U-Mo alloys and on relaxation of microstresses which cause widening of the lines in an X-ray diffraction pattern of rolled uranium. 7 ref. (Q25, 2-67; U-b, Mo)

1139-Q. Fracture Toughness Tests of High-Strength Sheet metals. Pt. 1. Harold Bernstein and George C. Young. Engineering Dept. U. S. Naval Gun Factory, NAVORD Report 6496, May 18, 1959, 19 p.

Effect of section thickness, strength level, surface finish, flash welding, fusion welding and Mig welding on the fracture toughness of 6150 steel, 4340 steel, AMS 6434 steel, X-200 Airsteel, Vascojet 1000, Tricent M-300, Potomac A, Crucible 56, 4340 steel and B120VCA Ti alloy. (Q26; SGB-a, 4-53)

1140-Q. Fracture Toughness of High-Strength Sheet Metals. Pt. 2. Harold Bernstein and George C. Young. Engineering Dept. U. S. Naval Weapons Plant, NAVORD Report 6496, Jan. 28, 1960, 23 p.

Fracture toughness results on several high-strength sheet steels are presented. Data cover the effects of heat treatment, section size and directionality. (Q26r, Q23r; ST, SGB-a, 4-53)

1141-Q. Strength of Thick-Walled Cylindrical Vessels Under Internal Pressure for Three Steels. Joseph Marin and Tu-Lung Weng. Welding Research Council, Bulletin Series, no. 67, Mar. 1961, 13 p.

Pressure-expansion relations and maximum internal pressures for 30 thick-walled cylinder specimens of varied inside-outside diameter ratios for A212 Grade B Firebox, A285 Grade C Firebox, and T304 stainless steel are determined in fraction tests with calculations based on simple tension and torsion-shear true stress-strain relations. 6 ref. (Q10b, Q25, T26q; ST)

1142-Q. (Pamphlet.) Discontinuous Deformation and Fracture of Metals. Mar. 1961. 14 p. Dept. of Metallurgical Engineering, Illinois Institute of Technology, Chicago 16, Ill.

Determination of the effect of prestraining 95-5 phosphor bronze, OFHC Cu, Armco iron, 1018, 1113, C 1213 and 4340 steels and 70-30 brass on the yield point, elongation and propagation of deformation by a spreading band. 8 ref. (Q24, Q23p, 3-68; Cu-b, Fe-a, ST)

1143-Q. Evaluation of Aircraft Material by Fracture. W. E. Anderson and P. Paris. Materials Engineering Quarterly, v. 1, May 1961, p. 33-44.

Fracture and fatigue testing of 7171-T6, 2024-T3, 7075-T6 Al alloys and AM 350 CRT, 301 FH, AM 355 CRT and 300 M steel alloys to determine relationship between crack growth rate and critical stress intensity. Calculation of stress intensity factor. (Q26, Q7; Al-b, ST)

1144-Q. Notch Toughness of Structural Sheets. R. D. Stout and E. H. Kottcamp. Metals Engineering Quarterly, v. 1, May 1961, p. 58-69.

Mechanical testing of C1080 structural steel and low-carbon steel consisting of ferrite-pearlite aggregates to determine notch ductility and notch transition temperature as affected by austenitic grain size, pearlite spacing and tensile strength. Electron microphotographs. 17 ref. (Q23s, 2-59, 3-71; CN-g, SGB-s)

1145-Q. Effect of Structure on the Properties of Titanium Alloys. E. Bohanek. Metals Engineering Quarterly, v. 1, May 1961, p. 70-88.

Forming, heat treating and mechanical testing of Ti-35A, Ti-55A, Ti-8Al-1M-1V, Ti-4Al-3Mo-1V, Ti-6Al-4V and Ti-13V-11Cr-3Al alloys to determine effect of grain size on tensile strength, ductility, creep and twinning resistance, drawability, elongation and microhardness. Photographs of microstructure. (Q-general, 2-59; Ti-b)

1146-Q. Electron-Beam Welding. E. G. Thompson, E. C. Bernett and H. Binder. Metals Engineering Quarterly, v. 1, May 1961, p. 89-102.

Mechanical testing of electron beam welded specimens of Mo and arc-cast

Mo-0.5% Ti alloy from 80-3200° F. to determine porosity, tensile strength, elongation, Young's modulus and stress-strain relationship. 12 ref. (Q27, Q23, 9-68; Mo-b, Ti, 7-51)

1147-Q. Preventing Fatigue Failures. Pt. 5. Calculating Fatigue Strength. F. B. Stulen, H. N. Cummings and W. C. Schulte. Machine Design, v. 33, June 22, 1961, p. 159-165.

Calculations to determine tensile and fatigue strengths and standard deviation values for 4340 and 4350 steels, 6Al-4V-Ti alloy, 7076-T61 alloy, 5-Ni-10Al-bronze and BeCu under four stress situations including constant amplitude service stress, steady stress superimposed on constant amplitude stress, alternating stresses of varying amplitudes and steady stresses superimposed on alternating stresses of varying amplitudes. 24 ref. (Q27a, Q7a; Al-b, Cu-b, ST, Ti-b)

1148-Q. Rapid-Rate Compression Testing of Sheet Materials at High Temperatures. E. C. Bernett and W. W. Gerberich. Jet Propulsion Laboratory, California Institute of Technology, Technical Report no. 32-76, June 15, 1961, 11 p.

Test equipment and procedures for evaluating structural sheet material compression properties at preselected constant strain rates and/or loads. Data are given for an Al alloy, stainless steel, Ti alloy and Cr-Ni-Co-Fe alloy. (Q28, 2-62; Al-b, Fe-b, SS, Ti-b, SGB-s, 4-53)

1149-Q. Contact Stress and Load as Parameters in Metallic Wear. A. Dorinson and V. E. Broman. Wear, v. 4, Mar-Apr. 1961, p. 93-110.

Analysis of metallic wear in the presence of white oil under different loads and contact stresses. Wear process is found to be multistage, showing abrupt rise, leveling-off and transition to accelerated wear. 17 ref. (Q9)

1150-Q. Relation Between Wear Rate and Debris Composition in Wear of Wrought Iron and Mild Steel. B. J. Nield and O. G. Griffin. Wear, v. 4, Mar-Apr. 1961, p. 111-122.

Comparison of wear rates of wrought iron and mild steel under unlubricated conditions to determine the effect of relative humidity on wear rate and debris composition. The composition of wear debris as determined by X-ray diffraction analysis may be a guide to the type of wear mechanism and the conditions under which debris is produced. 12 ref. (Q9; CN, Fe)

1151-Q. An Electron-Microscopic Study of Friction and Wear. Rolf Weil and Roger A. Paquin. Wear, v. 4, Mar-Apr. 1961, p. 123-136.

Static and dynamic friction testing of Ni, Cu and Cr electroplated on Cu sheet followed by microscopic examination of the surface. Coefficient of friction is not affected by surface roughness, load, mechanical properties and plating conditions. Determination of relationship between wear, surface roughness and work hardening. 16 ref. (Q9, M21e; Cu, Cr, Ni, 4-53, 8-62)

1152-Q. On the Nature of Solid Friction. Gordon E. Gross. Wear, v. 4, Mar-Apr. 1961, p. 161-164.

Review of papers on solid friction studies, friction and adhesion of molecularly smooth surfaces, friction in polymers, promotion of wear by reciprocal sliding and several other topics dealing with friction in terms of the microscopic properties of solids. 4 ref. (Q9)

1153-Q. Study of Plastic Deformation in Metals With the Electron Microscope. H. Wilsdorf and D. Kuhlmann-Wilsdorff. Philips--Serving Science and Industry, v. 7, June 1960, p. 193-198.

Report on investigation of plastic deformation in Al-Cu alloys and metal films by electron microscopy. Analysis of crystal structure slip lines and dislocation decorations in film samples of Al, Cu and Zn. 29 ref. (Q24, M21e; Al, Cu, Zn, 14-62)

1154-Q. (German.) Correlations Between Mechanical Properties in Castings and in Separately Cast Testing Rods. Wilhelm Patterson and Friedrich Iske. Forschungsberichte des Landes Nordrhein-Westfalen, n. 964, 1961, p. 3-4.

Comparative measurement of hardness, tensile strength and "Heller-Jungbluth wall thickness parameter" in cast iron castings and cast testing rods. (Q-general, 3-73; CI, 5)

1155-Q. (German.) High-Alloyed Steels in Nuclear Power Plants. J. Jagersberger. Atomwirtschaft, v. 6, Mar. 1961, p. 154-157.

Review of function of alloying elements in development of mechanical and physical properties of steel with emphasis on susceptibility to radio-activation. Effect of heat treatment on properties of steel subjected to radiation as influenced by alloying elements. (Q-general, P-general, 2-60, 2-64, 2-67; ST)

1156-Q. (Spanish.) Effect of Tin in Spring Steel. Jose M. Palacios Reparaz. Tecnica Metalurgica, v. 17, Jan-Feb. 1961, p. 17-28.

Spring steels containing 0.004-0.116% Sn are mechanically tested to study the effect of Sn on tensile strength, elongation, elastic limit and impact strength. (Q27a, Q23p, Q21, Q6n, 2-60; ST, Sn, SGA-b)

1157-Q. Hardness-Tensile Strength Conversion for Rockwell Hardness, C Scale. ASTM Bulletin (Materials Research and Standards), v. 1, June 1961, p. 448-451.

Hardness-tensile strength correlation for 4340 steel heat treated above Rockwell C 40 by oil-quenching and tempering. (Q27, Q29, 2-64; ST)

1158-Q. Creep Testing by Centrifugal-Force Loading. R. E. Hook, A. M. Adair and J. W. Spretnak. ASTM Bulletin (Materials Research and Standards), v. 1, June 1961, p. 464-470.

Design and construction of a machine for creep testing of electrolytic tough pitch Cu at 300° C., 750 rpm. and 5470 psi. maximum fiber stress and of Ni rich Al binary alloys at 650° C., 1080 rpm. and 10,950 psi. maximum fiber stress. Statistical evaluation of the creep data. 18 ref. (Q3q, 1-52; Cu-b, Ni-b, Al-b)

1159-Q. Expression of Stress-Rupture Data With Functions Derived by the Least-Squares Method. M. J. Stutzman and J. W. Faber. ASTM Bulletin (Materials Research and Standards), v. 1, June 1961, p. 460-464.

Stress-rupture considered as a function of temperature, stress and time-to-rupture. Expression of the time-temperature variables as a function of stress by the Larson-Miller parameter and calculation of the line of minimum deviation by the least-squares method. Illustration of data that follow a straight line (Stellite 31) and data that follow a parabolic curve (Nicrotung). Method of converting test data to the equivalent stress for a designated time-to-rupture at a given temperature. (Q3m; Ni-b, SGA-h)

1160-Q. Use of the Bulge Test for Determining Mechanical Properties of Stainless Steel Foil. D. B. Ballard. ASTM Bulletin (Materials Research and Standards), v. 1, June 1961, p. 471-473.

Determination of yield pressure, burst pressure and maximum bulge height for 17-7 PH and AM 350 stainless steel foils using a hydraulic bulge tester. Yield pressure is indicated to be a function of heat treatment. 12 ref. (Q10b, Q23b; SS)

1161-Q. Effects of Hot-Cold Working on High-Speed Steels. R. F. Harvey. Cobalt, no. 11, June 1961, p. 36-37.

To test results of hot cold working ground samples of M-2 and M-6 high-speed steels austenitized at 2225° F. are cooled from 900-1000° F. and subjected to 1500-ton pressure. Thickness reduction, deformation and hardness determined. Microscopic examination of austenitic grain structures. (Q29n, M27c, 3-68; TS-m, Co)

1162-Q. High Speed Steels Meet Tool Needs. Pt. 2. Peter Payson. Metal Progress, v. 80, July 1961, p. 91-96.

To date, metallurgists have determined that high-speed steels are hardened by tempering above 1000° F. because fine alloy carbides precipitate in the matrix. This phenomenon, secondary hardening, makes it possible for tools of such steels to retain cutting edges at red heat. (Q-general, Q29, M27; TS-m)

1163-Q. Toughness in Weld Metal. Stanley S. Sagan and Hallock C. Campbell. Digest of "Factors Which Affect Low-Alloy Weld Metal Notch Toughness". Welding Research Council Bulletin, no. 59, Apr. 1960, 16 p. Metal Progress, v. 80, July 1961, p. 170-172.

Effect of metallic arc welding variables on the Charpy V-notch toughness of the deposited weld metal from -80 to 75° F. Factors considered include alloying elements, electrode size, heat treatment, welding position and dilution of weld metal by base metal. (Q23s, 2-61; 7-51)

1164-Q. Progress in High-Strength Aluminum Alloy Castings of Airframes. William A. Bailey and Emmett N. Bossing. Western Machinery and Steel World, v. 52, June 1961, p. 45-47.

Mechanical properties of Al alloy castings used in airframes and missile

configurations. Effects of factors in the casting process and subsequent heat treatment and of the alloy composition on mechanical properties of Al alloy castings used in airframes and missile configurations. (Q-general, 2-60, 2-64, T24; Al-b, SGB-A, 5)

1165-Q. Investment Castings as Members in Critical Structural Assemblies. N. Silverberg and W. F. Shaw. Western Machinery and Steel World, v. 52, June 1961, p. 48-49.

Mechanical properties of 17-4 PH alloy investment castings used in aircraft and missiles. (Q-general, T24; SS, 5-62, 17-57)

1166-Q. Structural Characteristics of Fasteners for Honeycomb. Jack Cherne. Assembly & Fastener Engineering, v. 4, July 1961, p. 33-37.

Tensile strength of SL 78 potted-in fasteners as affected by skin thickness, core density and over-all sandwich thickness of 2024 ST Al honeycomb panels. (Q27a, T7f)

1167-Q. Study of the Rate Controlling Process for Compressive Deformation of High Purity Aluminum. A. E. Riessen. Materials Central (Wright Air Development Division). U. S. Office of Technical Services, PB 171488, Sept. 1960, 27 p. $.75.

To determine the rate-controlling deformation mechanism in a hardness test from 297-358° K. a "unique" testing technique involves the removal of the minor load spring in a standard Wilson Rockwell Hardness Tester which renders the minor load a "dead load" of 30.825 lb. when the arm is released as when making a hardness determination with no load on the weight pan. An attempt is made to correlate the activation energy for compression with a recognized rate-controlling process for tensile deformation of Al. (Q29n, Q24; Al)

1168-Q. Applicability of Present Creep Prediction Techniques for Extrapolating Very Long Time Creep Behavior. K. D. Shimmin. Materials Central (Wright Air Development Center). U. S. Office of Technical Services, PB 171487, Oct. 1960, 21 p. $.75.

The Manson-Haferd time-temperature parameter method proves the most successful in correlating existing stress-rupture data and promises the most success in extrapolating data to times up to 100,000 hr. (Q3, 10-51)

1169-Q. Behavior of Riveted and Welded Crack Arrestors. R. J. Mosborg. University of Illinois (Bureau of Ships). U. S. Office of Technical Services, PB 171576, Aug. 1960, 114 p.

Steel plates 2 ft. and 6 ft. wide containing welded inserts of T-1 steel, riveted doubler plates or welded inserts of ABS Class C normalized steel subjected to laboratory-propagated notch crack tests. A riveted doubler plate performs well and it is noted that rivet holes do not necessarily attract propagating cracks. Drop-weight and explosion-bulge tests results plus data from various Charpy V-notch criteria are compared with the results from large scale tests of crack-arrestor specimens. (Q26q; ST, 7-51, 7-53)

1170-Q. Creep of a Recrystallized Aluminum SAP-Type Alloy. G. S. Ansell and F. V. Lenel. Metallurgical Society of AIME, Transactions, v. 221, June 1961, p. 452-456.

The creep behavior of an Al-Al_2O_3 alloy with a dispersion spacing of 1 micron at 400, fabricated by compacting an atomized Al powder, extruding the compact, cold working and recrystallizing the extrusion, is investigated in steady state tests from 500-620° C. Theoretical analysis is made in terms of a model proposed by Ansell and Weertman for dispersion strengthening with creep being attributed to dislocation climb. 7 ref. (Q3, M26c, N-general; Al-b, 6-70)

1171-Q. Prismatic Glide in Cadmium Crystals. J. J. Gilman. Metallurgical Society of AIME, Transactions, v. 221, June 1961, p. 456-457.

Rates of prismatic plastic glide $(10\bar{1}0)$ (2110) in pure Cd crystals are measured from 158-276° C. The glide rate is proportional to the 2.75 power of the applied shear-stress and the activation energy is 29.2 kcal. per mol. The rates of prismatic glide in Cd and Zn crystals are determined by the strengths of the atomic bonds across the prism planes. (Q24, M26c, 3-67, 3-73; Cu-a, 14-61)

1172-Q. Effect of Copper Additions on the Activation Energies for Creep of Aluminum

Single Crystals. D. Walton, L. Shepard and J. E. Dorn. Metallurgical Society of AIME, Transactions, v. 221, June 1961, p. 458-460.

The influence of small solute additions 0.005-0.25% of Cu on the activation energies for creep in single crystal bar specimens determined from 78-850° K. Data are given for secondary creep rate, flow stress, strain aging phenomena and activation energy as a function of time, temperature and composition. 7 ref. (Q3, N7e, 2-60, 2-61; Al, 14-61, Cu)

1173-Q. Delay Time in Single Crystals of Aluminum, Zinc and Iron. I. R. Kramer. Metallurgical Society of AIME, Transactions, v. 221, June 1961, p. 474-478.

The delay time for single crystals of Fe, Zn and prestrained Al are measured under conditions of high speed deformation. The delayed yielding of Al is affected by the orientation of the crystal and those of Zn and Fe by impurity content. Under the dynamic conditions employed, the calculated "activated volume" term appears to be very small for the metals studied. 12 ref. (Q24c, 3-67, 3-72; Al, Fe, Zn, 14-61)

1174-Q. Notch Sensitivity of Refractory Metals. A. G. Imgram, F. C. Holden, H. R. Ogden and R. I. Jaffee. Metallurgical Society of AIME, Transactions, v. 221, June 1961, p. 517-527.

The tensile and notch tensile properties of four refractory metals, Mo, W, Cb and Ta and one alloy, Mo-0.5% Ti in bar and sheet form are investigated from -250 to 20° C. after various heat treatments. The notch sensitivity of each material is evaluated on the basis of several criteria including the notch-unnotch strength ratio, the ductility transition and the fracture transition. (Q23s, Q23r, Q27d, 2-63, 2-64; EG-d37, Mo-b, Cb, Ta, W)

1175-Q. Hardness Anisotropy in Single Crystal and Polycrystalline Magnesium. M. Schwartz, S. K. Nash and R. Zeman. Metallurgical Society of AIME, Transactions, v. 221, June 1961, p. 554-560.

Knoop hardness in the rolling and longitudinal planes of hot and cold rolled sheets of sublimed Mg is measured as a function of the angle between the long axis of the indenter and the rolling direction. The measurements are correlated with similar data taken on the (0001) and (10$\bar{1}$0) planes of a single crystal of Mg where the hardness is measured as a function of the angle between the long axis of the indenter and the (11$\bar{2}$0) direction. 13 ref. (Q29n, 3-72; Mg-a)

1176-Q. Development of Copper Base High Strength-Medium Conductivity Alloys--Cu-Ti-Sn and Cu-Ti-Sn-Cr. Matti J. Saarivirta. Metallurgical Society of AIME, Transactions, v. 221, June 1961, p. 596-606.

Room and elevated temperature mechanical and physical properties of two new precipitation hardening Cu-base alloys, Cu-1.5% Ti-2.5% Sn and Cu-1.5% Ti-2.5% Sn-0.4% Cr, as obtained by solution annealing and subsequent heat treatment and cold working. Tensile properties, ductility and electrical conductivity of these alloys compare favorably with the above Cu-Be-Co alloys. 6 ref. (Q-general, A-general, N7, P-general, 2-64; Cu-b, Ti, Sn, Cr)

1177-Q. Effect of Grain Size on Brittle Fracture in Steel. F. de Kazinczy and W. A. Backofen. Metallurgical Society of AIME, Transactions, v. 221, June 1961, p. 640-641.

Grain size dependence of fracture and yield stress for brittle fracture (at the ductility transition temperature) is investigated from -220 to -100° C. for notched and plain specimens of low-carbon steels with varying grain sizes as produced by heat treatment. 6 ref. (Q23, Q26s, 2-59, 2-63, 2-64; CN-g)

1178-Q. Identification of Deformation Twins in a Molybdenum-35% Rhenium Alloy. H. W. Schadler and A. Lawley. Metallurgical Society of AIME, Transactions, v. 221, June 1961, p. 650-652.

Laue X-ray back reflection examination of deformation markings in specimens deformed 6% in tension at 78° K. showing that deformation twins form on (112) planes by shear in the (11$\bar{1}$) direction. 9 ref. (Q24b, Q24c, M22g; Mo-b, Rh)

1179-Q. (German.) Nonoctahedral Slip in Polycrystalline Aluminum. Randolf J. Hartmann and Eckard Macherauch. Zeitschrift fur Metallkunde, v. 52, May 1961, p. 353-358.

Tensile deformation of 550° C. vacuum annealed pure Al (99.99%) specimens with 0.2-0.5 mm. average crystallite diameter and combined X-ray, light and electron microscope examination to investigate frequency of nonoctahedral slip as influenced by deformation rate, crystallite diameter, ratio of Burger's vector and slip plane spacing. (Q24a, Q27, M21; Al)

1180-Q. (German.) Yield Point of Alpha Iron Single Crystals. Manfred Evers. Zeitschrift fur Metallkunde, v. 52, May 1961, p. 359-364.

Tensile testing of 850° C. vacuum annealed, water quenched, electrolytically polished, 200° C. annealed and -65 to 50° C. aged alpha iron single crystal specimens containing 0.005% C. Yield point as influenced by aging stress, time, temperature and strain rate. (Q24c, Q27, 2-65; Fe-a, 14-61)

1181-Q. (German.) Fatigue Strength of Uranium Containing 0.35 Wt.% Columbium. Hans Buhler and Walter Schreiber. Zeitschrift fur Metallkunde, v. 52, May 1961, p. 365-367.

Alternating torsion testing (frequency 1430 cpm.) of 630° C. annealed uranium specimens containing 0.35 wt.% Cb. Representation of results in terms of S-N curves (Wohler curves), damage line and axial loading diagram. (Q7a, Q1; U-b, Cb)

1182-Q. (German.) Hardness and Backspring of Metal Wires. Konrad Thielmann. Zeitschrift fur Metallkunde, v. 52, May 1961, p. 368-370.

Method and apparatus for measuring torsional backspring of metal wires (examples given for Pb, Al, Cu, Fe, CuNi 45, Ni67Cu, MS 58, SiBz 2, MnMBz 12) and evaluation of Brinell hardness from torsional backspring data. (Q1, Q29n; Al, Cu-b, Fe, Ni-b, Pb, 4-61)

1183-Q. Why Stress Relieve Cryogenic Vessels Made From 9% Nickel Steels? Welding Design & Fabrication, v. 33, Dec. 1960, p. 57-59.

Tests show that tanks and pressure vessels made from 9% nickel steels withstand impact shocks and high pressures at low temperatures without stress relieving. (Q6, Q28, 2-63, T26q; AY, Ni, 17-57)

1184-Q. (Italian.) Effects on Macro and Microstructure of Thermal Cycles on Alpha Uranium. R. Salice and F. N. Zein. Metallurgia Italiana, v. 53, Apr. 1961, p. 133-142.

Thermal cycle test on alpha uranium from 550-100° C., 630-100° C. and 630-400° C. are made to study the effect of temperature on subgrain formation, grain boundary corrugation and migration accompanied by intergranular deformation. These changes develop more rapidly for the 630-100° C. cycle since internal stresses are stronger. The double texture formed during thermal cycles is discussed and a correlation between the grain size and double texture is suggested. 15 ref. (Q7j, M27, M28, 2-61; U)

1185-Q. (Italian.) SAP and Aluminum Behavior to Thermal Fatigue. B. Buttinelli and G. de Gregorio. Metallurgia Italiana, v. 53, Apr. 1961, p. 143-148.

Influence of thermal fatigue on mechanical properties (hardness, impact, tensile strength and elongation) of SAP and Al. Observations are also made of dimensional instability, structure brittleness and crystal grain growth. 5 ref. (Q7j, Q-general, P10d, M27; Al)

1186-Q. (Translation.) Composition and Properties of Soviet Gas Turbine Steels. U. S. Office of Technical Services, 60-21031, Dec. 11, 1959, 44 p. $1.25.

Review of heat resistant, austenitic, high-alloy Soviet steels with comparative data given for brand designation, chemical composition, comparable steels, Soviet and non-Soviet, applications, heat treatment, chemical stability and physical and mechanical properties including stress-rupture strength, creep resistance. 20 ref. (Q-general, P-general, W11m; SS-e, 10-54, 17-57)

1187-Q. The Effect of Molding Material on the Mechanical Properties of 356-T6 Aluminum Alloy Castings. Gordon L. Tingley. Current Engineering Practice, v. 3, Apr. 1961, p. 15-23.

Ultimate strength, yield strength and elongation are compared for castings produced in permanent molds, green sand molds, dry sand molds, shell molds, Niforge aluminum molds and rammed graphite molds. (Q27a, Q23; 5)

1188-Q. A New Material for Engine Bearings. P. G. Forrester. Current Engineering Practice, v. 3, Apr. 1961, p. 4-7.

Results of bearing fatigue strength tests performed on a Glacier Viking machine comparing a new reticular Sn-Al alloy with Sn-base whitemetal, Pb-base whitemetal, unplated Cu-Pb alloy and Cu-Pb alloy with Pb-base overlay. 9 ref. (Q7a, T7d; Al-b, Cu-b, Pb-b, Sn-b)

1189-Q. Nickel-Alloyed Ductile Iron Rolls. Inco Nickel Topics, v. 14, Apr. 1961, p. 6-7.

Hardness and resistance to galling, scuffing and fire-cracking of chill cast, pearlitic and acicular rolls. (Q29, Q9n, Q26, W23k)

1190-Q. Steel With Hitherto Unattainable Characteristics Developed. Inco Nickel Topics, v. 14, Apr. 1961, p. 8.

Heat treatment involving age hardening of martensite of a newly developed alloy steel containing Ni, Co, Mo, Ti and carbon to produce a high yield and tensile strength, low-ductility temperature steel which can be cold formed, shaped or machined and is crack and corrosion resistant. (Q-general, Q23q, R-general, 2-64; AY)

1191-Q. The Stress Field of a Slipped Crystal and the Early Plastic Behavior of Polycrystalline Materials. B. Budiansky. Harvard University (Office of Naval Research). U. S. Office of Technical Services, PB 171531, Apr. 1960, 36 p.

Investigation of the initial phases of the plastic deformation of polycrystals during which elastic strain predominates. Results obtained for the polycrystal composed of grains having one slip system each indicate that, in the absence of mechanisms of plastic deformation other than slip, such a hypothetical material would need stresses far above the elastic limit for plastic strains to become comparable to elastic strains. (Q24)

1192-Q. (German.) Impact Bend Testing of Case Hardened and Notched Specimens. H. Brugger. Harterei-Technische Mitteilungen, v. 16, Apr. 1961, p. 12-18.

Impact bend testing of case hardened 25 CrMo 4, 34 CrMo 4, 15 CrNi 6, 20 MnCr 5 and C15 steel specimens to investigate influence of composition, heat treatment, case depth, shape of specimen and testing variables. (Q5, Q6, J28g, 2-60, 2-64, 3-73; AY)

1193-Q. Dynamic Anelastic Deformation of Metals. H. G. Hopkins. Applied Mechanics Reviews, v. 14, June 1961, p. 417-431.

Research into nonlinear stress-wave propagation in metals and alloys as polycrystalline aggregates. Calculation of rate of strain and pressure effects on dependent and independent mechanical behavior as related to low amplitude stress levels. High amplitude stress effects on deformation and compressibility of quasi-fluid and solid mechanical behavior. 136 ref. (Q22, Q28)

1194-Q. Residual Stress Versus Cutting Fluid Selection When Grinding High-Temperature Alloys. D. A. Stewart and H. R. Soderstorm. Lubrication Engineering, v. 17, June 1961, p. 286-291.

Deflection method testing of 25% Ni-15% Cr-Fe alloy, 7% Ar-4% Mo-Ti alloy and two CrCoNi-base alloys to determine residual stress when using various grinding fluids. (Q25h, G18, 18-73; Fe-b, Ni-b, Ti-b, SGA-h)

1195-Q. Experiments on Fabricated Pipe Bends. P. H. R. Lane and R. T. Rose. British Welding Journal, v. 8, June 1961, p. 323-334.

Stress distributions, changes in bend angle and diameter and flexibility factors for gusseted pipe bends subjected to in and out-of-plane bending and internal pressure. Comparison of experimental results with theoretical smooth-bend behavior and nature of divergence. 4 ref. (Q5, 3-74, 4-60)

1196-Q. The Effects of Internal Pressure on Thin-Shell Pressure Vessel Heads. E. O. Jones, Jr. Welding Research Council Bulletin Series, no. 69, June 1961, p. 1-10.

Determination of shell-to-head junction stresses and external pressures-to-collapse for hot rolled 1010 steel pressure vessels with torispherical, 2 to 1 and 90° ellipsoidal and 120° toriconical heads and wall thicknesses from 0.110-0.137 in. (Q10b, 3-74, T26q)

1197-Q. Wrinkling of a Large, Thin Code Head Under Internal Pressure. A. Fino and R. W. Schneider. Welding Research Council Bulletin Series, no. 69, June 1961, p. 11-13.

Failure by meridional wrinkling in the knuckle region of a large thin semi-ellipsoidal head designed to A. S. M. E.

code formulas at a pressure below the code prescribed test pressure. Influence of head diameter to thickness ratio and head geometry on propensity to such failure. (Q10b, 3-73, T26q)

1198-Q. (German.) Behavior of Tungsten Wire Under Torsion Stressing. H. J. Boos and H. Wiedenmann. Metall, v. 15, June 1961, p. 576-578.

Torsion testing from 0-500° C. under nitrogen atmosphere of cleaned bright, oxide or graphite covered ("black") tungsten wire specimens by measuring length change after a defined number of twists and by twisting to fracture. Influence of heat treatments and surface coatings. 6 ref. (Q1, 2-61, 2-64; W, 4-61)

1199-Q. (Russian.) New Formulas to Determine Deformation Resistance During Rolling. Yu. M. Chizhikov. Izvestiya VUZ--Chernaya Metallurgiya, Feb. 1961, p. 77-85.

Determination of deformation resistance during rolling of mild steel. 10 ref. (Q23, F23; CN)

1200-Q. (Russian.) Mathematical Analysis of the Strain Condition in Tensile Deformation. V. Kh. Sobolev and L. D. Sokolov. Izvestiya VUZ--Chernaya Metallurgiya, Feb. 1961, p. 93-95.

Theoretical examination of conditions in a test bar to find the true strain. Values are used in an experimentally derived formula. 4 ref. (Q27h, Q25, Q21)

1201-Q. (Russian.) Testing of Low-Carbon Steel Hardened by the Heat Left Over After Rolling. K. F. Starodubov, Yu. Z. Borkovskii and Yu. P. Gul'. Izvestiya VUZ--Chernaya Metallurgiya, Feb. 1961, p. 109-113.

Investigation of the possibility of exploiting the heat of rolled low-carbon steel immediately after rolling for further treatment and hardening. 15 ref. (Q29, 2-61, F23; CN)

1202-Q. (Russian.) Strength of Flat Bottoms of Steel Teeming Ladles. A. A. Kazantsev. Izvestiya VUZ--Chernaya Metallurgiya, Feb. 1961, p. 151-153.

Method for calculation of stresses in different parts of flat bottomed teeming ladles which are frequently used for Martin furnaces. 9 ref. (Q25, W19b)

1203-Q. Attenuation of Sound in Germanium at Ultra-High Frequencies. E. Roland Dobbs. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 291-293.

The acoustic wave in pure Ge is measured from 1.5-300° K. using compressional waves at 508 Mc/s and shear waves at 333 Mc/s. The temperature dependence of the attenuation is accounted for in terms of the known behavior of the phonon mean free path. 9 ref. (Q21f, M25, 2-63; Ge-a)

1204-Q. Ultrasonic Attenuation in Metals. R. W. Morse. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 233-239.

Review of experiments on the interaction between ultrasonic and electrons in metals at low temperature by observation of an attenuation of ultrasonic waves by electrons which occurs when the electron free path is comparable to or greater in size than the ultrasonic wave length. Application of attenuation measurements to determination of Fermi surface, superconducting energy gap, anisotropy and possibility of an acoustic factor in Au, Ag, Sn and Cu single crystals at 1.2° K. 9 ref. (Q21, P15g, 2-63, 3-72; Ag, Au, Sn, Cu, 14-61)

1205-Q. Shear Wave Attenuation in Normal and Superconducting Tin. A. R. Mackintosh. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 240-243.

Measurement on Sn single crystals at 1.2° K. with attenuation 80 Mc/s, the temperature dependence of the electromagnetic part of the absorption of waves in a superconductor being determined theoretically. Values are obtained for magneto-acoustic effects as a function of temperature and magnetic field direction. 6 ref. (Q21f, P16, P15g, 2-63; Sn, 14-61)

1206-Q. Investigation of the Mechanical Properties of Metals at Temperatures Below 1° K. N. M. Reinov and A. P. Smirnov. Paper from "Seventh International Conference on Low Temperature Physics, Proceedings". University of Toronto Press, Canada, 1961, p. 712.

A thermal method is used to determine the quantities of heat yielded during the deformation process in extension of superconducting metal with low thermal conductivities and heat capacities at temperatures below 1° K. Application to measurement of thermal elastic limits of Sn and In. (Q21, Q-general, M23r, 2-63, 3-68; In, Sn)

1207-Q. (French.) Spanish "Sulf-Inuz 18" High-Speed Steel. Rene Brochon. Machine Moderne, v. 55, Apr. 1961, p. 25-26.

Service life of drills and a lathe centering cone, manufactured from Sulf-Inuz 18 steel containing 18% tungsten. Effect of sulphurizing. (Q9, G17, T6n, 2-60, 2-64; TS-m, 17-52, 17-57)

1208-Q. Investigation of Three Analytical Hypotheses for Determining Material Creep Behavior Under Varied Loads, With an Application to 2024-T3 Aluminum-Alloy Sheet in Tension at 400° F. Avraham Berkovits. NASA Technical Note D-799, May 1961, 40 p. (Available from National Aeronautics and Space Administration, Washington, D. C. D. C.) $1.

Mathematical formulation of hypotheses including time-hardening, strain-hardening and life-fraction rules to estimate tensile creep strain under varied loads and constant temperature from creep data obtained under constant load and temperature. Predicted creep behavior is compared with data for 2024-T3 specimens under cyclic loading. (Q3, 2-61, 3-68; Al-b)

1209-Q. A Review of Recent Developments in Titanium and Titanium Alloy Technology. R. A. Wood. Defense Metals Information Center, Battelle Memorial Institute, DMIC Memo. 113, July 3, 1961, 4 p.

Summary of mechanical properties such as fracture toughness, creep characteristics and elevated temperature strength of Ti-13V-11Cr-3Al, Ti-8Al-1Mo-1V and Ti-8Al-10V alloys. Comparison of the tensile properties of zone-refined iodide titanium and sodium-reduced and electrorefined Ti. 12 ref. (Q-general, A-general, C-general, 2-60, 2-61; Ti-b, 10-54)

1210-Q. (Russian.) Some Properties of Cast Graphitic Steel. A. P. Serbin and N. I. Blinov. Liteinoe Proizvodstvo, Mar. 1961, p. 24-26.

Wear properties, antifrictional quality, thermal stability, plasticity, hardness, resilience and elongation as dependent on heat treatment, cooling method and chemical composition. The most favorable chemical composition is 1.3-1.45% C, 1.4-1.6% Si, 0.07% Cr and 0.4% Mn. 6 ref. (Q-general, P11, 2-60, 2-64; TS)

1211-Q. (Russian.) Brittleness of Cerium Cast Iron. P. I. Talanov and N. I. Astafurova. Liteinoe Proizvodstvo, Mar. 1961, p. 27-28.

Effect of small additions of Ce to cast iron on its resilience, threshold of brittleness, graphite spheroidization and neutralization of the adverse influence of Ti, Bi, Pb, Sb and other impurities on the globularization of graphite and cleanliness of crystal boundaries. (Q21, Q26s, N8q, M26, 2-60; CI, Ce)

1212-Q. The Pressure Variation of the Elastic Constants of Sodium. William B. Daniels. Paper from "Progress in Very High Pressure Research". John Wiley & Sons, Inc., New York 16, 1961, p. 203-215.

Pressure variation of the single crystal elastic constants of Na are measured from 0-299° K. using a modified ultrasonic pulse echo method. Results are interpreted in terms of Fuch's theoretical calculation of the Coulomb contribution to the shear stiffnesses of the alkali metals. 22 ref. (Q21d, 2-61, 3-74; Na, EG-e)

1213-Q. Quantum Effects in Diffusion: Internal Friction Due to Hydrogen and Deuterium Dissolved in Alpha Iron. W. R. Heller. Acta Metallurgica, v. 9, June 1961, p. 600-613.

Torsion pendulum measurements from 4.2-300° K. on annealed and quenched wire specimens with theoretical analysis of internal friction phenomena in terms of quantum mechanics. Effect of dissolved hydrogen-deuterium on relaxation and magneto-mechanical damping effects as a function of temperature. Relation of isotope shifted peaks to tunnelling effects and localized lattice distortion around the dissolved atom. 24 ref. (Q22, M26, N1, 2-60, 2-61; Fe-a, H)

1214-Q. Activation Energies for High Temperature Creep of Polycrystalline

Magnesium. W. J. McG. Tegart. Acta Metallurgica, v. 9, June 1961, p. 600-613.

Constant stress creep tests on 99.99% Mg specimens from 450-850° K. with activation energy variation determined as a function of stress and temperature. Creep rate is analyzed in terms of two thermally activated mechanisms, dislocation climb and nonbasal cross-slip acting additively. 18 ref. (Q3, Q24a, M26b, 2-62, 3-66; Mg)

1215-Q. Fatigue of Indium Antimonide. R. E. Maringer and J. J. Duga. Acta Metallurgica, v. 9, June 1961, p. 617-618.

Fatigue tests on single crystal specimens of InSe under cyclic plastic strain at 400° C. Fatigue cracking is observed at the boundary between intersecting slip bands and is rationalized in terms of dislocation pile-ups. Surface distortion is associated with slip as a function of strain. 8 ref. (Q7, Q24a, M26b, 3-68; In-b, Sb)

1216-Q. The Yield Stress of Iron Above Room Temperature. D. V. Wilson. Acta Metallurgica, v. 9, June 1961, p. 618-620.

Tensile test determination of the lower yield stress of polycrystalline low-carbon steel (alpha iron) from 20-200° C. as influenced by temperature dependent Cottrell locking of dislocations. 7 ref. (Q23b, Q24c, M26b, 2-61; Fe-b)

1217-Q. Pseudo Yield Point Effects. G. F. Bolling, L. E. Hayes and H. W. Wiedersich. Acta Metallurgica, v. 9, June 1961, p. 622-624.

Single crystals of Pb, Cu and Ag and polycrystalline specimens of Cu, Al and Fe are examined in various tensile machine at several temperatures and strain rates. Load-elongation and crosshead rate-elongation curves are derived as a function of time, with negative yield points appearing on the curves as a function of the machine characteristics, creep rate and strain rate sensitivity and positive yield points by a combination of machine characteristics and strain rate sensitivity. (Q24c, 1-52, 3-68; Ag, Al, Cu, Fe, Pb)

1218-Q. (French.) Titanium and Its Alloys. Technique Moderne, v. 53, Apr. 1961, p. 152-154.

Mechanical and physical properties and corrosion resistance. Effect of O, N, C, Al, Fe, Cr, Mn, Cu, Ni, Co, Bi, H, Mo, V, Cb and Ta on alpha-beta transformation. Weldability and effect of N, O and C impurities on tensile strength of the base metal and ductility of weldments. (Q-general, P-general, R-general, N-general, K9s, 2-60; Ti-b)

1219-Q. (French.) Formation of Electron-Microscopic Structures of Aluminum and Their Relationship to the Restoration of Mechanical Properties and Electrical Resistivity. Technique Moderne, v. 53, Apr. 1961, p. 159.

Samples of pure Al or Al alloys containing 120 x 10^{-6}% Cu are subjected to 90% cold deformation and held for 0-2 hr. at 0-250° C. to study recovery and recrystallization processes and their influence on hardness, tensile strength and electrical resistivity. Relation to formation and growth of atomic blocks in microstructure. (Q29, Q27, Q22n, M27, P15g, N5, 3-68; Al, Al-b, Cu)

1220-Q. (German.) Federal Laboratories for Material Testing at the Institute of Technology in Stuttgart. Karl Wellinger and Dietrich Uebing. Materialprufung, v. 3, May 20, 1961, p. 190-197.

Methods and apparatus used in creep testing at temperatures up to 1200° C., thermal cycling, fatigue testing of tubing by simultaneous cyclic pressurizing and bending, pressurizing of boilers with fatigue testing of chain links, mechanical testing of weldments, and impact-tensile testing from -200 to 20° C. 7 ref. (Q-general, 1-54, T26q; 4-60, 7-51)

1221-Q. The Mechanical Properties and Structure of Some High Tensile Alloy Steels. S. Becker and M. G. Bader. Research Council of Israel, Bulletin, v. 9C, Feb. 1961, p. 61-78.

Tensile strength and hardness are investigated in Si-Mo-V-Cu high-tensile alloy steels in the water quenched and tempered condition. Results are compared with observations made by optical microscopic analysis to establish a relationship between mechanical properties

and microstructure evidencing precipitation hardening. 14 ref. (Q27, Q29, M27, N7a; ST, Si, Mo, V, Cu)

1222-Q. Metals and Alloys at Elevated Temperatures (Anomalous Fracture in the Creep of Nickel). T. C. Reuther, P. Shahinian and M. R. Achter. Report of NRL (Naval Research Laboratory) Progress, June 1961, p. 25. (Available as PB 1713109 from U. S. Office of Technical Services, Washington 25, D.C.) $1.25.

Tapered Ni rod specimens are crept in vacuum and oxidizing air from 1200-1500° F. for various times to investigate the occurrence of fracture in larger sections of specimens at less stress than for smaller sections in air. The anomaly, which does not occur in vacuum is attributed to internal oxidation strengthening of cracks in the smaller sections with the fracture being progressively displaced to the heavier section as the stress increases. (Q26q, Q3, R1h, 2-66, 3-66, 3-73; Ni)

1223-Q. Metallurgical Aspects of Plastic Flow Processes (Low Cycle Fatigue). E. A. Lange and E. P. Klier. Report of NRL (Naval Research Laboratory) Progress, June 1961, p. 27-28. (Available as PB 1713109 from U. S. Office of Technical Services, Washington 25, D. C.) $1.25.

Two welded pressure vessels of A201 steel are tested to failure under high stresses at low cyclic fatigue loading. Catastrophic failure is by development of a fast-moving through crack (brittle fracture) for one of the vessels and by a slow-moving through for the other, both being explained in terms of the levels of applied stress and the NDT (nil-ductility transition) temperature of the steel. (Q26, Q7, Q23, 3-66, T26q; ST)

1224-Q. Improved Steel for Polaris (Temperature Dependence of Plane-Strain Crack Toughness of a High Strength Steel). J. E. Srawley and C. D. Beachem. Report of NRL (Naval Research Laboratory) Progress, June 1961, p. 28-29. (Available as PB 1713109 from U. S. Office of Technical Services, Washington 25, D.C.) $1.25.

Crack propagation tests from -280 to 80° F. on sheet specimens of a air hardened and tempered low alloy, high-strength steel, with the crack toughness as a function of thickness and temperature being calculated by a relationship drawn by Irwin. 4 ref. (Q23s, Q26q, 2-61, 2-64, 3-73; AY, SGB-a, 4-53)

1225-Q. Fundamental Study of Weld Joint Behavior (Significance of Energy Absorption to Shear Fracture Failure). A. J. Babecki and P. P. Puzak. Report of NRL (Naval Research Laboratory) Progress, June 1961, p. 29-32. (Available as PB 1713109 from U. S. Office of Technical Services, Washington 25, D. C.) $1.25.

Explosion tear test plates of STS steel with through-thickness cracks are tested under explosion loading at conditions to produce ductile (shear) failure. Tear resistance is measured for various heat treatment conditions and temperatures are correlated with Charpy-V energy absorption levels. (Q6q, Q-general, K9r, 2-61, 2-64; ST, 7-51)

1226-Q. (Japanese.) The Difference in Wear of Cast Iron Brake Shoes in Each Season. Minoru Nakai. Imono (Japan Foundrymen's Society, Journal), v. 33, May 1961, p. 336-339.

Statistical comparison of wear in summer as opposed to winter for cast iron brake shoes on railway cars with seasonal variations being attributed to temperature and humidity differences. (Q9n, T23; CI, 17-57)

1227-Q. (Japanese.) The Influence of Cementite Particle Dispersion on the Strength Indices of Tempered Carbon Steels. Genjiro Mima. Tetsu-to-Hagane (Iron and Steel Institute of Japan, Journal), v. 47, May 1961, p. 699-706.

Relationships between yield strength, tensile strength and hardness and transformation microstructures in specimens of plain carbon steel are studied after isothermal tempering at 690° C. for 6 min. to 400 hr. Effect of size-frequency distributions of cementite particles, mean free ferrite paths and ferrite grain size on mechanical properties. 21 ref. (Q-general, M27, N8, 3-71; CN-g)

1228-Q. (Japanese.) Effect of Al, Al + Ti and W + V + Nb on Properties of Heat-Resisting 38% Ni Alloy. Sadao Koshiba, Tsuneo Kunou and Shin Kimura. Tetsu-to-Ha-

gane (Iron and Steel Institute of Japan, Journal), v. 47, May 1961, p. 727-733.

Tensile properties from 20-900° C., rupture strength, oxidation resistance, microstructure, nature of precipitates and hardness after aging and solution treatment to 1150° C. are examined for Ni-Co-Cr alloy specimens as a function of alloy additions. (Q-general, M27, R1h, 2-60, 2-61, 2-64; Ni-b, Co, Cr, Al, Ti, W, V, Cb)

1229-Q. Creep and Rupture Properties of Carbon Steels. A. I. Smith, E. A. Jenkinson and D. J. Armstrong. Institution of Mechanical Engineers, Proceedings, v. 174, 1960, p. 745-765.

Comparison of short and long-time properties for KVA tube steel, KPJ pipe steel and LFA header steel conducted at 450° C. under a creep rate of 8 ton/in.^{2} up to 100,000 hr. Data are presented in the form of stress against temperature curves with a review of rupture tests on other carbon steels containing 0.07-0.51% carbon. 35 ref. (Q3, 2-60, 2-61, 3-67; CN)

1230-Q. Science for Electroplaters. Pt. 66. Nickel-Hardness, Tensile Strength. L. Serota. Metal Finishing, v. 59, July 1961, p. 69-70.

Experimental analysis of the hydrogen and colloidal inclusion theories as explanations for variations in hardness of electrodeposited Ni. Crystal structure, tensile strength and abrasion resistance. (To be continued.) (Q29n, 2-60, 3-71, M26, Q27a, Q9n; Ni, 8-62)

1231-Q. Aircraft Wheel Bearing Failures--Why? E. B. Palmer. Scientific Lubrication, v. 13, June 1961, p. 20-24.

Inspection for pits, corrosion, dents, scratches, fatigue, worn or cracked retainers, Brinelling, fractures, carbonization and heat discoloration. Procedure for cleaning, lubricating and packing. (Q9, Q7, Q26, R-general, T7d, 18-73)

1232-Q. (English.) Deep Temperature Tensile Tests. Th. Lipp. Werkstatt und Betrieb, v. 94, May 1961, p. 122.

Application of a tensile testing machine with a deep-freezing tank for tensile testing of steel wires, foils and strip down to -70° C. (Q27, 1-54, 2-63; ST)

1233-Q. (English.) Tool Steels for the Cold Extrusion of Steel. Herbert Briefs. Werkstatt und Betrieb, v. 94, May 1961, p. 122-123.

Evaluation of steel types and their mechanical and physical properties for application in cold extrusion dies. Rockwell C hardness and impact-ball hardness of hardened high-speed steel B18 and carbon sheet C 100 WI are compared as a function of the testing temperature at a holding period of 1 hr. 7 ref. (Q29n, Q-general, T6r; TS, 17-52, 17-57)

1234-Q. (French.) Rapid Flow of Nicral D Alloy. Jean Poulignier. Recherche Aeronautique, no. 81, Mar-Apr. 1961, p. 13-21.

The refractory Fe-Ni-Cr alloy Nicral D is tensile-tested at temperatures of 900-1300° C. to determine elongation and reduction of area as a function of temperature for the condition of rapid flow (i.e. time elapsed until rupture: 1-90 min.) 4 ref. (Q3m, Q27, Q23p, 2-61; Fe-b, Ni, Cr)

1235-Q. Boron in Steel. Mechanical World, v. 141, July 1961, p. 245-246.

Influence of boron on hardenability, corrosion cracking, tensile impact and rupture strength. Maximum boron hardenability is obtained with alloys containing 0.00033% effective boron at the austenitizing temperature (840° C). (Q-general, J5, 2-60; AY, B)

1236-Q. (Translation-Brutcher no. 5120.) Creep Properties of 18-8 Columbium Stainless Steel. Shoji Terai. Tetsu-to-Hagane (Iron and Steel Institute of Japan, Journal), v. 46, Mar. 1960, p. 379-381.

Effect of Cb and Ti on creep rupture properties. Stress versus rupture time relationship with smooth as against notched specimens; effect of temperature on solution treatment; differences in creep versus time under load relationship between 18-8 Cb and 18-8 Ti steel annealed at various temperatures. (Q3q, 2-60; SS, Ti, Cb)

1237-Q. (Translation-Brutcher no. 4979.) Present State and Perspectives of Metal Science in the German Democratic Republic. F. Erdmann-Jesnitzer. Metallovedenie i Termicheskaya Obrabotka Metallov, Oct. 1959, p. 2-5.

Survey of research and development on metal plasticity, cold deformation

and recovery of polycrystals, migration of grain boundaries during deformation within grain growth temperature range. (Q24)

1238-Q. (Translation-Brutcher no. 4981.) Measurement of Elastic Stresses in Metals by X-Rays. E. Schiebold and H. Stroppe. Metallovedenie i Termicheskaya Obrabotka Metallov, Oct. 1959, p. 16-19.

Report on the Schiebold X-ray tensograph, based on use of a primary X-ray beam in the form of concentric circular cones to form a perpendicular to the specimen surface with a specified apex angle. (Q25)

1239-Q. (Translation-Brutcher no. 4121.) Changes in Properties of Ni-Cr Alloy E1765 for Stationary and Propulsion Turbines During Heating for up to 10,000 hr. V. Z. Tseitlin and G. G. Morozova. Metallovedenie i Termicheskaya Obrabotka Metallov, Jan. 1958, p. 30-35.

Data on a Ni-base alloy containing about 15% Cr, 5% W, 4% Mo, 1.3% Ti, 2% Al, 0.008% B, balance Ni, tested for periods of up to 10,000 hr. at high temperatures. Brinell hardness, impact toughness, electrical resistance and magnetic susceptibility at 1380° F. (Q3; Ni-b)

1240-Q. (French.) SG-Cast Iron. Michel Paris and Jean Driancourt. Technique Moderne, v. 53, Mar. 1961, p. 104-106.

Introduction of Mg into cast iron free of S, Ti and Al and containing a maximum of 0.1% P under high pressure, tensile strength and elongation. Corrosion in 40% H_2SO_3 and 50% HCl from 105-108° C., in sea water and maritime soil. Application in the manufacture of crankshafts, camshafts and cylinders for hydraulic brake systems and light and heavy pipes for high pressure applications. (Q27a, Q23p, R6g, R4b, R8; CI-r, 17-57)

1241-Q. (Russian.) Study of Cast and Forged Heat Resistant Steel. B. M. Kolobashkin. Liteinoe Proizvodstvo, Dec. 1960, p. 34-36.

Comparison of specimens of EI481 steel of same size and composition tested at different temperatures (20-800° C.) and aging time (0-150 hr.) showing advantages of cast steel over forgings in terms of mechanical properties, such as tensile strength, elongation, reduction of area, weakening under load and brittleness. 4 ref. (Q-general, 2-61, 2-64; ST, 4-51, 5)

1242-Q. (Translation-Brutcher no. 5130.) Effect of Segregation of Elements in Cast Technical Iron on Plasticity. G. K. Mekhed and A. A. Baikova. Trudy Inst. Met., v. 4, 1960, p. 254-256.

Preliminary study of permissible limits of segregation of C, Mn, S, Al and O_2 in 1765 lb. ingots of openhearth rimmed and killed 0.03% carbon steel for easy subsequent working and uniform mechanical properties. Melting and deoxidizing procedures; numerical data on distribution of elements over 16 cross sections along the ingot length. (Q23p; CI, 5-59)

1243-Q. (Translation-Brutcher no. 5006.) Fatigue Strength of Hot Rolled Steel Rods and Flats With Scaled Surface. I. V. Kudryavtsev. Metallovedenie i Termicheskaya Obrabotka Metallov, Dec. 1959, p. 31-35.

Results of tensile and hardness tests on as-rolled and as-machined sections of various carbon steels; fatigue test results; effect of "black" surface on fatigue of shafts and flats under noncontact versus contact conditions. (Q7a; CN)

1244-Q. (Translation-Brutcher no. 5013.) Speed of Sound Propagation as a Quality Criterion of Gray Cast Iron. Metallovedenie i Termicheskaya Obrabotka Metallov, Dec. 1959, p. 55-60.

Simple method of assessing the properties of gray iron castings with standard ultrasonic ultrasonic pulse-echo apparatus. Determination of velocity of sound propagation and elastic modulus in cast iron. Effect of section size on elastic modulus, tensile strength and Brinell hardness. (Q21a, Q21f, 1-74; CI-n)

1245-Q. (Translation-Brutcher no. 5180.) Investigation of Heat-Resisting Steel As-Cast and As-Forged. B. M. Kolobashin. Liteinoe Proizvodstvo, Dec. 1960, p. 34-36.

Study of advantages offered by a 0.30% C, 8% Mn, 13% Cr, 8% Ni heat resisting steel for high temperature service. Tensile test results obtained from 20-700° C.; creep tests results at 650° C. (Q27a, 2-64; ST, SGA-h)

1246-Q. A Study of the Accumulation of Fatigue Damage in Steel. W. H. Erickson and Clyde E. Work. ASTM Preprint no. 71, 1961, 14 p. $.50.

Accumulation of fatigue damage in SAE 4340 steel at stresses up to 150% of the endurance limit. It is observed that damage depends on the stresses employed to evaluate it and is not a linear function of the number of repetitions of stress. 21 ref. (Q7, 3-66; AY)

1247-Q. Creep and Rupture Properties of Five Copper Base Casting Alloys. Donald P. Moon and Ward F. Simmons. ASTM Preprint no. 78, 1961, 18 p. $.50.

Creep evaluation is conducted on cast specimens of 76% Cu, 2 1/2% Sn, 6 1/2% Pb, 15% Zn, 65,000-psi. manganese bronze, 110,000 psi. manganese bronze, 20% Ni-Ag, and 81-4-15 silicon brass alloys at selected temperatures between 250-550° F. Stability of these alloys during creep exposure is determined by tension tests and metallographic examination after creep exposure. 6 ref. (Q3, Q23, M-general, 2-61; Cu-b, Sn, Pb, Zn, Cu-s, Ag-b, Ni, Cu-n)

1248-Q. Some Effects of Section Size and Testing Condition on Tensile Properties of Zircaloy 2 at 600° F. S. L. Ames. ASTM Preprint no. 84, 1961, 10 p. $.50.

Zircaloy 2 in a number of mill product forms is tested after annealing in vacuum or air. Effects of changes in tensile test procedure, annealing method and oxygen impurities. Yield and tensile strengths appear to be dependent on type of specimen used. 7 ref. (Q27, 2-60, 2-64, 3-73; Zr-b)

1249-Q. Influence of Sheet Thickness on Sharp-Edge-Notch Properties of a Beta-Titanium Alloy at Room and Low Temperatures. A. J. Repko, M. H. Jones and W. F. Brown, Jr. ASTM Preprint no. 80b, 1961, 17 p. $.50.

B120 VCA Ti alloy sheets from 0.010-0.130 in. thick are tested at temperatures ranging from -320° F. to room temperature to determine influence of thickness on fracture toughness, per cent shear and slow crack extension. 7 ref. (Q3, Q26q, Q2g, 3-73, 2-61; Ti-b)

1250-Q. Why Did These Parts Fail? John Carroll. Materials in Design Engineering, v. 54, July 1961, p. 91-95.

Improper techniques as factors causing breaks, fracture, rupture, corrosion, chipping, bursting and fatigue fracture failure in various industrial products. (Q-general, 2-60, 3-68, T-general, 9)

1251-Q. The Role of Materials in Cryogenics. Donald Peckner and Malcolm Riley. Materials in Design Engineering, v. 54, July 1961, p. 107-118.

Use of superconductors in switching devices and cryogenic magnets. Mechanical properties of austenitic stainless steels, Al and Al alloys, Co and Ni alloys, Ti, Mg, Ta, alloy steels, glass and plastics at cryogenic temperatures. Methods for evaluating and testing plastics. 20 ref. (Q-general, P15g, 2-63; SS-e, Al, Co-b, Ni-b, Ti, Mg, Ta, AY, 17-57)

1252-Q. Microplasticity in Metals and Alloys at Low Temperatures. P. Feltham. Metal Treatment and Drop Forging, v. 28, June 1961, p. 221-224.

The yield phenomenon in mild steel and alpha brasses and short range order in alpha brass are studied by creep and stress relaxation tests at small plastic strains from 77-358° K. Relations are obtained on the dynamics of dislocations occurring on an atomic scale. (Q23b, Q24c, M26b, N10, 2-63, 3-68; CN, Cu-n)

1253-Q. Theoretical Investigation of the Behavior of Steel Structures at Elevated Temperatures. N. W. Murray and R. W. Bailey. Paper from "Nuclear Reactor Containment Buildings and Pressure Vessels". Butterworths & Co. (Publishers) Ltd., London, England, 1960, p. 379-382.

Two methods enable the behavior of steel structures at elevated temperatures to be studied. In the first method, creep curves are completely linearized and the concept of a creep surface is used. For the steel used it is possible to use a hyperbolic paraboloid as the creep surface and so obtain great simplification of creep phenomena. In the second method the creep curves are approximated by empirical laws and the ef-

fects of changes in the variables are obtained by integration. (Q3, 2-62; ST)

1254-Q. Thermal Stresses in Thin-Walled Circular Cylinders. D. J. Payne. Paper from "Nuclear Reactor Containment Buildings and Pressure Vessels". Butterworths & Co. (Publishers) Ltd., London, England, 1960, p. 393-410.

Analytical and numerical methods are used to find the elastic stresses and deflections produced by temperature variations over the surface of a cylinder typical of those used to support the core of graphite moderated gas-cooled reactors. The particular temperature distribution studied varies exponentially along the cylinder and sinusoidally around it. 12 ref. (Q25p)

1255-Q. The Steady Creep of Shells--A Method of Analysis. C. R. Calladine. Paper from "Nuclear Reactor Containment Buildings and Pressure Vessels". Butterworths & Co. (Publishers) Ltd., London, England, 1960, p. 411-431.

An expression is set up to describe the creep behavior of a shell element subject to arbitrary bending and direct stress resultants. The expression contains a single quadratic interaction expression in contrast to the more usual piecewise-linear expressions. A creep law is used in which strain rate depends on the third power of the stress. A finite difference iterative method is described by which the shell equations, incorporating the results of the first part of the analysis, may be solved. (Q3, 3-66)

1256-Q. Analysis of Brittle Strength of a Reactor Vessel. J. Nemec. Paper from "Nuclear Reactor Containment Buildings and Pressure Vessels". Butterworths & Co. (Publishers) Ltd., London, England, 1960, p. 521-531.

Analysis of brittle fracture based on a certain number of new theoretical stress and plastic strain characteristics. 20 ref. (Q26s, 3-66, 3-68)

1257-Q. Brittle Fracture Behavior of Metal Structures. H. M. Schnadt. Paper from "Nuclear Reactor Containment Buildings and Pressure Vessels". Butterworths & Co. (Publishers) Ltd., London, England, 1960, p. 532-541.

Relation between brittle fracture safety of a metal structure and stress calculations based on its elastic behavior. (Q21, Q26s, 3-66)

1258-Q. Repeated Rest Periods in the Fatigue of a Mild Steel Bar. J. G. Whitman. Engineer, v. 211, June 30, 1961, p. 1074-1076.

A series of fatigue tests conducted on mild steel specimens containing a machined stress raiser indicating the effect of short rest periods between each application of stress fatigue behavior with applications to welded structures. (Q7; ST)

1259-Q. Preventing Fatigue Failures. Pt. 6. Bi-axial Fatigue Stresses. F. B. Stulen, H. N. Cummings and W. C. Schulte. Machine Design, v. 33, July 6, 1961, p. 154-158.

Method for relating multiaxial fatigue stresses to a single allowable fatigue stress. Sample calculations using SAE 4340 steel structural parts. 4 ref. (Q7e; ST)

1260-Q. Statistical Analysis of Tensile Properties of Heat-Treated Ti-4Al-3Mo-IV and Ti-2.5Al-16Y Sheet. G. H. Beatty and H. R. Ogden. Defense Metals Information Center, Battelle Memorial Institute, DMIC Report no. 46J, June 6, 1961, 41 p. (Available as PB 171425 from U. S. Office of Technical Services, Washington 25, D.C.)

Ultimate strength, yield strength and elongation data are determined for solution treated and aged sheet-rolled alloys. (Q27a, Q23, 2-60, 2-64, 3-68; Ti-b, Al, Mo, V, 4-53)

1261-Q. The Effect of Manganese on the Tensile Properties of Quenched and Aged Aluminum-Copper Alloys Containing 3 and 4.5 Wt.% Copper. V. B. Ghate and D. R. F. West. Metallurgia, v. 63, June 1961, p. 269-272.

Measurement of elongation, ultimate tensile strength and proof stress of wrought Al alloys containing 0-2.0 wt.% Mn. The alloys are solution treated at 525° C. and aged for times up to 120 days at 130° C. Examination of transcrystalline fracture. 12 ref. (Q27, Q23p, S21, Q26, 2-60, 2-64; Al-b, Cu, Mg)

1262-Q. Vanadium-Columbium Alloys. Metallurgia, v. 63, June 1961, p. 275.

Ultimate tensile strength, stress-rupture properties, strain rate sensitivity, aqueous corrosion resistance and

oxidation resistance of V-Cb alloys containing 20-50% Cb by weight for application in oxidizing and reducing environments. Effect of hot working, stress relieving and Ti and Al additions. (Q27a, Q3m, Q27h, R4, R1h, 2-60, 2-64; V-b, Cb-b)

1263-Q. An Improved Tensile Testing Apparatus. N. C. Balchin and B. L. Mordike. Metallurgia, v. 63, June 1961, p. 313-314.

Testing method in which accurate indication of load is obtained by use of a complaint spring and in which the strain rate is maintained constant as if an infinitely stiff spring were used. (Q27, 1-53)

1264-Q. The Use of the Inverted Microscope for Series Micro-Hardness Testing. E. J. Hooker. Metallurgia, v. 63, June 1961, p. 315-317.

Errors arising from incorrect counter-poising on inverted microscopes are allowed for by including a standard test piece within each specimen mount and measuring its hardness under the same conditions of balance. Multiplying factor is then obtained to correct the hardness of the other specimens in the mount. Application to Pb specimens containing 0.2-0.8% Sb. 4 ref. (Q29q, 1-53; Pb-b, Sb)

1265-Q. Excess Negative-Rake Strain-Hardens Torsion Bars. Metalworking Production, v. 105, June 28, 1961, p. 54.

Turning with an excessively negative-raked tool produces a modified amorphous martensitic surface. Measurements of fatigue resistance are compared with those of roller-burnished specimens. (G17a, G19, 3-68, Q7a, Q24m)

1266-Q. (Translation-Brutcher no. 4963.) Interplay of Creep and Stress Relaxation. I. A. Oding and G. F. Lepin. Metallovedenie i Termicheskaya Obrabotka Metallov, Sept. 1959, p. 2-8.

Previously abstracted from original. See item 1354-Q, 1959. (Q3, Q3a)

1267-Q. (Translation-Brutcher no. 4964.) Effect of Heat Treatment Conditions on Creep Resistance of Boiler and Turbine Steel 12KhMF. I. N. Bogachev and Kh. D. Reshetnyak. Metallovedenie i Termicheskaya Obrabotka Metallov, Sept. 1959, p. 8-12.

Previously abstracted from original. See item 1355-Q, 1959. (Q3m, 2-64, 3-71; SS, SGA-h)

1268-Q. (Translation-Brutcher no. 4966.) The Effect of Sigma Phase on the Mechanical Properties of Heat Resisting Steels. E. E. Levin, E. M. Pivnik, P. M. Libman. Metallovedenie i Termicheskaya Obrabotka Metallov, Sept. 1959, p. 17-19.

Previously abstracted from original. See item 1356-Q, 1959. (Q27a, Q23p, 2-60; ST, SGA-h)

1269-Q. (Translation-Brutcher no. 4967.) Application of Temperature and Parametric Relations of Long-Time Strength. N. N. Geminov. Metallovedenie i Termicheskaya Obrabotka Metallov, Sept. 1959, p. 19-22.

Previously abstracted from original. See item 1362-Q, 1959. (Q3, 2-61)

1270-Q. (Translation-Brutcher no. 4968.) Certain Anomalies of the Early Stage of Plastic Deformation. Ya. R. Rauzin. Metallovedenie i Termicheskaya Obrabotka Metallov, Sept. 1959, p. 23-29.

Previously abstracted from original. See item 1357-Q, 1959. (Q24, 2-59, 2-60)

1271-Q. (Translation-Brutcher no. 4974.) Effect of Chromium and Manganese on Brittle Fracture of Low-Carbon Steel. V. G. Savitskii, K. V. Popov, V. F. Zakharov, and G. M. Grigor'eva. Metallovedenie i Termicheskaya Obrabotka Metallov, Sept. 1959, p. 49-51.

Previously abstracted from original. See item 1358-Q, 1959. (Q26s, 2-64; CN-g)

1272-Q. (Translation-Brutcher no. 4975.) Effect of Heating in Hydrogen at High Temperature on the Embrittlement of Welds. L. S. Livshits, L. P. Bakhrakh, I. D. Grebeshkova and V. P. Teodorovich. Metallovedenie i Termicheskaya Obrabotka Metallov, Sept. 1959, p. 52-55.

Previously abstracted from original. See item 1359-Q, 1959. (Q26s; AY, 7-51)

1273-Q. (Translation-Brutcher no. 4976.) Effect of a Fine-Grained Surface Layer on Low-Temperature Embrittlement of Steel. P. S. Sakharov. Metallovedenie i Termicheskaya Obrabotka Metallov, Sept. 1959, p. 55-57.

Previously abstracted from original. See item 1360-Q, 1959. (Q26s, 3-71; AY)

1274-Q. (Translation-Brutcher no. 4977.) Causes of Hydrogen Embrittlement of Sheet Steel During Pickling. P. G. Kovtun. Metallovedenie i Termicheskaya Obrabotka Metallov, Sept. 1959, p. 58-59.

Previously abstracted from original. See item 1361-Q, 1959. (Q26s, L12g, Q27a, 2-64; ST, H)

1275-Q. (Translation-Brutcher no. 4984.) Notch Sensitivity of Alpha-Alloys of Titanium. V. I. Chernetsov. Metallovedenie i Termicheskaya Obrabotka Metallov, Oct. 1959, p. 27-32.

Previously abstracted from original. See item 19-Q, 1960. (Q23s, Q27, 2-60, 2-61; Ti-b, H)

1276-Q. (Translation-Brutcher no. 4986.) Effect of Cold Work and Annealing on the Anelasticity of L62 (62% Cu) Brass. S. O. Tsobkallo and Z. A. Vashchenko. Metallovedenie i Termicheskaya Obrabotka Metallov, Oct. 1959, p. 38-42.

Previously abstracted from original. See item 20-Q, 1960. (Q21, Q23p, Q29q, 3-68; Cu-n)

1277-Q. (Translation-Brutcher no. 4988.) On the Seizure (Cold Welding) of Clean Metallic Surfaces. A. P. Semenov and V. V. Pozdnyakov. Metallovedenie i Termicheskaya Obrabotka Metallov, Oct. 1959, p. 44-47.

Previously abstracted from original. See item 21-Q, 1960. (Q9q, 3-68; Ag, Cu-b)

1278-Q. (Translation-Brutcher no. 5002.) Effect of Alloying Elements on the Tempering of Steel. A. S. Zav'yalov and M. I. Senchenko. Metallovedenie i Termicheskaya Obrabotka Metallov, Dec. 1959, p. 2-11.

Previously abstracted from original. See item 184-Q, 1960. (Q27a, 2-60; AY, AD-n)

1279-Q. (Translation-Brutcher no. 5005.) Effect of Creep at Elevated Temperatures on the Internal Friction and Elastic Modulus of Metals. I. A. Oding. Metallovedenie i Termicheskaya Obrabotka Metallov, Dec. 1959, p. 24-31.

Previously abstracted from original. See item 185-Q, 1960. (Q3, Q21a, Q22, 2-62)

1280-Q. (Translation-Brutcher no. 5155.) Some Properties of Titanium Carbide Coated Steel. H. Wiegand and W. Ruppert. Metalloberflache, v. 14, Aug. 1960, p. 229-235.

Previously abstracted from original. See item 1648-Q, 1960. (Q9, L25; ST, Ti, NM-a35)

1281-Q. (Translation-Brutcher no. 5065.) Study of Reversible (High Temperature) Temper Brittleness by the Micro Thermo-Electromotive Force Method. E. V. Panchenko and E. M. Strug. Izvestiya VUZ--Chernaya Metallurgiya, Sept. 1960, p. 157-159.

Previously abstracted from original. See item 905-Q, 1961. (Q26s; ST)

1282-Q. Friction and Wear for Water-Lubricated Seals. Robert L. Cornell, Robert S. Lucas and Harold G. Young. Product Engineering, v. 32, July 24, 1961, p. 38-41.

Wear rate is investigated as a function of friction using carbon and laminated phenolic seals running against bronze, K-Monel and Stellite-faced and chrome-plated steel. A synthetic sea water is used as the lubricant. 5 ref. (Q9p; ST, Cu-n, C, NM-b, Ni-b, Co-b, Cr)

1283-Q. Six New Techniques for Photoelastic Coatings. Felix Zandman and Herb N. Maier. Product Engineering, v. 32, July 24, 1961, p. 42-45.

Stress analysis applied to the design of Al engines by bonding a layer of photoelastic plastic to the part, applying a load of 1000 psi. and viewing discoloration of the coating using a reflection polariscope. Elastic, reversible coating allows measurement of static and dynamic strain. (Q25, T21b; Al, 17-57)

1284-Q. (Japanese.) Wear Phenomena of Heat Treated Titanium Cast Iron With Eutectic Graphite Structure. Eiichi Takeuchi. Imono (Japan Foundrymen's Society, Journal), v. 33, Apr. 1961, p. 271-277.

Wear tests on titanium cast iron specimens after hardening, annealing, tempering or isothermal treatments from 150-900° C. with superior wear resistance being attributed to isothermally treated specimens. Data are given for Rockwell B and Vickers hardness. 6 ref. (Q9n, Q29n, 2-64, 2-65; CI)

1285-Q. Effect of Organic Compounds on Metal Fatigue. Products Finishing, v. 25, July 1961, p. 78, 82-83.

Increase in fatigue life of steel, Mg and Cu-Be alloys by coating with organic compounds. Compounds having a carbon chain of at least 12 with a polar group at one end are found to be most beneficial. (Q7b, L26; ST, Mg, Cu-b, Be)

1286-Q. New Casting Alloy Is Strong, Ductile Without Solution Heat Treatment. Modern Metals, v. 17, June 1961, p. 48.

Al casting alloy, called Precedent 71B, can be stress relieved at only 700° F. and retains high tensile and yield strength for structural applications. Elongation, Brinell hardness and fatigue endurance limit as compared to Rolls Royce 50 and 355T6. (Q-general, J1a, E25p; Al-b)

1287-Q. Rolling-Contact Fatigue Studies With Four Tool Steels and a Crystallized Glass Ceramic. Erwin V. Zaretsky and William J. Anderson. American Society of Mechanical Engineers, Transactions (Journal of Basic Engineering) Paper no. 61-LubS-3, 1961, 8 p.

Rolling contact fatigue properties of crystallized glass ceramic balls together with AISI M-1, AISI M-50, Halmo and WB-49 alloy steel balls tempered to various hardness levels are determined in the NASA spin rig and in the five-ball fatigue tester. (Q7, 3-68, T7d; TS, NM-f, 17-57)

1288-Q. Development of Techniques for Producing Beryllium Structural Shapes. 3rd Interim Technical Report no. AF33(600)-41959-3. Beryllium Corp., Reading, Pa., Jan. 29-Apr. 28, 1961, 68 p.

Tensile and yield strengths and formability of rolled sheet and bar Be are investigated as a function of beryllium oxide level and of rolling parameters. Mechanical properties and microstructure are studied to determine effects of heat treatment, aging, cladding and extruding. (Q27, Q23, M27, 2-60, 2-64, 3-68; Be, 4-53, 4-55)

1289-Q. A Review of Some Recent Developments in Copper Alloy Technology. C. D. Campbell and A. H. Coote. Australian Institute of Metals, Journal, v. 6, May 1961, p. 137-149.

Composition and mechanical properties of Cu alloys and wrought and alloy bronzes. Fabricating techniques including continuous casting and various methods of preparing heat exchangers such as roll bonding, tube-in-strip and integral finned tube. Methods of preparing fine-grained brass strip, of hot pressing brass and of welding Cu alloys. 9 ref. (Q-general, C5q, G1, 1-66, K-general, W13b; Cu, Cu-n, 4-53)

1290-Q. Tensile Properties of Annealed Chromium Between -196 and +900° C. C. W. Weaver. Institute of Metals, Journal, v. 89, June 1961, p. 385-390.

Tensile tests on extruded annealed high purity specimens from -196 to 900° C. to establish brittle fracture behavior and ductile behavior of Cr. The brittle-ductile is sensitive to N impurity content with the brittle fracture stress being temperature dependent. Data are given for tensile properties and yielding, strain aging, workhardening, strain-induced precipitation and strain rate effects as a function of temperature, purity, b-c-c. structure and deformation velocity. 19 ref. (Q27, Q23r, Q26s, 2-60, 2-61, 3-68; Cr-a)

1291-Q. Strain Rate Distribution During Experimental Metal Rolling. K. S. Yajnik and J. Frisch. American Society of Mechanical Engineers, Transactions (Journal of Engineering for Industry), Paper no. 61-Prod-6, 1961, 8 p.

Measurement of two-dimensional plastic flow of Pb (99.9%) strips during torque-free rolling at room temperature. Determination of the slipline field and the maximum shear strain rate. Comparison of experimental plastic-rigid boundary with theoretical solution. 11 ref. (Q24, F23, 3-68; Pb, 4-53)

1292-Q. Metallurgical Concomitants of Residual Stress. G. M. Boyd. British Welding Journal, v. 8, July 1961, p. 343-348.

Strain-aging, quench-aging and other similar metallurgical changes which a steel undergoes during welding can most often cause the embrittlement that is ascribed to stress conditions. 24 ref. (Q26s, 2-65, Q25h; ST, 7-51)

1293-Q. (Japanese.) Stress-Strain Relationship of Mild Steel Under Impact Tensile Loading. Pt. 1. Studies of Tensile Properties of Steels Under High Speed Impulsive Loading. Seita Sakui,

Tadahisa Nakamura, and Shigetomo Nundmura. Tetsu-to-Hagane (Iron and Steel Institute of Japan), v. 47, June 1961, p. 800-809.

The impact tensile properties of annealed mild steel specimens at room temperature under various loading conditions are measured experimentally; discussion of the observed load-time curve and related stress strain curves in terms of plastic and elastic strain wave propagation. The strength properties are related to impact velocity and also to specimen dimensions and ferrite grain size. (Q27b, Q24j; Q25n, 3-67, 3-73; CN)

1294-Q. (English.) Effect of Grain Size and Size of Notch on the Fatigue Behavior of a Magnesium Alloy. F. H. Vitovec. Schweizer Archiv, v. 27, Apr. 1961, p. 163-166.

Fatigue testing at room temperature of Mg specimens containing 2.49% Al of different grain size and with different notch size in the specimen. Analysis of results for correlations between grain size, size of notch, relative stress gradient, stress gradient prograin and theoretical maximum strength of notched specimens. 13 ref. (Q7, 2-59, 3-66, 3-73; Mg-b)

1295-Q. (German.) Causes and Removal of Residual Stresses in Gray Cast Iron Castings. W. Felicke and F. Kuhndorfer. Maschinenbau Technik, v. 10, May 1961, p. 233-237.

Occurrences of residual stresses during cooling and methods for their experimental measurement. Methods for elimination of residual stresses, including aging, mechanical means such as vibration, and heat treatments (stress-free annealing). 15 ref. (Q25h, G23, J1a, 2-61; CI-n, 5)

1296-Q. Model Investigations of Unstiffened and Stiffened Circular Shells. L. A. Harris, H. S. Suer and W. T. Skene. Experimental Mechanics, v. 1, July 1961, p. 1-9.

Fiberglass, Mylar, 18-8 stainless steel, 2S-H-18 Al alloy and 2024-T3 Al alloy cylinders are tested under compressive, bending and torsion loads to determine effect of modulus of elasticity, compressive yield strength, Poisson's ratio and stringer geometry on stress distributions and buckle patterns. 8 ref. (Q25, Q1, Q5, Q28; SS, Al-b)

1297-Q. Damping Characteristics of Pipes Vibrating in Flexure and Filled With Various Materials. Ahmed Ezzat. Experimental Mechanics, v. 1, July 1961, p. 10-15.

Measurement of vibration parameters of oscillating Al alloy pipes with magnetic pickup coil to determine effect of kinematic viscosity of filler fluid and solid filler particle size on damping co-efficient, resonant frequency and equivalent spring constant. (Q8; Al-b, 4-60)

1298-Q. Structural Testing at High Temperature. Louis Young. Experimental Mechanics, v. 1, July 1961, p. 16-22.

Testing a large multicell box beam of 420 stainless steel unfilled and filled with a 2% solution of carboxy-methylcellulose at temperatures between 80-230° F. to determine effect of transient heating and applied load on stress distribution and heating rate. (Q25p, 2-61, 3-68; ST)

1299-Q. Crack Propagation. W. MacFarlane. Paper from "West of Scotland Iron and Steel Institute, Journal", v. 67, 1959-1960, p. 61-85.

Rates of crack propagation obtained during fatigue tests on mild steel are measured by two different methods and results compared with existing theories and correlated with structural changes observed by electron and light microscope techniques. 21 ref. (Q26q, Q7, 3-71, M21; CN)

1300-Q. Fracture of Notched Bar Tension Specimen. Kazuo Terazawa, Midori Otani, Toshio Yoshida and Kiyoshi Terai. Tenth Japan National Congress for Applied Mechanics, Proceedings, Mar. 1961, p. 131-140.

Investigation of the characteristics of fracture stress of a mild steel bar with the notch shape changed in series by varying the notch radius, minimum diameter of notched section and notch angle while the diameter of the specimen is kept constant. Examination of crack initiation and rim effect. 13 ref. (Q27d, Q26q, 3-73; CN)

1301-Q. Eddy Currents Tried for New Roles. Steel, v. 149, July 17, 1961, p. 118-120.

Applications of nondestructive eddy current testing to measurement of core and case hardness in ferrous automobile engine components and of tensile strength and conductivity of Al

aircraft components. (Q-general, P-general, 1-54, 1-69; Fe-b, Al-b)

1302-Q. (German.) Amplitude-Dependent Damping of Steel--Its Causes and Correlations to Brittle Fracture Susceptibility. Gunter Muller-Vogt. Archiv fur das Eisenhuttenwesen, v. 32, May 1961, p. 323-330.

Investigation by free torsion oscillation of damping in 5 and 7 mm. thick specimens of unalloyed and low-alloyed steels (0.04-0.69% C), at frequencies from 25-400 oscillations per sec. and at temperatures from -8 to 40° C. (Q8, Q26, 2-61, 3-68; ST)

1303-Q. (German.) A New Method for the Evaluation of Yielding Curves of Steel at Room Temperature. Markus Reihle. Archiv fur das Eisenhuttenwesen, v. 32, May 1961, p. 331-334.

Theoretical derivation and tensile test verification of a method for evaluation of yielding curves of unalloyed and low-alloyed steels from tensile test data. (Q27, Q23b, 2-61; ST)

1304-Q. (Russian.) Effect of Small Hydrogen Contents on the Mechanical Properties of Titanium Alloys. E. V. Petunina and V. L. Poplavskaya. Metallovedenie i Termicheskaya Obrabotka Metallov, Apr. 1961, p. 25-27.

Sheet of sintered IMP 1A Ti with 0.004% H and sintered IMP 7 Ti alloy containing 0.01% H are tensile and impact tested to compare their tensile and yield strengths and the values for elongation, reduction of area and impact strength. Effect of sheet thickness on mechanical properties. 4 ref. (Q27, Q23, Q7, 2-60, 3-73; Ti-b, H)

1305-Q. (Russian.) Microstructure and Mechanical Properties of Titanium Alloys. L. S. Golubev and R. P. Shchegoleva. Metallovedenie i Termicheskaya Obrabotka Metallov, Apr. 1961, p. 28-30.

Mechanical testing of alloys containing 3% Fe, 0-3% Mn, 3-5% Cr and 0-3% Al in the forged state after holding from 700-800° C. for 1 hr. or from 400-600° C. for 100 hr. Change of hardness during artificial aging from 200-500° C. after water quenching from 900° C. 6 ref. (Q-general, 2-64, 2-65; Ti-b, Fe, Mn, Cr, Al)

1306-Q. (Russian.) Mechanical and Technological Properties of Ternary Titanium Alloys. L. P. Luzhnikov and V. M. Novikova. Metallovedenie i Termicheskaya Obrabotka Metallov, Apr. 1961, p. 31-35.

Ternary alloys of Ti with Sn, Zr, Cr, V, Mo, Al and Mn are tension tested, bend and cupping tested at room temperature and tension tested from 350 and 400° C. Tensile strength, elongation, bend strength and deep drawing properties as functions of composition and temperature. (Q-general, 2-60, 2-61, M24c; Ti-b)

1307-Q. (Russian.) Relaxation of Quenched Steel. S. S. Shurakov. Metallovedenie i Termicheskaya Obrabotka Metallov, Apr. 1961, p. 36-39.

Quenching of 12Kh2N4A steel at 1150° C. Determination of tensile strength, torsional strength, modulus of elasticity and relaxation behavior after natural aging for 15 min. to 10 days. 9 ref. (Q3, Q-general, 2-65; ST)

1308-Q. (Russian.) Changes in Strength and Structure Caused by Cycling. V. A. Parfenov. Metallovedenie i Termicheskaya Obrabotka Metallov, Apr. 1961, p. 40-44.

The alloys AD1, D16, M3, L62, BrOF, EI602 and EI437B are exposed to cyclic bending or tension from 20-850° C. to study the effect of cycling on tensile strength and crystal structure as tested by X-ray diffraction. (Q27, M26, Q5; ST, Cu-b)

1309-Q. (Russian.) Residual Stress Developing in the Case Hardening of Steel. G. K. Shreiber and A. Kan. Metallovedenie i Termicheskaya Obrabotka Metallov, Apr. 1961, p. 44-49.

Computation of the stress present in a cylindrical sample having a heated surface. Temperature distribution over the cross section. Tangential stress as a function of hardening depth. 8 ref. (Q25h, J28; ST)

1310-Q. Japan Expands Use of High-Strength Cast Irons. Tohru Taki. Foundry, v. 89, Aug. 1961, p. 115.

Chemical compositions, melting points, specific weights, tensile strength, hardness and elongation of titanium cast iron with eutectic graphite structure, Fe alloys containing Ca, irons treated with alloys containing Ca and irons treated with calcium silicide and fluorides of rare earth metals. (Q-general, P12n, P10a; CI, Ti, Ca)

1311-Q. Rhodium-Platinum Alloys. Pt. 2. A. S. Darling. Platinum Metals Review, v. 5, July 1961, p. 97-100.

Creep properties, workability, corrosion and oxidation resistance and applications in industry. 54 ref. (Q3, Q23q, R-general, R1h; Pt-b, Rh, 17-57)

1312-Q. (Czech.) Fracture Criteria of Cast Steels. Karel Stransky. Slevarenstvi, v. 9, May 1961, p. 164-168.

Tensile testing of cast carbon steel containing approx. 0.15-0.45% C and low-alloy steel with up to 1.08% Ni. Samples are cast, homogenization annealed and stress relief annealed from 660-750° C. for 10 hr. with subsequent air or oven cooling. Effects of composition, relief annealing temperatures and cooling methods on fracture, deformation work, plasticity and the development of flaws. 10 ref. (Q26r, Q24, Q27, 2-60, 2-64, 3-68; ST, 5)

1313-Q. (Russian.) Use of Radioactive Tracers in the Investigation of Drawing Die Wear. P. F. Groshev. Tsvetnye Metally, Mar. 1961, p. 71-75.

Cu wire is drawn through a radioactive drawing die to study the distribution of wear products on the wire surface and within the lubricant. Drawing die wear is determined as a function of drawing speed. 4 ref. (Q9, W24n, 1-59)

1314-Q. (Czech.) Effect of Vanadium and Titanium on the Properties of Steel Used for High-Strength Tubing. Roman Sejnoha. Hutnicke Listy, v. 16, May 1961, p. 351-355.

Mechanical properties of 20 MnSiCrMoTi and 20 MnSiCrMoV steels of Ti and V contents and tempering from 300-600° C. 16 ref. (Q-general, 2-60, 2-64; AY, Ti, V)

1315-Q. (Czech.) Effect of H on Properties of Heavier Cr-Ni-Mo Steel Castings. Ivan Zlatnik. Hutnicke Listy, v. 16, May 1961, p. 325-335.

Development of flaws, microstructure, tensile strength, elongation, reduction of area and fracture as functions of ingot weight, cross section of forgings heat treatment and hydrogen content. 41 ref. (Q-general, Q26, 2-60, 2-64; AY, H, 5, 9)

1316-Q. (German.) Cobalt Alloyed Materials for Gas Turbine Construction. Hans R. Kautz and Horst Gerlach. MTZ (Motortechnische Zeitschrift), v. 22, Apr. 1961, p. 134-139.

Investigation of creep and resistance to thermal shock of forged and precision investment cast alloys containing 10-55% Co. Evaluation of material requirements for application in gas turbine parts including scale and corrosion resistance and rupture behavior. (Q3, Q10a, R-general, 2-60, W11m; Co-b, 17-57)

1317-Q. A Bifurcation Phenomenon of Static Friction. F. F. Ling and R. S. Weiner. American Society of Mechanical Engineers, Transactions (Journal of Applied Mechanics), paper no. 61-APM-7, 1961, 5 p.

Measurements of electrical contact resistance, actual contact area, static friction, adhesion and pure shear for Pb on Pb. The data exhibit a statistical bifurcation of friction below extreme pressures, there are two branches of the co-efficient of friction versus normal load relationship. (Q9p; Pb)

1318-Q. Metallic Contact and Friction Between Sliding Surfaces. M. J. Furey. ASLE (American Society of Lubrication Engineers) Transactions, v. 4, Apr. 1961, p. 1-11.

Electrical resistance measurements in the surfaces of a fixed ball rotated against a cylinder, both of 52100 steel, using mineral oil as a lubricant. Metallic contact, friction and surface damage are determined as functions of speed, time, load and lubricant viscosity and composition. 14 ref. (Q9p, P15g, 1-54, 3-67, 18-73; ST)

1319-Q. Development of Iron-Base Seal Materials for High Temperature Applications. Robert J. MacDonald. ASLE (American Society of Lubrication Engineers) Transactions, v. 4, Apr. 1961, p. 12-19.

Rotative rubbing tests on powder metallurgy produced M-10, H-41, M-2 and M-36 toolsteels and Fe-base alloys containing Mo(5-20%) and Co(0-20%) for 5 hr. under 18 psi. load. Friction coefficient and wear are measured as functions of rubbing velocity (16-150 fps.), temperature (68-1200° F.) and atmosphere (air or nitrogen) to determine applicability in rubbing seals.

6 ref. (Q9, 2-62, 3-67; Fe-b, TS, Mo, Co, 6-72, 17-57)

1320-Q. The Performance of Ball Bearings in Nitrogen and Carbon Dioxide at Elevated Temperatures. K. G. Eickhoff and A. White. ASLE (American Society of Lubrication Engineers) Transactions, v. 4, Apr. 1961, p. 39-49.

Bearings of 52100 steel and 440 C stainless steel are tested in nitrogen from 200-250° C. and in carbon dioxide from 325-375° C. at a speed of 100 rpm. Life and wear are determined as functions of thrust load, temperature, atmosphere and lubrication with solid MoS_2. (Q9, T7d, 2-61, 17-52; ST, 17-57)

1321-Q. Evaluation of Ball Bearing Separator Materials Operating Submerged in Liquid Nitrogen. W. A. Wilson, K. B. Martin, J. A. Brennan and B. W. Birmingham. ASLE (American Society of Lubrication Engineers) Transactions, v. 4, Apr. 1961, p. 50-58.

Stainless steel ball bearings with separators, of either metal, phenolic or filled polytetrafluoroethylene are tested under a thrust load of 144 lb. and a speed of 350 rpm. at cryogenic temperatures. Bearing life, wear and torque are measured as functions of separator composition and configuration. 4 ref. (Q9, T7d, 2-63, 17-52; SS, SGA-c, 17-57)

1322-Q. A New Way to Specify Strength of Metal-Powder Parts. R. Talmage and H. L. Kee. Product Engineering, v. 32, July 31, 1961, p. 44.

Use of the hardness-tensile strength correlation in sintered metal powders and in wrought or cast metals as an index to their strength and quality. Brinell hardness-ultimate tensile strength relationship for steels, brasses, bronze, Al alloys and other alloys. (Q27a, Q29n, S22; ST, Cu-n, Cu-s, Al-b)

1323-Q. (German.) Measurement of Internal Stresses in Steel by X-Rays. Jaakko Salokangas. Materialprufung, v. 3, June 1961, p. 225-227.

X-ray measurement (swivelling technique, Cr radiation, 45° angle of incidence) of residual stresses in bending-stressed steel sheet specimens (0.12% C). Application of method to examination of a failed crusher shaft to determine cause of failure. 10 ref. (Q25, S13e; ST)

1324-Q. Grease Lubrication Studies With Plain Journal Bearings. L. J. Bradford, E. M. Barber and J. R. Muenger. Journal of Basic Engineering (ASME Transactions), Series D, v. 83, June 1961, p. 153-161.

Determination of the rheodynamic lubricating behavior of grease and oil based films on cast bronze plain journal bearings (Cu, Pb, Sn, -80:10:10) from 85-130° F.) Effects of variation of load, speed, clearance, feed rate and viscosity upon co-efficient of friction. 11 ref. (Q9p, 18-73, T7d; Cu-s, 17-57)

1325-Q. The Volume of Stressed Material Involved in the Rolling of a Ball. R. C. Drutowski. Journal of Basic Engineering (ASME Transactions), Series D, v. 83, June 1961, p. 162-168.

The threshold contact stress, the constant of proportionality between rolling force and stressed volume and the contact stress at which plastic deformation is initiated determined for 1020 and 52100 steel balls of different diameters on a flat plate. 4 ref. (Q25, Q24, T7d, 3-73; ST, 17-57)

1326-Q. Theory of Lubrication and Failure of Rolling Contacts. B. Sternlight, P. Lewis and P. Flynn. Journal of Basic Engineering (ASME Transactions), Series D, June 1961, p. 213-226.

The influence of fluid lubricants on the rolling contact fatigue life of 202 steel ball bearings, cylinders and disks is determined from 20-135° F. using compounded oils. Dynamic stress in two contacting cylindrical bodies are measured by photoelastic techniques. The pressure and temperature distribution within the contact zone of rolling disks are analyzed with a hypothesis given for the failure mechanism. 29 ref. (Q7, T7d, 2-60, 18-73; ST, 17-52, 17-57)

1327-Q. Experimental Investigation of Corners in the Yield Surface. Aris Phillips and G. A. Gray. Journal of Basic Engineering (ASME Transactions), Series D, v. 83, June 1961, p. 275-288.

Thin-walled tubes of annealed commerically pure Al (2S-O) are tested with various combinations of axial tension and torsion along nonradial paths of loading with measurement of the change

in the yield surface during loading and determination of the existence of pointed vertices. 20 ref. (Q24c, 3-66; Al-a)

1328-Q. The Influence of Elevated Temperature on the Strength of Expanded Tube Joints. Journal of Basic Engineering (ASME Transactions), Series D, v. 83, June 1961, p. 315-316.

Specimen tubes of 16-gage 1020 and mild steel are swaged into disks (4 in.) of similar material. Joints produced are tested at 1000° F. for several hours with determination of the leak resistance, joint shear strength and the residual elastic stress as a function of temperature and pressure. 5 ref. (Q-general, 2-62; ST, 4-61, 7-56)

1329-Q. New Copper-Zirconium Alloy Can Improve Resistance Welding. Harold Kruitbosch. Welding Design & Fabrication, v. 34, July 1961, p. 60-61.

Physical and mechanical properties of Electroloy Z, containing a maximum of 0.15% Zr alloyed with 99.9% pure Cu for use in resistance welding electrodes. (Q-general, P-general, W29h; Cu-b, Zr, 17-57)

1330-Q. (French.) How to Guarantee Nonbrittleness of Structural Steel Grades Within the Framework of a Specification. E. de Kerversau. Revue de Metallurgie, v. 58, May 1961, p. 393-400.

Test based on the transition temperature which is related to a minimum level of roughness which is low enough to be within the brittleness range but, at the same time, sufficiently high to remain significant. 12 ref. (Q23; ST)

1331-Q. (French.) A Machine for the Study of Isothermal Relaxation. E. Pouillard. Revue de Metallurgie, v. 58, May 1961, p. 407-415.

Special equipment for relaxation tests at room and elevated temperatures; use of machine for the study of the relaxation of Cr-Mo-V steel rod for prestressed concrete. (Q3a, 1-52; AY)

1332-Q. (Swedish.) Comparison Between Results Obtained With Standard V-Notch Impact Test Specimens and Miniature Test Specimens. G. Malmberg. Jernkontorets Annaler, v. 145, Apr. 1961, p. 183-204.

No clear indication is found of any difference in standard deviation between the converted impact values obtained with test specimens of three different sizes. As the type of material greatly influences the numerical values of the conversion factor and of the transition range displacement of the comparative curves, it is necessary to determine these quantities for each grade of steel to be tested. (Q6, Q23s, 3-73; ST)

1333-Q. Plastic Stress-Strain Relationships--Further Experiments on the Effect of Loading History. J. Parker and J. Kettlewell. American Society of Mechanical Engineers, Paper no. 61-APM-24, 1961, 8 p.

Tests are conducted on thin closed-end alpha brass tubes subjected to various combinations of torque and internal pressure. Effect of loading, unloading and reloading along different paths. 7 ref. (Q25n, 3-74; Cu-n, 4-60)

1334-Q. Exhaustion of Ductility by Hot Straining--An Explanation of Fracture Initiation Close to Welds. C. Mylonas and K. C. Rockey. Welding Journal, v. 40, July 1961, p. 306s-310s.

Plastic compression or extension at 400-600° F. greatly reduce the subsequent ductility of mild steel bars when subjected to tension at 75 and -16° F. This exhaustion of cold ductility by hot extension occurs during cooling of welded plates and provides explanation of brittle fracture close to welds. 24 ref. (Q23p, Q26s, 2-61, 3-68; CN, 7-51)

1335-Q. Transition Temperature From Test Bars Using a Strain Aged Initiation Site. Claes Pfeiffer. Welding Journal, v. 40, July 1961, p. 311s-314s.

Strain aged zones are used as the initiation point for brittle fracture in test bars in drop-weight and notched tensile tests from -110 to 0° F. Comparison is made with techniques using test bars with brittle weld metal as the initiation site. Results of impact tests on A203, A285, A302, A212 and SIS 14 14-11 steels. 5 ref. (Q23r, Q6, Q27d, N7e, 2-61, 2-64; AY)

1336-Q. Effect of an Irregular Notch on Subsize Impact Data. A. L. Lowe, Jr. Welding Journal, v. 40, July 1961, p. 315s-316s.

Two series of subsize Izod impact specimens are tested to determine the

correlation of V-flat root notch and V-round root notch impact data for a 1.25% Cr and 0.5% Mo steel. Impact properties are evaluated in terms of energy absorption, lateral expansion, fracture appearance and effect of notch geometry on transition temperature. (Q6, Q23s, Q23r, 3-73; AY)

1337-Q. (Russian.) Physical Equations on the Mechanics of a Body Under Deformation in the Theory of Mechanical Treatment of Metals by Pressure. I. Ya. Tarnovskii, A. A. Pozdeev and L. V. Meandrov. Izvestiya VUZ--Chernaya Metallurgiya, Apr. 1961, p. 67-78.

Development of equations for theoretical investigation of the state of a metal body when subjected to mechanical treatment at different speeds and degrees of deformation and different temperatures with consideration of mechanical properties of the metal, plasticity and viscosity limit. 9 ref. (Q24, 2-61, 3-67, Q-general, 10-51)

1338-Q. (Russian.) Possibility of Replacing Thermal Strengthening of KH17N7YU Steel by Mechanical Strengthening. V. I. Zaitsev and A. G. Yakhontov. Izvestiya VUZ--Chernaya Metallurgiya, Apr. 1961, p. 93-96.

Required combinations of strength and plasticity as obtained by a mechanical strengthening method through varying the degree of deformation and annealing temperature. (Q27a, Q23p, 2-64, 3-68; ST)

1339-Q. (Russian.) Influence of Quenching Method on Mechanical Properties of Special Shaped Profile Strips From 4S and SKHL-4 Steels. E. S. Tovpenets, V. T. Piskun and A. R. Katenberg. Izvestiya VUZ--Chernaya Metallurgiya, Apr. 1961, p. 114-118.

Effect of heat treatment and quenching in air, water and chemical solutions at different temperatures and time periods on mechanical properties of rolled low-carbon steel and NL1, SKHL-1, SKHL-4 and 14KHGS low-alloy steels and other steels. (Q-general, 2-64; ST, 4-53)

1340-Q. (Russian.) Mechanical Properties of High-Speed Toolsteel Containing a High Percentage of Tungsten, Cobalt and Vanadium. A. N. Popandopulo. Izvestiya VUZ--Chernaya Metallurgiya, Apr. 1961, p. 119-125.

Effect of various heat treatments at different temperatures and cooling methods on mechanical properties of R18F4K8M toolsteel. 10 ref. (Q-general, 2-60, 2-64; TS, W, Co, V)

1341-Q. (Russian.) Calculation of Tension and Fatigue Curve Changes. V. M. Grebenik. Izvestiya VUZ--Chernaya Metallurgiya, Apr. 1961, p. 167-176.

Effect of changing tension on strength and durability of different steels as dependent on chemical composition, heat treatment, number of load cycles and nature of loads. 17 ref. (Q27a, Q7a, 2-60, 2-64, 3-68; ST)

1342-Q. Application of High Strength Aluminum Castings. M. L. Slawsky and F. A. Heiser. Watervliet Arsenal (Wright Air Development Division). U. S. Office of Technical Services, PB 171564, Octo. 1959. $.75.

Al castings with improved strength and ductility can be produced by careful control of foundry variables, particularly Fe contamination, process variations and specialized heat treatment. (Q23p, Q-general, 2-60, 2-64; Al-b, 5, 17-57)

1343-Q. Residual Stresses in Circular Tubes Having a History of Pressure-Induced Plastic Deformation. R. E. Weigle and M. J. Pascual. Watervliet Arsenal, U. S. Office of Technical Services, PB 171357, Dec. 1960, 12 p. $.50.

Results indicate that in the application of the autofrettage process to the fabrication of high-strength steel gun tubes it may be possible to obtain a satisfactory residual stress level without causing complete plasticity in the tube. The magnitude of the residual tangential stresses is a function of the degree of plasticity induced in the tube. (Q25, Q23, 3-68, T2m; AY, SGB-a, 17-57)

1344-Q. Preliminary Observation on the Effectiveness of Heat Treatment for the Recovery of Properties of Irradiated Steels. J. R. Hawthorne and L. E. Steele. Naval Research Laboratory. U. S. Office of Technical Services, PB 171188, Feb. 1961, 16 p. $.50.

Construction steel deteriorated by use in working nuclear reactor regains at least 50% of its notch-ductility properties when post irradiation treatments are applied. While heat treatment of A212B, A302B and A201 plate and SA 336 forging ring material that were irradiated at less than 200° F. and at 575° F. prove effective, the effectiveness of particular heat treatments are strongly dependent upon irradiation temperatures. (Q23s, Q22n, Q-general, 2-61, 2-64, 2-67; ST)

1345-Q. Radiation Effects Upon and the Recovery of the Mechanical Properties of Metals. E. N. Aqua and R. J. Allio. General Electric Company. U. S. Office of Technical Services, KAPL-2103, Oct. 1960, 33 p. $1.

Irradiation-produced mechanical property change and recovery in various metals including Mo, steel, Ni and Ti. Irradiation damage rate is a function of the type of radiation, flux, total dose and exposure temperature and is dependent on the prior history and composition of the specimen. Mechanical property damage is a two-stage process comprising dislocation source hardening and lattice hardening. The mechanism of recovery consists of the migration of poly-vacancies to clustered interstitials, or the dissipation of vacancy clusters. (Q-general, N3, 2-64, 2-67; ST, Mo, Ni, Ti)

1346-Q. The Dynamic Compressibility of Solids From Single Experiments Using Light Reflection Techniques. N. L. Coleburn. Naval Ordnance Laboratory. U. S. Office of Technical Services, PB 171686, Oct. 1960, 35 p. $1.

Study of the dynamic compressibility of solids has resulted in the development of a method to gage in a single experiment the dynamic compressibility of a solid over a relatively large pressure range. The method uses a rotating mirror smear camera to observe the behavior of the free surface of a wedge of the test material shortly after the opposite wedge surface has been struck by a plane, explosive-driven shock wave. (Q28, 1-53)

1347-Q. Elastic and Plastic Stress Equations for Hollow Cylinders and Spheres Subjected to Internal and External Pressure. V. C. D. Dawson. Naval Ordnance Laboratory. U. S. Office of Technical Services, PB 171684, Feb. 1960, 41 p. $1.25.

A study of various strength theories and methods of obtaining high-strength chambers for hypervelocity launchers developed a set of equations for the design of cylindrical and spherical high-pressure vessels. Where strength requirements are not severe, the elastic equations, together with the distortion energy theory of failure, are used. (Q25, 3-74)

1348-Q. Pressure-Differential Testing of Tubing. G. H. Symons. Materials Research & Standards, v. 1, July 1961, p. 539-541.

Determination of the soundness of a vessel by its ability to maintain a given air pressure. Two units are charged with identical air pressure, isolated from the air supply and from each other and interconnected through a U-tube manometer. Subsequently, the manometer is observed to determine whether or not a pressure differential exists between the units. (Q10; 4-60)

1349-Q. Testing Carboloy--Some Early Experiences. S. L. Hoyt. Materials Research & Standards, v. 1, July 1961, p. 546-548.

Development of hardness and strength testing techniques and metallographic examination. (Q29, Q27, M-general; W-b, C, 6-70)

1350-Q. Internal Friction in Lightly Deformed Pure Iron Wires. J. D. Fast and M. B. Verrijp. Philips Research Reports, v. 16, Feb. 1961, p. 51-65.

Internal friction of pure (99.99%) Fe wires is measured before and after subjecting them to small plastic deformation. Damping after deformation is found to be dependent on amplitude, temperature of deformation and temperature of measurement. (Q22, Q8, 3-68, 2-61; Fe, 4-61)

1351-Q. Review of Recent Developments in the Evaluation of Special Metal Properties. J. E. Campbell. Defense Metals Information Center, Batelle Memorial Institute, DMIC Memo. 112, June 27, 1961, 10 p.

Effect of cold reduction and notching on low temperature (-423° F.) tensile strength of sheet 2014-T6,

6061-T6 and 5456-H24 Al alloys, Inconel X, AISI 301 and 310 stainless steels and Ti-5Al-2.5 Sn alloy. Hydrostatic and tensile testing of H-11, MBMC no. 1, AISI 4140 and AMS 6434 steels at high temperatures. 6 ref. (Q27d, Q10b, 2-61, 3-68, 10-54; ST, Al-b, Ni-b, 4-53)

1352-Q. The Manufacture and Uses of Austenitic Manganese Steels. C. Elliott. Edgar Allen News, v. 40, June 1961, p. 127-129.

Structural and mechanical properties of Hadfield steel produced in basic electric arc furnace or duplexing system. Applications of cast, roller or forged products based on work-hardening properties developed by heat treatment. (Q-general, Q23a, 2-60, 2-64; ST-f, Mn)

1353-Q. (French.) The Process of Fatigue Ruptures in Service Conditions From Analysis of Fractures. Henri de Leiris. Revue de Metallurgie, v. 58, Apr. 1961, p. 303-313.

Structural analysis of fractures occurring in diesel motors, cylinders, pistons and alternator rotors during service. Fatigue ruptures and fractures are studied by electron micrography and nondestructive metallography. 7 ref. (Q26, Q7k, M21e, W11j)

1354-Q. (French.) Influence of the Cross Section and the Degree of Quenching on the Mechanical Properties of Heat Treated Bars. C. Simonin and A. Rabey. Revue de Metallurgie, v. 58, Apr. 1961, p. 315-320.

Comparison of the quenching characteristics of steel bars of different diameters after heating from 525-670° C. Steel alloys studied are 25CD4, 35CD4, 42CD4, 30NC11, 35NC6 and 30NCD 8 with diameters of 30, 50, 80 and 120 mm. Effect of tensile stress and bar diameter on mechanical properties. 10 ref. (Q-general, 2-64, 3-66, 3-73; AY, 4-55)

1355-Q. How Are We to Get More From Our Steels? G. O. H. Sjogren. Metallurgia, v. 63, May 1961, p. 217-220.

Reduction of sensitivity to stress raisers of strong, high-hardness steels by high surface compressive stresses developed by induction hardening. 13 ref. (Q25, 2-64; ST)

1356-Q. The Effect of Plastic Deformation and Strain Ageing on the Transition Temperature of Mild Steel. T. R. G. Williams and D. H. Hughes. Metallurgia, v. 63, May 1961, p. 233-237.

Plastic deformation of normalized mild steel lowers the transition temperature while strain aging raises it. The two effects do not cancel. 8 ref. (Q23r, Q24, N7e; CN)

1357-Q. Work-Hardening of Hexagonal Close-Packed Crystals and in the Easy Glide Region of Face-Centered Cubic Crystals. A. Seeger, H. Kronmuller, S. Mader and H. Trauble. Philosophical Magazine, v. 6, May 1961, p. 639-655.

Review of data for workhardening curves, slip-line observations and ferromagnetic measurements for metals and alloys deformed at 90-293° C., with particular reference to Cu, Cd, Zn, Ni and an Ni-Co alloy, with interpretation in terms of dislocation theory and interactions in stress fields. 23 ref. (Q23a, M26b, 2-61, 3-66, 3-68; Cu, Cd, Zn, Ni-b, Co)

1358-Q. Instrumentation for High-Speed Strain Measurement. J. M. Krafft. Paper from "Response of Metals to High Velocity Deformation". v. 9. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 9-49.

Relationship of the distribution of plastic strain in a dynamically tested specimen with the slope of the nominal stress-strain curve and estimation in terms of plastic bar wave velocities and influence of adiabatic heating strain rate. Basic requirements for and the characteristics of gas-pressurized and impact loader high-speed testing machines. Use of bonded wire strain gages to record distortion of weigh bar. (Q24, Q25, X28j, X29q, 3-67)

1359-Q. Effect of Grain Size, Rate of Strain and Neutron Irradiation on the Tensile Strength of Alpha-Iron. J. D. Campbell and J. Harding. Paper from "Response of Metals to High Velocity Deformation". v. 9. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 57-76.

Review of previous investigations and explanation of results in terms of dislocation theory. Impact apparatus

for tensile testing at strain rates in the order of 10^3 per sec. is used to obtain dynamic stress-strain curves for specimens of pure Fe and 0.21% carbon steel in both unirradiated conditions and after different doses of neutron irradiation. Data are given for effects of grain size and strain rate on lower yield stress, brittle behavior elongation to fracture. 20 ref. (Q27, Q23r, 2-59, 2-67, 3-67, 3-68; Fe-a)

1360-Q. Dynamic Stress and Deformation in a Mild Steel at Normal and Low Temperatures. D. B. C. Taylor and L. E. Malvern. Paper from "Response of Metals to High Velocity Deformation". v. 9. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 77-91.

Effects of dynamic rates of strain up to 5% per sec. combined with temperatures down to -70° C. on the lower yield stress and amplitude of nonuniform plastic strain of normalized mild steel containing 0.19% carbon. Data are given for tensile properties. 6 ref. (Q23b, Q24h, 2-61, 3-67, 3-68)

1361-Q. Strain Rate Effects in Plastic Wave Propagation. F. E. Hauser, J. A. Simmons and J. E. Dorn. Paper from "Response of Metals to High Velocity Deformation". v. 9. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 93-114.

Stress-strain-strain rate relations in high purity Al determined at 78-295° K. for strain rates of 2-12,000 per sec. Comparison between elastic plastic and strain rate theories and explanation of strain rate effects in terms of dislocation theory. 18 ref. (Q24j, Q25n, M26b, 2-61, 3-67, 3-68; Al-a)

1362-Q. Effects of Explosive Loading on Single Crystals and Polycrystalline Aggregates. C. M. Glass, Gerald L. Moss and Stanley K. Golaski. Paper from "Response of Metals to High Velocity Deformation". v. 9. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 115-143.

Flow, fracture and structural changes developed in explosively loaded Cu and Al single crystals and polycrystalline Cu, Al and 1020 steel specimens. Analysis of time intervals within which microscopically observable structures develop; strain markings produced by explosive loading; and nature of fracture due to added stress waves. 7 ref. (Q24, Q25m, Q26, 3-67, 3-68; Cu, Al, ST)

1363-Q. Crystallographic Aspects of High Velocity Deformation of Aluminum Single Crystals. R. B. Pond and C. M. Glass. Paper from "Response of Metals to High Velocity Deformation". v. 9. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 145-161.

Single crystal specimens of Al are extended in tension at strain rates varying from 36-2000 ips. and examined by optical and X-ray techniques. Probable existence of a von Karman critical velocity is deduced from data using velocity versus elongation technique. Orientation relations of deformation are considered as a function of velocity. 8 ref. (Q24, M26c, 3-67, 3-68; Al-b)

1364-Q. Some Properties and Applications of Shock Waves. George E. Duvall. Paper from "Response of Metals to High Velocity Deformation". v. 9. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 165-203.

Detonations and the shock waves they produce in inert materials are described qualitatively. Equations of the shock transition are applied in an example to obtain the amplitudes of shocks produced in several solids. Methods for measuring the equations of state of solids with shock waves. Reflection of a shock wave at a free surface. Plastic yield and phase transitions are shown to produce multiple shocks in solids. (Q24j, Q6p, 3-67, 3-68)

1365-Q. Dynamic Response of Iron and Iron Alloys to Shock Waves. F. Stanley Minshall. Paper from "Response of Metals to High Velocity Deformation". v. 9. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 249-274.

Pressures and profiles of shock waves produced by the detonation of an explosive are related to the dynamic properties of Armco iron and 1020,

1040, 1055, 4340 and 347 steels. Effects of annealing, cold rolling and carbon content. (Q6p, Q24j, 2-60, 2-64, 3-67, 3-68; Fe-b, ST)

1366-Q. A Metallurgical Method for Simplifying the Determination of Hugoniot Curves for Iron Alloys in the Two-Wave Region. C. M. Fowler, F. Stanley Minshall and E. G. Zukas. Paper from "Response of Metals to High Velocity Deformation". v. 9. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 275-308.

Equation of state data for Fe alloyed with Ni and Cr given. Metallurgical examination of recovered specimens subjected to shock pressures is used for determination of Hugoniot curve in the two wave regions of these alloys with an error analysis being presented. 6 ref. (Q24j, 3-67, 3-68; Fe-b, Ni, Cr)

1367-Q. Metallographic Studies on Metals After Explosive Shock. Cyril Stanley Smith and C. M. Fowler. Paper from "Response of Metals to High Velocity Deformation". v. 9. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 309-341.

Investigation of position of interaction between first shock rarefaction and second shock in Fe; influence of orientation on deformation markings in single crystals of Cu after plane shock and local shock behavior around notches; and propagation of shock in duplex sample of Fe and Cu as indicated by position of shock interaction zone and local shock direction. (Q24c, Q24, M-general, 3-67, 3-68, 3-72; Cu-b, Fe)

1368-Q. Behavior of Iron and Steel Under Impulsive Loading. E. G. Zukas and C. M. Fowler. Paper from "Response of Metals to High Velocity Deformation". v. 9. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 343-369.

Twinning behavior of Fe under plain shock wave loading at pressures to 750 kbars. Effect of prestraining by rolling or pressing; influence of quenching or quenching and tempering treatments on behavior of shock loaded carbon steel containing 0.25-1% carbon; and effects of heat treatment on position of plastic I rarefaction--plastic II compression interaction boundaries. 12 ref. (Q24, 2-60, 2-64, 3-67, 3-68; Fe-b, ST)

1369-Q. Fracture of Solids Under Impulsive Loading Conditions. J. L. O'Brien and R. S. Davis. Paper from "Response of Metals to High Velocity Deformation". v. 9. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 371-388.

Scabbing phenomenon associated with the reflection of a compression stress wave from a free surface is discussed in terms of previous investigations and results obtained using a multiple pellet technique to determine the pressure profile of incident compression shock. Analysis of stress for fracture of single crystal and polycrystalline Al, 2024 Al alloys and Armco iron specimens and of errors introduced by various techniques used to measure shock profiles. 11 ref. (Q24j, Q26, Q28k, 3-67, 3-68; Al-b, Fe-a)

1370-Q. Observations on Explosively Loaded Iron and Mild Steel. H. P. Tardif, F. Claisse and P. H. Chollet. Paper from "Response of Metals to High Velocity Deformation". v. 9. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 389-407.

Deformation markings in single crystals of Fe subjected to explosive loading are found to follow conventional crystallographic law of twinning and are suggested to be mechanical twins, the number of twins decreasing proportionately to hardness. Numerous mechanical twins are found to propagate undeviated from ferrite grains into adjacent pearlite colonies in medium carbon steel indicating an orientation relationship between the pro-eutectoid ferrite and pearlite ferrite. 13 ref. (Q24b, Q24c, Q24m, 2-60, 3-67, 3-68, 3-72; Fe, CN)

1371-Q. Metallurgical Effects of High-Intensity Shock Waves in Metals. G. E. Dieter. Paper from "Response of Metals to High Velocity Deformation". v. 9. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 409-445.

Changes in microstructure, microhardness and tensile properties produced by high intensity shock waves of explosive origin are studied for bcc. metals including Fe, Cb, Ta, 0.17%

carbon mild steel and Fe-3% Si alloys, and for fcc. Ni. Analysis of hardening of Fe due to pressure induced polymorphic transformation and electron microscopic examination of slip band structure of explosively hardened Ni. 23 ref. (Q24m, Q24j, Q27, M27, 3-67, 3-68, 3-71; Fe-b, Cb, Ta, Ni)

1372-Q. Strengthening of Austenitic Manganese Steel by Plane Shock Waves. A. H. Holtzman and G. R. Cowan. Paper from "Response of Metals to High Velocity Deformation". v. 9. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 447-482.

Changes in the microstructure and mechanical properties of austenitic, manganese steel by the passage of plane compressional shock waves. Strengthening effects are found to be pressure dependent and the strength and hardness increase rapidly with pressure between 70 and 422 kbars. Comparison with cold rolled materials and analysis of strengthening mechanisms. 16 ref. (Q-general, Q24m, Q24j, M27, 3-67, 3-68, 3-74; AY)

1373-Q. (Book.) Response of Metals to High Velocity Deformation. v. 9. Metallurgical Society of AIME. P. G. Shewmon and V. F. Zackay, Editors. 1961. 491 p. Interscience Publishers, Inc., 250 Fifth Ave., New York 1, N. Y.

Proceedings of a technical conference sponsored by the Physical Metallurgy Committee of the Institute of Metals Div. of AIME held at Estes Park, Colo., July 11-12, 1960. Topics include instrumentation for high speed strain measurement, influence of strain rate as a function of time on the stress-strain relationship of various single crystalline and polycrystalline metals, shock wave propagation and the effects of high intensity shock waves on the structure and behavior of metals. Papers are abstracted separately. (Q-general, Q24, Q25, 3-67, 3-68, A-general, 10-54)

1374-Q. Some Aspects of Bending Brittle Materials. Conan H. Spaderna. Experimental Mechanics, v. 1, Aug. 1961, p. 71-72.

Calculation of factors affecting the bending of brittle materials with example for cast iron, including tensile strain, bending strength, rupture modulus, Poisson's ratio, tangential resistance and resistance forces. (Q5, Q-general, 3-68; CI)

1375-Q. Photodot Investigation of Plastic-Strain Pattern in Flat Sheet With a Hole. P. S. Merrill. Experimental Mechanics, v. 1, Aug. 1961, p. 73-80.

Measurement of strain pattern in a flat 24St-3 Al sheet with a central hole, unidirectionally loaded into the plastic region, by the photodot method. Test results are presented with analysis of errors. 9 ref. (Q24h, 1-54; Al-b, 4-53)

1376-Q. (Translation.) Elastic Deformation and Thermal Expansion. R. I. Garber and I. A. Gindin. Soviet Physics--Solid State, v. 3, July 1961, p. 127-128. (Translation of Fizika Tverdogo Tela, v. 3, Jan. 1961, p. 3-310).

The relationship between deformation stress and the thermal expansion coefficient is derived, assuming uni-axial or homogeneous isotropic deformation. Values for the constants appearing in the relation are given for Pd, Ag, Pt, Cu, alpha iron, Ni, W and Co. (Q21, P11g, 3-66, 3-68)

1377-Q. (Translation.) Twins and Dislocations in Silicon Monocrystals. M. G. Mil'vidskii and L. V. Lainer. Soviet Physics--Solid State, v. 3, July 1961, p. 210-214. (Translation of Fizika Tverdogo Tela, v. 3, Jan. 1961, p. 3-310).

The external forms of twins, interactions between twins and dislocations and factors affecting dislocation density in twins investigated for Si single crystals including effects of twin boundaries and slip lines on dislocation movement and of original density and slip system orientation due to thermal twinning on dislocation density. 4 ref. (Q24b, Q24a, M26b; Si, 14-61)

1378-Q. (Russian.) Temperature-Time Dependence of the Strength of Hardened Steel. S. S. Shurakov. Fizika Metallov i Metallovedenie, v. 10, Dec. 1960, p. 886-895.

3Kh13 steel is oil quenched from 1100-1200° C., immersed in liquid nitrogen for 10 min. to 5 hr., tempered at 20-200° C. for 3 hr.; and 30KhN3A steel is case hardened at 910° C. in a solid medium, oil quenched from 800° C. and immersed in liquid nitrogen for 10 min. to determine the effects of testing temperature on creep strength and of tempering temperature on tensile strength and hardness. 31 ref. (Q3, Q27, Q29n, 2-61, 2-64; ST)

1379-Q. (Russian.) Effect of Quenching Temperature on the "Nitrogen Peak" of the Internal Friction of Iron. Yu. V. Piguzov and M. S. Blanter. Fizika Metallov i Metallovedenie, v. 10, Dec. 1960, p. 931-933.

Fe wire containing impurities of 0.009% C, 0.19% S, 0.008% P, 0.06% O and 26-85 x 10^{-4}% N in solid solution are held at 720-1300° C. for 1 hr. and subsequently water quenched. Internal friction measurements are performed at 20-100° C. at a vibratory frequency of 0.8 cps. 11 ref. (Q22, 2-61, 2-64, 3-69; Fe-b, N)

1380-Q. (Russian.) Change of the Mechanical Properties of Nichrome in the K-State. G. V. Starikova and A. A. Presnyakov. Fizika Metallov i Metallovedenie, v. 10, Dec. 1960, p. 943-945.

The effect of tempering at 100-700° C. for 6 hr. and of isothermal heat treatment at 450° C. is determined by tensile tests on Nichrome wire specimens. (Q-general, 2-64; Ni-b)

1381-Q. (Russian.) Fatigue Strength of Welded Beams Manufactured From Six Different Steels. A. A. Bat'. Avtomaticheskaya Svarka, Jan. 1961, p. 13-16.

I-beams are welded from 12 mm. thick sheet of St.3kp, St.3kpT, K St. 3kp, 15KhSND, 14G or 19G steel and tested to determine effects of design on fatigue, tensile, impact and yield strengths and elongation and impact strength. 9 ref. (Q-general, Q7; ST, 7-51)

1382-Q. Variation in the Properties of Galvanized Steel Wire as a Function of the Coating Speed. F. Baldi and A. Pirozzi. Wire Industry, v. 28, July 1961, p. 669, 701.

Mechanical properties of steel wire after galvanizing with heavy Zn coatings. Effect of coating speed and wire diameter on tensile, elongation, reduction in continuous torsion and alternating bend strength. (Q-general; ST, 4-61, 8-65)

1383-Q. Ultrasonic Attenuation in Tin Single Crystals at Low Temperatures. Kazuo Kamigaki. Physical Society of Japan, Journal, v. 16, June 1961, p. 1141-1144.

Ultrasonic attenuation coefficient and velocity in the superconducting and normal states of Sn single crystals are measured at 1.5 and 4.2° K. 12 ref. (Q21f, 2-63; Sn, 14-61)

1384-Q. (Russian.) Plasticity of Several Steels at High Temperatures. V. Ya. Tarnovskii, G. A. Hasin, A. A. Pozdeev and L. V. Meandrov. Izvestiya VUZ--Chernaya Metallurgiya, Dec. 1960, p. 63-69.

Mechanical properties of 18 alloy steels investigated from 800-1250° C. to determine tensile and impact strengths, elongation and contraction in area as influenced by alloy, temperature, strain rate and rolling orientation. (Q-general, Q23, 2-60, 2-62, 3-68, 3-72; AY)

1385-Q. (Russian.) Effect of Temperature and Hot Forging Time on the Properties of Large Steel Ingots. N. P. Braun, B. B. Vinokur, E. I. Mirovskii and A. L. Geller. Izvestiya VUZ--Chernaya Metallurgiya, Dec. 1960, p. 111-113.

Analysis of 55H, 50HM and 35HNM steels forged from 1230-1250° C. to determine yield strength, yield point, reduction in area, elongation and toughness with relation to composition, forging time and temperature and location of test specimen in cross section of sample. 12 ref. (Q-general, F22, 2-60, 2-61, 3-68; ST, 4-51)

1386-Q. (German.) Contribution to Short-Time Creep Strength of Platinum Alloys Between Room Temperature and 1250° C. Pt. 2. G. Reinacher. Metall, v. 15, July 1961, p. 657-665.

Creep testing and microstructural investigation of heat treated wire specimens containing 5-10% Rh or Ir, 4% Pd or 5% Au at 20-1250° C. (Q3, M27, 2-60, 2-61; EG-c31, Pt-b, Ir, Rh, Pd, Au)

1387-Q. (German.) Plastic Deformation of Beryllium. H. Weik. Metall, v. 15, July 1961, p. 686-694.

Crystal structure and plastic deformation mechanism of polycrystalline Be and Be single crystals. Means for improving workability and elimination of crack formation. Study of grain refinement, control of deformation texture and surface quality and methods for cladding and plating. (Q24, Q23q, Q26, L-general, M-general; Be)

1388-Q. Static Friction Between Clean Copper Single Crystal Surfaces. Riitsu

Takagi and Yuko Tsuya. Wear, v. 4, May-June 1961, p. 216-227.

Static friction between two very clean oxide-free Cu single crystal (001) planes is studied by applying a horizontal force in a direction parallel to either (100) or (110) to a sphere placed on the horizontal surface of a fixed cube of the same crystallographic orientation. Cross sections, longitudinal sections and layer sections of the lower crystals are examined with an optical microscope, electron microscope and microhardness tester to find the extent of the occurrence of phenomena such as deformation, adhesion, shearing and internal strain which accompany the friction and to clarify the mechanism. 9 ref. (Q9p, Q24, M26, 3-68; Cu, 14-61)

1389-Q. Low-Frequency Measurements on the Bordoni Internal Friction Peak in Copper. D. H. Niblett. Journal of Applied Physics, v. 32, May 1961, p. 895-899.

Torsion pendulum measurement of the internal friction of cold worked specimens at 4-300° K. at a frequency of 10-20 cps. The Bordoni internal friction peak is observed in pure polycrystalline Cu at 62° K. at 13.4 cps. A value of 0.14 ev. is deduced for the activation energy by comparison. 15 ref. (Q22, 2-63, 3-67; Cu)

1390-Q. Third Order Elastic Moduli of Germanium. T. Bateman, W. P. Mason and H. J. McSkimin. Journal of Applied Physics, v. 32, May 1961, p. 928-936.

Elastic moduli are determined by measuring ultrasonic velocities in selected directions when directed static stresses are applied to the crystal. Three measurements are obtained by hydrostatic pressures, three by a static compression along the (001) axis and six by stressing the (110) axis. 14 ref. (Q21, 3-66, 3-72; Ge)

1391-Q. Smooth Spalls and the Polymorphism of Iron. John O. Erkman. Journal of Applied Physics, v. 32, May 1961, p. 939-944.

When Armco iron is loaded with a transient wave in which the pressure exceeds 0.131 megabar, smooth spalls are observed, the two distinct compression shocks transmitted by the Fe being followed by a steep rarefaction called rarefaction shock. The interaction of these waves results in a localized tension of destructive magnitude, producing smooth fracture. 10 ref. (Q24j, Q26, 3-71; Fe-a)

1392-Q. (Italian.) Heat Resisting Steels and Alloys Used in the Construction of Gaseous Case Hardening Heat Treatment Furnaces. Gilles Pomey. Il Nickel, no. 91, Apr. 1961, p. 1-11.

Mechanical properties of nickel-chromium steels and Ni-Cr and Fe-Cr alloys used in the construction of heat treatment furnaces and their behavior when subjected to high temperatures in carburizing, carbonitriding, nitriding and oxidizing atmospheres. Design considerations are given for selecting steels and optimum heat treatment techniques. (Q-general, 2-62, W27n; SGA-h, ST, Ni-b, Cr-b, 17-57)

1393-Q. (German.) Influence of Materials in Friction on Contacts Between Solids in Cold Working. Heinrich Wiegand, Karl Heinz Kloos and Klaus Muller. Stahl und Eisen, v. 81, July 6, 1961, p. 924-933.

Investigation of friction and lubrication during cold heading by measurement of friction coefficient and surface roughness in plasticizing involving slip under pressure, with and without isolation or lubrication, of materials including 105 W Cr 6 steel (Ni coated and noncoated), X 120 Cr 12 steel (TiC coated and noncoated, nitrided and nonnitrided) and AlMBz bronze. (Q9n, 3-68, 18-73, G10; ST, Cu-s)

1394-Q. The Effect of Heat Treatments on the Structural Stability of Sintered Aluminium Products. Niels Hansen and Eivind Adolph. Danish Atomic Energy Commission, Research Establishment Riso, Metallurgy Laboratory. Riso Rept. no. 25, May 1961, 37 p.

Degassing and heat treating plate, rod and tubing of sintered Al at temperatures between 400 and 640° C. in a vacuum and in air to determine effect of time and temperature of heat treatment on microstructure, gas content and stress. 9 ref. (Q-general, C5, 2-64; Al, 6-72)

1395-Q. Cracked Extrusion Billets. W. W. Frank. Modern Metals, v. 17, July 1961, p. 60-61.

Ultrasonic and dip-stick testing of 6061, 6062 and 6063 Al alloys and its effect on cracking of extrusion billets. Effect of pouring temperature and rate, alloy involved, nucleation agents, water temperature

and pressure and billet diameter. (Q26, 2-60, 2-61, 3-73, S13g; Al-b, 4-52, 4-58)

1396-Q. (Czech.) Effect of Heat Treatment on Mechanical Properties of 13% Chromium Steels. Stanislav Drapal. Hutnicke Listy, v. 16, Feb. 1961, p. 120-128.

Macrostructure and sulphur segregation of 6 melts with different carbon contents (0.05-0.034%) are studied on cast wedge-shaped test pieces. Effects of carbon content, testing temperature, homogenization, austenitization at 950-1150° C., tempering at 650-750° C. and cooling velocity on tensile, yield and impact strengths, elongation and reduction of area. 5 ref. (Q-general, M27, 2-60, 2-61, 2-64; AY, Cr)

1397-Q. (Czech.) Embrittlement of AK 1 Steels Containing 13% Chromium. Jaroslav Koutsky and Josef Teindl. Hutnicke Listy, v. 16, Feb. 1961, p. 129-135.

Samples are quench hardened at 900-1100° C., annealed for 2 hr. at 750° C. and subsequently air cooled or oil quenched and subjected to a second annealing at 400-650° C. Effects of heat treatment on fracture, hardness, tensile, yield and impact strengths, ductility and transition temperature. 11 ref. (Q26s, Q-general, 2-64; AY, Cr)

1398-Q. Development Promises More Uniform Wheel Grading. L. V. Colwell, R. O. Lane and K. N. Soderlund. Grinding and Finishing, v. 7, Aug. 1961, p. 26-27.

Test method for determining wheel hardness using a two-component lathe dynamometer and a crushing wheel. 4 ref. (Q29, 1-53, 1-54, W25c)

1399-Q. (Russian.) Deformation as a Function of Toughness During Treatment Under Pressure at High Temperatures. I. Ya. Tarnovskii, A. A. Pozdeev, L. V. Meandrov and G. A. Khasin. Izvestiya VUZ--Chernaya Metallurgiya, Mar. 1961, p. 82-90.

Experimental investigation of 16 alloy steels to develop parameters for calculating deformation resistance as a function of the toughness properties of steel. Observations are made at various temperatures and pressures of deformation and mechanical plasticity. Coefficients of toughness for various temperatures and conditions of deformation are derived. 4 ref. (Q-general, 2-60, 3-68, 3-74)

1400-Q. (Russian.) Hardening and Softening of Austenitic Steels During Relaxation of Tension. Ya. S. Gintsburg. Izvestiya VUZ--Chernaya Metallurgiya, Mar. 1961, p. 126-133.

Investigation into the character and intensity of the relaxation process of austenitic steels produced in a high-frequency furnace as dependent on chemical, physical and mechanical properties and on temperature. 5 ref. (Q27c, Q3, P-general, 2-60, 2-61; ST, 1-69)

1401-Q. (Italian.) Brittle Fracture of Steels Seen From the Constructor's Point of View. Ugo Guerrera. Rivista Italiana della Saldatura, v. 13, Jan-Feb. 1961, p. 3-9.

Behavior of several structural steel specimens under tensile load and at different temperatures. Influence of design and selection of steels to suit particular applications. (Q26s, 2-61, 3-68; ST, SGB-s)

1402-Q. (French.) Testing of Bearing Wear by Use of Radioactive Isotopes. D. Pavelescu, I. Iliuc, S. Barbul, E. Procopovici, M. Nastase and V. Constantinescu. Revue de Mecanique Appliquee, v. 6, Jan 1961, p. 77-90.

The wear of cast iron sliding friction between cast iron and steel is measured by pressing a cast iron block containing the radioactive isotope Fe^{59} against a rotating steel shaft. Rumanian oil no. 405 is used as a lubricant and its Fe^{59} content is tested for various times, rpm. and contact pressures. 9 ref. (Q9, 1-59; CI, ST, NM-h)

1403-Q. (Italian.) Tear-Testing of Light Alloy Sheets. L. Mori. Alluminio Nuova Metallurgia, v. 30, May 1961, p. 241-248.

Description and analysis of the tear-test as applied to welded Pe 35 R, Av 24, TN, Eg 65 Ta and Pe 35 H_2O alloy sheets stressed at different temperature. Results are compared

to those obtained by conventional tensile testing. 11 ref. (Q5; Al-b, 4-53)

1404-Q. German Commentary on Turbine Failures. S. Ammareller and P. Gruen. Metal Progress, v. 80, Aug. 1961, p. 89-91.

Failures in Europe in the 1920's led German metallurgists to use a low-alloy steel of good hardenability, oil quenched and tempered for high strength and ductility. Recently, vacuum pouring has eliminated danger of flaking. (Q26, Q25, J26; AY, 4-51)

1405-Q. Residual Welding Stresses in Aluminum Alloys. H. N. Hill. Metal Progress, v. 80, Aug. 1961, p. 92-96.

Fusion welding produces residual stresses in the vicinity of the weld that are about equal to the minimum yield strength in the heat affected zone. These stresses do not impair the ability of a welded structure to resist static or impact loading. (Q25h, K9; Al-b)

1406-Q. Creep Tests on a Flake Graphite Cast Iron at 350° C. K. B. Palmer. BCIRA Journal (British Cast Iron Research Assoc.), v. 9, July 1961, p. 537-539.

Results of tests at 350° C. are compared with tests at 400° C. Variation of modulus of elasticity with tensile stress at 350° C. It is shown that cast iron may be used advantageously at temperatures up to at least 343° C. (Q3, 2-61, Q21a, 3-66; CI)

1407-Q. Residual Thermal Stresses in Compression Ignition Engines. A. Dearden. BCIRA Journal (British Cast Iron Research Assoc.), v. 9, July 1961, p. 540-559.

Failure (cracking) of cylinder heads, pistons and cylinder liners composed of nodular iron and gray iron due to high operating temperatures and subsequent cooling. Results of thermal cycling tests and engine test bed investigations. 8 ref. (Q26, Q25h, Q25p, T21b; CI)

1408-Q. Impact Extrusions Offer Better Properties at Lower Costs. Precision Metal Molding, v. 19, July 1961, p. 28-29.

Comparison of impact extrusions to castings and forgings in terms of surface smoothness, tolerances, strength to weight ratios and economic factors. Use of impact extrusions in the production of pistons. Thermal expansion control. (Q27, S15, T21b; 4-58, 4-51, 5, 17-55)

1409-Q. Hydrogen Embrittlement of Tantalum in Aqueous Media. Claude R. Bishop and Milton Stern. Corrosion, v. 17, Aug. 1961, p. 85-91.

Prevention of Ta embrittlement in aggressive reducing acid media by contact with a small area of Pt. Corrosion rate is not increased by such contact and in some cases decreases. Results of experiments show that Ta is successfully protected at various temperatures and under conditions of cathodic charging. 17 ref. (Q26s, R6g, R10g; Ta)

1410-Q. (Spanish.) Delayed Failure of High Strength Steels. Arturo Rodriques de la Pena. Tecnica Metalurgica, v. 16, Nov-Dec. 1960, p. 232-242.

Notched and unnotched samples are heated up to 850° C. and slowly cooled to determine the effect of hydrogen absorption, caused by electrolytic treatment, on reduction of area and on delayed failure of notched samples. 14 ref. (Q7, 2-69; ST, SGB-a)

1411-Q. (Ukranian.) Effect of Plastic Deformation on Fatigue Strength of Heat Resistant Alloys. M. I. Chernyak. Dopovidi Akademii Nauk Ukrainskol RSR, Feb. 1961, p. 173-174.

Bend-torsion test of Ni-base alloys at room temperature and 700° C. Endurance limit in relation to deformation degree and temperature. (Q7a, Q1, Q5, 2-61, 3-68; Ni-b, SGA-h)

1412-Q. Frictional Behavior of Sodium-Lubricated Materials in a Controlled High-Temperature Environment. C. M. Allen J. W. Kissel and W. A. Glaeser. American Society of Mechanical Engineers, Paper No. 61-LUBS-16, 1961, 9 p. $1.

Frictional behavior between Mo, W, tungsten carbide and titanium carbide sliding-contact specimens is studied from 80-1300° F. at a speed of 0.2 mm. per sec. and a load of 100,000 psi. Experiments are performed in argon-swept vacuum, both dry and with molten Na at the specimen interface. 9 ref. (Q9p, 18-73, 2-61, 3-68; Mo, W, 14-68)

1413-Q. (German.) Investigation of Cold-Stretched Steels. K. Kloppel and R. Schardt. Stahlbau, v. 30, July 1961, p. 193-202.

Separate investigations of strain-hardening and stress aging in cold working using a model of similar deformation characteristics. Tensile testing of welded steel specimens (0.10-0.14% carbon) before and after annealing (400-1000° C.) Investigation of plastic behavior by bending tests and examination of fatigue properties as influenced by cold working. (Q23, Q27, F-general, 1-67; ST, 2-60, 2-64, 2-68, 7-51)

1414-Q. (Italian.) Brittle Fracture. Alberto Nacher. Rivista Italiana della Saldatura, v. 13, Mar. 1961, p. 109-129.

Study of the behavior of metals subjected to nonfatigue testing. Mechanism of the propagation of the brittle fracture. Analysis of basic tension testing and of the mechanics of the material. (Q26s, 1-54)

1415-Q. Low Endurance Fatigue of a Mild Steel and an Aluminium Alloy. P. P. Benham and Hugh Ford. Journal of Mechanical Engineering Science, v. 3, June 1961, p. 119-132.

Axial load and strain cycling tests are performed on hot rolled mild steel and D.T.D. 683 Al alloy at frequencies between 5-15 cycles per min. for endurances from monotonic tension to 50,000 cycles. Mean loads or strains of zero and half the maximum in tension are studied. Two mechanisms of fracture are found for mild steel. 27 ref. (Q7, 3-66, Q26; CN, Al-b)

1416-Q. Reactor Materials and Radiation Damage. G. E. Darwin and A. A. Johnson. Nuclear Power, v. 6, Aug. 1961, p. 64-65.

Damage flux determinations, focusing collisions, direct and indirect methods of observing defects, irradiation hardening, fracture, corrosion, growth and swelling are discussed in terms of the yield stress/grain size relation for Cu, En2 steel, Mo and pure iron. 4 ref. (Q-general, 2-67, T11; Cu, Fe, Mo, ST)

1417-Q. Redesign of Trailer Castings Offers Greater Strength, Lighter Weight. Joe W. Beckham. Current Engineering Practice, v. 3, June 1961, p. 28-31.

Design innovations on brake shoes, hubs, winch housing end plates and axle seats as determined by direct measurement of strain on the surface of the working part by stresscoat and electric strain gages. (Q25, 1-54, T21; ST, 5)

1418-Q. Making Steels of Very High Strengths. Arthur Kenneford. New Scientist, v. 11, Aug. 3, 1961, p. 272-273.

Effects of various alloy additions and heat treatment. Examples are given showing effect of Cr and Si on volume change at phase transformation and effect of tempering on hardness of quenched experimental steel. (Q29n, P10d, 2-60, 2-64; ST, Cr, Si)

1419-Q. Halt Hydrogen Embrittlement of Tantalum. Union Carbide Metals Review, v. 4, Summer 1961, p. 25.

Sputtering, spot welding, electrodeposition, riveting or mechanical attachment of Ta to an extremely small spot of Pt in the ratio of 10,000 Ta to one Pt. Tests show that Ta so contacted retains its ductility for more than 1000 hr. in concentrated HCl at 374° F. (Q26s, Q23p, 2-60; Ta, Pt)

1420-Q. (German.) Magnetic Determination of Yield Point of Steels. Paul Reti. Fertigungstechnik und Betrieb, v. 11, June 1961, p. 389-342.

Method and apparatus for evaluation of yield point by continuous measurement of magnetic permeability in tensile stressing of metal specimens. Applicability of method for Cr, CrV, M 125, M 175, C 45 and W 31 steel. (Q24c, P16q, 1-54; Cr, ST)

1421-Q. (French.) Marine Propellors of Cu-Al With Ni. R. F. Poirot. Revue du Nickel, v. 27, May-June 1961, p. 63-71.

Elasticity, Brinell hardness, corrosion fatigue and sea water erosion due to cavitation of Cu-Al propellors with additions of Mn, Ni, Fe, Si and Sn. 5 ref. (Q21, Q29n, R1e, R4b, T22h; Cu-b, Al, Ni)

1422-Q. (French.) Possibilities of Using 9% Ni-Steel for Constructing Welded Reservoirs to be Used in Storing or

Transporting Liquified Gas--Operation "Cryogenics". Revue du Nickel, v. 27, May-June 1961, p. 72-80.

Nickel steel rectangular and cylindrical reservoirs are studied under conditions of high pressure and low temperature to determine their usefulness as storage and transport containers for liquid propane, ethylene, methane, oxygen, nitrogen, hydrogen and He. Rupture load elastic limit, Charpy v-notch resilience and effects of welding. (Q3m, Q21, T26q; AY, Ni, 7-51)

1423-Q. (Translation-Brutcher no. 4996.) Shot Peening and Heat Treatment of Trolley-Bus Axle Shafts. N. Ya. Volnak. Metallovedenie i Termicheskaya Obrabotka Metalloy, Nov. 1959, p. 40-42.

Previously abstracted. See item 232-Q, 1960. (Q7a, G23n, 2-64; ST)

1424-Q. (Translation-Brutcher no. 4997.) Effect of Surface Hardening on the Fatigue Strength of Gear Teeth. G. Z. Zaitsev. Metallovedenie i Termicheskaya Obrabotka Metallov, Nov. 1959, p. 43-44.

Previously abstracted. See item 233-Q, 1960. (Q7a, T7a, J28; ST)

1425-Q. (Translation-Brutcher no. 5216.) Effect of Molybdenum Upon Properties of 18% Cr-12% Ni Stainless Steel. R. Nakagawa and Y. Otoguro. Tetsu-to-Hagane (Iron and Steel Institute of Japan, Journal), v. 46, Mar. 1960, p. 377-379.

Effect of Mo additions of 0.85 to 3.70% upon stainless steel having carbon contents of 0.02, 0.10, 0.20 and 0.28%. X-ray analysis of electrolytically extracted precipitates for the nature of Mo-containing carbides. Tensile properties at room and elevated temperatures. (Q-general, 2-60; SS, Mo)

1426-Q. (Translation-Brutcher no. 5146.) Measurement of Surface Temperatures in Sliding Friction. A. G. Nikonov and G. N. Klebanov. Izvestiya VUZ--Chernaya Metallurgiya, Feb. 1961, p. 122-127.

Study of heating and cooling conditions in zones located at various distances from the friction surface of steel specimens. Data on thermal cycles at different distances from friction surface; temperature distribution across specimen section. Temperature at friction face; heating rate in hardened layer; formation of range of minimum austenite stability and cooling rate therein. (Q9p, S16b; ST)

1427-Q. Metallic Fatigue. W. J. Harris. 1961. 331 p. Pergamon Press Inc., 122 E. 55th St., New York 22, N. Y. $12.50.

Survey of the major factors affecting fatigue behavior of metals associated with flight structure with particular reference to certain standard aircraft fabrication and finishing processes. Theoretical considerations of stress concentration, frequency effects, corrosion, fretting and crack propagation. 376 ref. (Q-general, T24a, 1-53, 10-52)

1428-Q. (Russian.) Effect of Increased Oxygen and Nitrogen Content on the Mechanical Properties of Titanium. E. V. Petunina. Metallovedenie i Termicheskaya Obrabotka Metallov, June 1961, p. 50-53.

Technically pure Ti with 0.18-0.54% O and 0.035-0.105% N is subjected to mechanical testing at 20-500° C. Effect of the two elements on tensile, yield, impact and bends strengths, elongation and area reduction. (Q-general; Ti, 3-69)

1429-Q. (Russian.) Effect of Calcium on the Plasticity of the Alloy EI 765. S. A. Iodkovskii and A. S. Loboda. Metallovedenie i Termicheskaya Obrabotka Metallov, June 1961, p. 57-59.

Effect of 0.1-0.3% Ca added in metallic form to the melt, on microstructure and elongation and reduction of area determined in creep tests at 700° C. (Q23p; AY, AD-n32, Ca)

1430-Q. Die Cast Zinc Meets Competitive Demands. Jack H. Schaum. Modern Castings, v. 40, Aug. 1961, p. 34-37.

Mechanical properties, physical constants and casting characteristics of Zn alloys as compared to Al and Mg alloys. Applications of Zn die castings in automobile components. (Q-general, E25p, P-general, T21; Zn-b, Al-b, Mg-b, 5-61)

1431-Q. Centrifugally Cast Steel Cylinders Rapid Gas Heating Techniques.

A. Ayvazian. Modern Castings, v. 40, Aug. 1961, p. 73-80.

Comparison of yield and tensile strengths, elongation, reduction of area, impact strength and grain size of conventionally heat treated 4330 steel centrifugally cast cylinders and those hardened and tempered in rapid-heating gas furnaces. (Q-general, M27c, 2-64; AY, 5)

1432-Q. Cast Nickel Containing Aluminum Bronze Properties and Microstructure. E. Belkin. Modern Castings, v. 40, Aug. 1961, p. 87-97.

Microstructure, hardness, tensile properties and ductility of as-cast alloys containing 9.5-11.5% Al, 3-6% Fe and 3-6% Ni as affected by heat treatment and composition. 5 ref. (Q29, Q27, Q23p, M27, 2-60, 2-64; Cu-s, Al, Ni, Fe, 5)

1433-Q. Aluminum Alloy 356 + Be Permanent Mold Casting. A. J. Iler. Modern Castings, v. 40, Aug. 1961, p. 98-105.

Effect of forces applied by the permanent mold centrifuge on mechanical properties and structure is measured using a specially developed mold which eliminated other solidification factors, radiography, photomicrography and tensile tests. (Q-general, M27, 1-53, 1-54; Al-b, Be, 5-63)

1434-Q. Magnesium Analysis as Reliability Criterion of Ductile Iron Quality. Modern Castings, v. 40, Aug. 1961, p. 106-108.

Comparison of results obtained from various laboratories of analyses of ductile iron for Mg content to determine with what degree of reliability the analysis could be employed in predicting the graphite form and thus the strength, ductility and modulus of elasticity of the Fe. (Q27a, Q23p, 2-60, 3-71; CI, Mg)

1435-Q. High Strength Structural Steel Castings for Aerospace Applications. W. R. Roser. Modern Castings, v. 40, Aug. 1961, p. 109-112.

Yield strength, ultimate strength, reduction of area and ductility of 17-4 PH stainless steel investment castings. Effect of chemical composition and foundry process control on properties, especially ductility. (Q-general, Q23p, 2-60, T24; SS, 5-62, 17-57)

1436-Q. Creep Collapse of Cylindrical Shells. Thein Wah. Franklin Institute, Journal, v. 272, July 1961, p. 45-60.

Analytical derivation of collapse time for cylinders under steady-state creep, external radial pressure and high temperature (300-500° F.) The boundary conditions assumed for the cylinders approximate the "simply supported" and "fixed-end" conditions. Theoretical predictions are compared with experimental results on 6061-T6 Al alloy cylinders. 7 ref. (Q3c, 2-61, 3-74; Al-b)

1437-Q. Studies of the Low-Temperature Tensile Properties of Some Refractory Metals. W. M. Armstrong and John A. H. Lund. Canadian Mining and Metallurgical Bulletin, v. 54, July 1961, p. 504-509.

Tensile properties of single crystal vanadium, polycrystalline vanadium and polycrystalline Ta from 20 to -196° C. Specimen preparation and testing techniques. Temperature dependence of yield stress and ductility. 8 ref. (Q27, Q23p, Q23b, 1-54, 2-63; V, Ta)

1438-Q. High Temperature Deformation of Aluminum Single Crystals. S. Howe, B. Liebmann and K. Lucke. Acta Metallurgica, v. 9, July 1961, p. 625-631.

Temperature and strain rate dependence of workhardening is investigated in Al crystals. Single crystals of high purity Al are grown and extended at various strain rates from -196 to 600° C. 15 ref. (Q23a, 2-62, 2-68; Al, 14-61)

1439-Q. (Italian.) The Diffusion of Fatigue Cracks in Notched Light Alloy Specimens. C. Panseri, L. Mori and D. Morri. Alluminio Nuova Metallurgiya, v. 30, July-Aug. 1961, p. 347-355.

Fatigue crack diffusion characteristics of notched Avional 24 alloy in TN, TA 17/10 and TA 20/48 states and of Peraluman 50 R alloy are determined by a rotary bending fatigue testing machine at 11,500 cycles per min. (Q7, 1-53; Al-b)

1440-Q. (Italian.) Influence of Technological Production on the Properties of Rolled Al-Mn Alloy 1,2 UNI 3568

Products. M. Leoni. Alluminio Nuova Metallurgiya, v. 30, July-Aug. 1961, p. 357-366.

Structural testing of Al-Mn alloy of controlled chemical composition indicates that the optimum composition for obtaining rolled products of good structural, mechanical, deep drawing and anodizing characteristics is about 1-1.2% Mn and 0.5% Fe. Influence of thermal cycling on structural and mechanical characteristics. (Q-general, G4, L19, 17-52, 2-60, 2-64; Al-b, Mn, Fe)

1441-Q. (Pamphlet.) New Concepts in Steel Design and Engineering. 1961. 59 p. U. S. Steel Corp., 525 William Penn Place, Pittsburgh 30, Pa.

Four papers on advancements in constructional steels relative to design practice and economy. Included are physical and mechanical properties, fabricability, corrosion resistance, optimum proportioning and other design factors for various carbon and alloy steel beams, sheets, castings, columns and girders. Papers are abstracted separately. (Q-general, T26, 17-51; CN, AY, SGB-s, 17-57)

1442-Q. The Fourth Dimension in Design. J. A. Gilligan. Paper from "New Concepts in Steel Design and Engineering". U. S. Steel Corp., Pittsburgh 30, 1961, p. 3-18.

Tensile strength, yield point, section thickness, weldability, corrosion resistance and stress strain relationship are given with cost considerations for structural carbon steels, high-strength, low-alloy steels and heat treated constructional alloy steel. Application of design in fabrication of storage tanks, bridges and buildings. (Q-general, T26; ST, SGB-s, 17-51, 17-53, 17-57)

1443-Q. Lighter Weight and Lower Cost Achieved With Stronger Steels. G. Haaijer. Paper from "New Concepts in Steel Design and Engineering". U. S. Steel Corp., Pittsburgh 30, 1961, p. 19-32.

Influence of yield stress and modulus of elasticity and cost considerations on the optimum proportioning of beams, girders and tension members of structural carbon steel, high-strength, low-alloy steel and constructional alloy steel is investigated by structural analysis. (Q23b, Q21; ST, SGB-s, 17-51, 17-53)

1444-Q. Column Strength of Constructional Steels. L. S. Beedle, T. V. Galambos and L. Tall. Paper from "New Concepts in Steel Design and Engineering". U. S. Steel Corp., Pittsburgh 30, 1961, p. 33-50.

Relationship between welding, heat treatment and mechanical stress relieving, and resultant residual stress, strain hardening, mechanical strength, deflection, shear modulus, stress slenderness ratio and stress-strain curve are given for columns of A7 structural carbon steel, A242 low-alloy steel and constructional alloy steel. (Q-general, Q25, G23, J1a; ST, SGB-s, 17-51)

1445-Q. New Steels and Products for Advanced Engineering Design. R. W. Simon. Paper from "New Concepts in Steel Design and Engineering". U. S. Steel Corp., Pittsburgh 30, 1961, p. 51-58.

Yield and tensile strengths as a function of temperature and corrosion resistance, machinability, weldability, impact resistance, brittleness and fabricability are given for beams, sheets and castings of A7, A36 and A440 structural steels; A441 and A242 low-alloy steels; constructional, X-200 and Ni alloy steels; and 304 stainless steels. (Q-general, ST, SGB-s, 4, 17-51)

1446-Q. Radiation Damage of Metals. L. E. Steele and J. R. Hawthorne. Report of NRL (Naval Research Laboratory) Progress, July 1961, p. 22. (Available as PB 171320 from U. S. Office of Technical Services, Washington 25, D. C.)

The effects of elevated irradiation temperatures on the shift in the ductile-to-brittle transition temperature of pressure vessel steels given. (Q23r, 2-61, 2-67, T26q, 10-54; ST)

1447-Q. (Russian.) Stability of Microfissures in Solids. Yu. M. Plishkin. Doklady Akademii Nauk SSSR, v. 137, Mar. 1961, p. 564-567.

Formation of microcracks in an assumed crystal of an ideal lattice when exposed to a load not exceeding its elastic limit. It is assumed that with the load still acting, microcrack propagation in an ideal lattice takes place at

sound velocity and can be stopped only by a lattice defect. Formation energy and stability of microfissures. 7 ref. (Q26q, 3-68; 14-61, 9-72)

1448-Q. (Russian.) Stresses in Cast Iron Box-Like Castings Resulting From Resistance of Cores. O. Yu. Kotsyubinski and A. M. Gerchikov. Liteinoe Proizvodstvo, Jan. 1961, p. 27-30.

Use of thin-wall molds designed for investigating the relationships between different core materials, cooling time and temperature and stresses developed in castings. Effect of 10-12% silvery graphite additions to the core mix. Influence of arbors on collapsibility. 10 ref. (Q25, 2-60, 2-61, W19g; CI)

1449-Q. Stresses in a Ductile Material Subject to Biaxial Plastic Strain. W. L. Bride. Engineer, v. 212, July 28, 1961, p. 141-144.

Application of the orthogonal shear stress theory to develop a graphical method of determining the strain components from known stresses. Development of a semigraphical method of determining the stresses from the measured total strains. (Q25, 3-68, 1-54)

1450-Q. Cold Working Tool Steels--Their Selection and Application. Robert S. Rowe. Australian Machinery and Production Engineering, v. 14, July 1961, p. 21-25.

Evaluation of the metallurgical characteristics (hardening properties, toughness, wear resistance, machinability, etc.) of various toolsteels relative to their applications. Composition and classification of each type of steel. 9 ref. (Q-general, G17k; TS, 17-57)

1451-Q. (French.) Mechanical Characteristics of Unalloyed or Weakly Alloyed Iron at High Temperatures. Fonderie, v. 185, June 1961, p. 229-237.

Mechanical properties of graphite, lamellar, spherical and malleable steels are given as functions of composition and temperature. (Q-general, 2-60, 2-62; CI)

1452-Q. (English) Cleavage Fracture in Single Crystals of Silicon Iron. Ryukichi Honda. Physical Society of Japan, Journal, v. 16, July 1961, p. 1309-1321.

Sheet specimens of 2.9% silicon iron with (110) surfaces are extended in the (100), (110) and (111) directions at -196° C. until fracture. Twins and slip lines are observed during extension and after fracture. 18 ref. (Q26n, Q24, 2-63, 3-72; Fe-b, Si, 4-53)

1453-Q. Low-Cost Honeycomb Materials Offer New Design Freedom. Iron Age, v. 188, Aug. 24, 1961, p. 66-68.

Values are given for strength-to-weight ratios, weight versus cell size and other design parameters for Al, stainless steel, refractory metal, paper and asbestos cores. (Q-general, 17-51; Al, SS, EG-d37, NM, 7-59)

1454-Q. The Flow Stress of Aluminum and Copper at High Temperatures. P. B. Hirsch and D. H. Warrington. Philosophical Magazine, v. 6, June 1961, p. 735-768.

The ratio of the flow stress at 20-600° C. to that at 0° is measured for polycrystalline Al and Cu and for single crystals of Al. The results are interpreted in terms of a model based on sessile vacancy jogs in screw dislocations which, below a certain critical temperature, advance with the aid of stress and above the critical temperature advance with the aid of thermal activation. 47 ref. (Q24, Q3, M26b, N3, 2-61; Al, Cu)

1455-Q. Stored Energy and Electrical Resistivity in Deformed Metals. L. M. Clarebrough, M. E. Hargreaves and M. H. Loretto. Philosophical Magazine, v. 6, June 1961, p. 807-810.

Superpurity Al (99.991%) is deformed in cubic compression and annealed at 400° C. for 1 hr. Stored energy, electrical resistivity and Vickers hardness are measured as functions of deformation and annealing temperature. Recrystallization phenomena is observed with stacking fault energy and dislocation density relations. 16 ref. (Q24, Q29n, M26b, N5, P15g, 2-64, 3-68; Al-a)

1456-Q. Stored Energy and Flow Stress in Deformed Metals. L. M. Clarebrough, M. E. Hargreaves, A. K. Head and M. H. Loretto. Philosophical Magazine, v. 6, June 1961, p. 819-822.

Review of data and theory for stored energy and dislocation pile-up relations to flow stress arising in workhardened

metals. Comparison of experimental data for Al, Cu and Ni deformed in compression and alpha brass and Ag deformed in tension. 11 ref. (Q24, Q23a, M26b, 3-68, Al, Cu-b, Ni, Ag)

1457-Q. (Japanese.) Influence of the Machined Surface Layer on Hardness of the Surface of Hardened Steel. Yutaka Arakida and Tsuruo Shibazaki. Tetsu-to-Hagane (Iron and Steel Institute of Japan, Journal), v. 47, July, 1961, p. 918-924.

Vickers and Shore hardness measurements and X-ray diffraction examination of the surface of alloy steel Sendzimir roll specimens after quenching treatment subsequent to finish machining by turning, grinding or mechanical polishing. Effect of "competition" between thermal and mechanical actions on workhardening and stress mechanisms in the surface layer. 7 ref. (Q29n, Q23a, 2-64, 3-66, 3-68; ST)

1458-Q. (Japanese.) Fire Cracking Characteristics of Chromium-Molybdenum Steel. Juroh Watanabe. Tetsu-to-Hagane (Iron and Steel Institute of Japan, Journal), v. 47, July, 1961, p. 925-929.

Crack depth and initiation and propagation behavior, in cast, normalized, spheroidized, annealed and forged alloy steel specimens (for slabbing and blooming mill rolls) is investigated by cyclic thermal stressing at 450-600° C. with subsequent electron microscopy analysis. Crack susceptibility is influenced by forcing reduction, porosity, carbon and cementite content and heat treatment induced segregation and microstructure data are given for Charpy impact value and Vickers hardness. 6 ref. (Q26q, Q-general, M27, 2-60, 2-64, 3-66, 3-68; AY)

1459-Q. (Russian.) Effect of Alloying Elements on Properties of Steel. M. P. Braun. Izvestiya Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk, Metallurgiya i Toplivo, Jan. 1961, p. 64-73.

Various alloy steels are mechanically tested in the quenched, tempered and normalization annealed states at temperatures from 50 to -60° C. Transition temperatures after various heat treatments. Effect of elements on isothermal austenite transformation. 13 ref. (Q-general, Q23r, N8g, 2-60, 2-61; AY)

1460-Q. (Russian.) Tensile Testing of Metals at Elevated Temperatures and Various Deformation Velocities. M. G. Lozinskii and N. Z. Pertsovskii. Izvestiya Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk, Metallurgiya i Toplivo, Jan. 1961, p. 96-107.

Ni samples are heated in a vacuum by d-c. passage and simultaneously subjected to a uniform tensile deformation of $1\text{-}0.6 \times 10^3$% per hr. Tensile strength, elongation, hardness and microstructure are determined for various temperatures and speeds. 17 ref. (Q27, Q23p, Q29, M27, 2-62, 3-68; Ni)

1461-Q. (Russian.) Local Plastic Deformation in the Brittle Fracture of Technical Iron. B. S. Kasatkin. Izvestiya Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk, Metallurgiya i Toplivo, Jan. 1961, p. 108-116.

Samples, made from hot rolled technical Fe that was hot forged, held at 1100° C. for 2 hr. and furnace cooled, are metallographically polished and etched and impact tested from 20 to -190° C. varying the deformation degree. Impact strength as a function of temperature. Effects of temperature and deformation degree on microstructure, crystal slip and deformation bands and ranges. 19 ref. (Q26s, Q6, Q24, M27, 2-61, M20; Fe)

1462-Q. (Russian.) Embrittlement of Steel in Connection With Secondary Hardness. V. I. Sarrak and R. I. Entin. Izvestiya Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk, Metallurgiya i Toplivo, Jan. 1961, p. 117-118.

Alloy steels 10T, 35T, 20S2G3N2KhF, 30S2G3N2F, 35S2G3N2F and 40S2G3N2F are quenched from 1350-1100° C. and tempered at temperatures to 650° C. Embrittlement, hardness, impact strength, width of X-ray interference lines, coercivity and propagation of microcracks are determined after tempering. 7 ref. (Q26s, Q29, Q6, P16a, 2-64; AY)

1463-Q. (Russian.) Effect of Columbium Oxide Inclusions on the Cracking Resistance of Low-Carbon Steel. L. M. Belova, O. D. Moldavskii and A. P. Pronov. Izvestiya Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk, Metallurgiya i Toplivo, Jan. 1961, p. 119-121.

Armco iron is melted in magnesite crucibles and ferrocolumbium is added in an amount sufficient to obtain a melt with 0.4-4.5% Cb. Samples are cast for structure testing and electrolytic isolation and analysis of nonmetallic inclusions. Resistance to cracking and concentration of CbO in the inclusions as functions of Cb content. (Q26, 2-60; CN, Cb, 9-69)

1464-Q. (Russian.) Plasitc Deformation of Chromium. M. P. Matveeva. Izvestiya Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk, Metallurgiya i Toplivo, Jan. 1961, p. 122-125.

Electrolytic Cr is suspension remelted in a He atmosphere, cast into blanks and electrolytically machined into polished samples. The effect of deformation on the microstructure is investigated by torsional testing at 1200-1400° C. in a vacuum and micrography. 9 ref. (Q24, M21, M27, 2-61; Cr)

1465-Q. Exotic Alloys. Factory, v. 119, Aug. 1961, p. 84-86.

Use of Ni and Co-base alloys for hard facing, in furnace trays, as wear and corrosion resistant strips and in fixtures. Mechanical properties and economic considerations. (Q-general, L24; Ni-b, Co-b, 4-53, 17-57)

1466-Q. Evaluation of Forming Characteristics of Columbium Alloys. R. T. Torgerson. Paper from "Columbium Metallurgy". v. 10. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 31-52.

Forming characteristics of five Cb alloy sheet materials proposed for hypersonic vehicle structures are evaluated by studies of tensile properties, bend and bi-axial ductility, brittle-ductile bend transition temperature and embrittling effects resulting from diffusion of interstitial elements. Results show good room temperature formability with brittle-ductile bend transition at subzero temperatures. (Q23q, Q-general, 2-61; Cb)

1467-Q. Influence of Carbon Additions on the Workability and Mechanical Properties of Columbium. R. T. Begley and A. I. Lewis. Paper from "Columbium Metallurgy". v. 10. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 53-74.

Effect of carbon on the microstructure, hardness, workability and low temperature tensile properties. Metallographic examination indicate that the maximum solubility of C in Cb is between 0.75 and 1.0 wt.% at 2230° C. Carbon additions up to 0.53 wt.% had no effect upon the yield strength of Cb at -196 to 200° C. but significantly reduce low temperature ductility. (Q23q, Q-general, M27, 2-60, 2-63; Cb-b, C)

1468-Q. Effect of Various Gaseous Contaminants on the Strength and Formability of Columbium. H. E. McCoy and D. A. Douglas. Paper from "Columbium Metallurgy". v. 10. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 85-118.

Results show that moderate addition of O, N and H strengthen Cb at room temperature. Oxygen present in solution in concentrations in excess of 3000 ppm. causes serious embrittlement. Nitrogen present in excess of 1000 ppm. reduces the room temperature bend and tensile ductilities of Cb to essentially zero. The strength of this material at 1010° C. is increased by nitrogen and the observed reductions in ductility are not as serious as at room temperature. Hydrogen concentrations in excess of 500 ppm. seriously embrittle Cb at room temperature. (Q26s, Q23q, Q-general, 3-69; Cb-b, O, H, N)

1469-Q. Processing and Properties of F-48 Columbium Alloy Sheet. T. K. Redden. Paper from "Columbium Metallurgy". v. 10. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 279-298.

Processing procedures and mechanical properties of a 15 wt.% W-5 wt.% Mo-1 wt.% Zr-Cb alloy. Sheet of 0.040-0.050 in. thickness is produced and used for determination of mechanical properties. Tensile properties to 1371° C. are given, together with stress rupture tests at 1093, 1204 and 1371° C. Reported mechanical properties show useful engineering strength to at least 1370° C. (Q-general, F-general, 2-60, 2-62; Cb-b, 4-53)

1470-Q. Young's Modulus of Columbium at Elevated Temperatures. David P. Laverty and Edward B. Evans. Paper from "Columbium Metallurgy". v. 10. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 299-307.

Young's modulus of high purity Cb is determined by a static test method at 20-820° C. Annealed sheet is stressed in axial tension under a protective atmosphere of argon and the resulting elastic strain read directly by optical means. The modulus decreases linearly from 16.2 million psi. at room temperatures to 14.1 million psi. at 820° C. (Q21a, 2-60, 2-61; Cb, 4-53)

1471-Q. Mechanisms of Creep in Columbium and Columbium-1% Zirconium Alloy. D. P. Gregory and G. H. Rowe. Paper from "Columbium Metallurgy". v. 10. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 309-341.

Experimental data are interpreted by extension of dislocation theory for b-c-c. metals. A low activation energy recovery process which significantly affects mechanical behavior of b-c-c. metals is described and utilized in the development of the creep theory. The rate controlling process for creep in Cb and Cb-1% Zr alloy changes from a slip controlled mechanism at temperatures of 930 and 1100° C., respectively. (Q3, Q24a, M26b, 2-60, 2-62; Cb-b)

1472-Q. Effect of Grain Size, Strain Rate and Temperature on the Yield Strength of Columbium. E. S. Tankins and R. Maddin. Paper from "Columbium Metallurgy". v. 10. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 343-363.

Cb behaves in a similar manner to other b-c-c. metals in that yield point, strain rate sensitivity and aging phenomenon are exhibited. Workhardening of Cb does not occur at low temperatures and only an upper yield point was observed. Twinning is shown at liquid air temperatures. Cb exhibits ductile properties down to liquid air temperature provided that gaseous impurities are at a minimum. (Q23b, Q-general, 2-59, 2-61, 3-67, 3-68; Cb)

1473-Q. The Flow and Fracture Characteristics of Electron-Beam-Melted Columbium. E. T. Wessel, L. L. France and R. T. Begley. Paper from "Columbium Metallurgy". v. 10. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 459-502.

Characteristics are studied in tension and compression tests from 600 to 269° C. to encompass both the ductile-to-brittle transition and the strain aging temperature regions. Effects of interstitial impurities, strain rate and temperature on the flow and fracture characteristics. 57 ref. (Q24, Q26, 2-61, 3-67, 3-68, 3-69; Cb-a)

1474-Q. Mechanical Behavior of Columbium Containing Oxygen. J. F. Enrietto, G. M. Sinclair and C. A. Wert. Paper from "Columbium Metallurgy". v. 10. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 503-521.

Cb is extremely susceptible to strain aging, both in tension and in fatigue when amounts of oxygen are present in solid solution. The stress magnitude of the strain aging peak for both tension and fatigue is dependent upon the oxygen concentration. Strengthening due to strain aging increases very rapidly with increasing oxygen content up to approximately 0.02 wt.% which corresponds to one oxygen atom per dislocation per atom plane in the severely deformed metal. Oxygen in excess of 0.02 wt.% contributes relatively little additional strengthening at the temperatures of maximum strain aging. (Q-general, N7e, 2-60, 2-61; Cb-b, O)

1475-Q. The Properties of Columbium-Aluminum-Vanadium Alloys. Pt. 2. Mechanical Properties. W. F. Sheely and J. L. Wilson. Paper from "Columbium Metallurgy". v. 10. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 585-594.

The Cb-3% Al-3% V alloy is one of the more oxidation-resistant Cb-base ternary alloys. Techniques for consolidating and fabricating alloys based on this compsoition are given with effects of Ti and Zr on mechanical properties. Zr increases elevated temperature strength, but while Ti improves oxidation resistance it also decreases elevated temperature strength.

(Q-general, G-general, R1h, 2-60, 2-62; Cb-b, Al, V)

1476-Q. (Italian.) Methods of Working and Characteristics of Pearlitic Malleable Cast Irons. Piers Bardusco. Tecnica Italiana, v. 26, Apr.-May 1961, p. 191-198.

Mechanical properties, workability, weldability and castability of whiteheart and blackheart cast iron and methods of producing various types of malleable-pearlitic cast irons. Classification, applications and economic considerations. (Q-general, Q23q, E25p, K9s; CI-s, 17-57)

1477-Q. (Translation.) Long-Time Strength and Steady Creep of Polycrystalline Bodies. A. N. Orlov. Soviet Physics--Solid State, v. 3, Aug. 1961, p. 367-369. (Translation of Fizika Tverdogo Tela, v. 3, Feb. 1961, p. 317-670).

The observed relationship between the steady creep rate and the time to rupture is interpreted on the basis of a model in which diffusionless crack growth governs both phenomena. 24 ref. (Q3, 17-56)

1478-Q. (English.) Deformation Twins by Tensile Impact in White Tin. Tomoo Hirokawa. Hiroshima University, Journal of Science, v. 24A, Dec. 1960, p. 637-646.

Single crystal plates of white Sn are pulled by impact and twin bands are observed with ordinary microscope. Correspondence of behavior of formed twins with crystallographic orientation in the impact direction is discussed in terms of twinning energy. 11 ref. (Q24a, 3-68, 3-72; Sn)

1479-Q. Internal Friction of Cold Worked Copper. P. R. Dhar, K. K. Bhattacharjee and S. S. Ghosh. Journal of Scientific & Industrial Research, v. 20D, June 1961, p. 237-238.

Effect of room temperature annealing (7 days) and removal of adherent oxide coatings from the surface on the internal friction of Cu wire specimens. Annealing causes added dislocation pinning by impurity atoms, lowering internal friction. Removal of the oxide increases the number of free dislocations, increasing the friction. 10 ref. (Q22, M26b, R1h, 2-64; Cu, 4-61)

1480-Q. (German.) Theory of Fracture, Its Problems and Recent Results. Hans Rumpf. Materialprufung, v. 3, July 1961, p. 253-265.

Review of physical mechanisms of energetic reactions for fracture and crack formation; establishment of physical models for interpretation of fracture in crystalline bodies. (Q26, 17-56)

1481-Q. (German.) Current Ideas on Mechanism of Brittle and Ductile Fracture of Metals. Albert Kochendorfer. Materialprufung, v. 3, July 1961, p. 266-274.

Modern theory of metal fracture is discussed in terms of plastic deformation in brittle fracture, theory of yield point mechanisms and brittle fracture and mechanism of ductile fracture. (Q26, Q24c)

1482-Q. On the Mechanism of Yielding and Flow in Iron. Hans Conrad. Iron and Steel Institute, Journal, v. 198, Aug. 1961, p. 364-375.

Review of thoery for plastic deformation mechanisms and activation energy-volume, stress-strain and dislocation relations in the yielding of Fe. Tension, compression, torsion and bending tests on mild steel and ingot, electrolytic, low-carbon and Yorkshire iron to determine yielding delay time, upper yield stress, lower yield stress, Luders band propagation, friction stress, flow stress and dislocation mobility. 62 ref. (Q24c, Q-general, M26b, 3-66, 3-68; Fe-b)

1483-Q. The Effects of Temper Rolling and Strain Ageing on the Formability of Low-Carbon Steel. D. V. Wilson, R. D. Butler and B. B. Moreton. Iron and Steel Institute, Journal, v. 198, Aug. 1961, p. 376-386.

Changes in the workhardening behavior of deep drawing sheet steel are observed by tensile, deep drawing and stretch forming tests after annealing, temper rolling in various directions and strain aging at 17° C. for up to 4 months. Data are given for additional mechanical properties including stress-strain relations, yield stress and crack initiation. 18 ref. (Q23q, Q-general, N7e, 2-64, 3-68; CN-g)

1484-Q. Friction of Metals in Reciprocating Sliding. Yasukatsu Tamai. Journal of Applied Physics, v. 32, Aug. 1961, p. 1437-1440.

Experiments conducted on metallic friction in reciprocating sliding with pendulum. Reciprocating sliding gives quite different results from those of single-traverse of unidirectional repeated sliding, a fact emphasized in the coefficient of friction and the electric contact resistance, surface damage due to sliding and the low friction phenomenon. 5 ref. (Q9p, 1-53)

1485-Q. Shock Wave Compression of Hardened and Annealed 2024 Aluminum. G. R. Fowles. Journal of Applied Physics, v. 32, Aug. 1961, p. 1475-1487.

Measurements of Hugoniot equations of state below 50 kbar. Using oblique shock geometry, shock and free-surface velocities are recorded by light-reflection technique. Observed elastic wave amplitudes for hardened and annealed material show agreement with predicted values. Shock wave data in the range of 25-50 kbar yield one-dimensional strain isotherms show agreement with semitheoretical curves. No significant strain effects are evident indicating that elastic-plastic theory is valid for this material. 26 ref. (Q24j; Al)

1486-Q. Nonlinear Damping Losses in YIG. Robert L. Conger. Journal of Applied Physics, v. 32, Aug. 1961, p. 1525-1527.

High-power ferromagnetic resonance in a flat plate has a small component of the precession parallel to the applied d-c. field. This component causes frequency doubling and also coherent amplification of some scattered spin waves, which then cause a linear damping of the parallel component of precession. The nonlinear damping causes the microwave susceptibility to decrease with increasing power and to become approximately inversely proportional to the rf. field at high power levels. 4 ref. (Q22j, P16)

1487-Q. Compression Testing at Elevated Temperatures. Julian P. King. Metals Engineering Quarterly, v. 1, Aug. 1961, p. 30-38.

Facilities and methods for obtaining compression strength data at temperatures from -100 to 1800° F. are presented with emphasis on means of controlling variables which produce discrepancies in experimental values. Effects of testing conditions on properties of Rene 41 and Inconel X sheet specimens. (Q28, 2-62; SGA-h, Ni-b)

1488-Q. Influence of Atmospheric Moisture on Fatigue of Hardened Steel. E. R. Mantel, G. H. Robinson and R. F. Thomson. Metals Engineering Quarterly, v. 1, Aug. 1961, p. 57-61.

Test data are presented to show that the fatigue durability of hardened 52100 steel, in both reversed and unidirectional bending, is extremely sensitive to moisture in the ambient atmosphere (decreasing as humidity increases), indicating that the humidity of the test environment should be closely controlled in laboratory fatigue testing of high-hardness steels. (Q7, S18p, 1-54; ST)

1489-Q. (French.) Monographs on Fatigue Failures. Soudage et Techniques Connexes, v. 15, May-June 1961, p. 185-194.

Analyses of the causes of the fatigue failure of various welded constructions, including water tanks of locomotive tenders, the shaft of a self-propelled hoist, longituderal members of lorry underframes and bottom plating of motor vessels. (Q7, 10-54, T-general; 7-51)

1490-Q. Missiles, Material Selection and Metallurgical Research. W. S. Lyman. Chemical Engineering Progress Symposium Series, v. 57, no. 33, 1961, p. 64-71.

Al, Mg, Ni, Ti and steel alloys for operational environments above 1500° F. are surveyed in regard to load-carrying functions, oxidation and erosion problems, propellant compatibility, tensile loading, service life, brittle failure, temperature resistance and strength properties. (Q-general, T24e, 10-54, 17-57; SS, Al, Mg, Ni, Ti, SGA-g, SGA-h, SGB-r)

1491-Q. High-Temperature Mechanical Properties of Steels Used in Gas-Cooled Reactor Pressure Vessels. J. M. Robertson and R. W. Nichols. Paper from "Steels for Reactor Pressure Circuits". no. 69. Iron and Steel Institute, London SW 1, England, 1961, p. 14-39.

Creep and stress rupture tests have been made on specimens of low-carbon high-maganese steels. For Al grain-refined steel the results indicate that 0.2% creep strain will occur in 200,000 hr. at 400° C. at a stress of 3 1/2 tons

per sq. in. hearth Si killed steel show a higher creep strength under similar conditions, but accurate extrapolation is not possible because of inflections in the experimental creep strain/time curves. (Q3, 2-60, 2-61, 3-66, T26q; ST, 17-57)

1492-Q. Metallurgical Aspects of Creep in Carbon and Low-Alloy Steels. J. Glen. Paper from "Steels for Reactor Pressure Circuits". no. 69. Iron and Steel Institute, London SW 1, England, 1961, p. 40-53.

Precipitation processes that occur in steel are the prime factor controlling creep strength. Special consideration is given to carbon steels and in particular to the scatter in creep properties. that exist in them. Creep strength and variations of same are related to the "active" nitrogen content. This applies to both Al and Si-killed steels. Thermal treatments that bring about the precipitation of noncoherent nitrides from such steels also cause a lowering of the creep strength. (Q3, N7, 2-60, 2-64; ST)

1493-Q. Stress Relaxation Tests on Pressure-Vessel and Low-Alloy Steels. D. S. Wood. Paper from "Steels for Reactor Pressure Circuits". no. 69. Iron and Steel Institute, London SW 1, England, 1961, p. 101-110.

Results are considered in three groups, Si-killed steels, Al grain-refined steels and low-alloy steels. Stress relieving below 600° C. is less effective in reducing the residual stress level than above 600° C. Wide variations in relaxation behavior can occur between different steels within the same group and for low-alloy steels significant variations can occur from cast to cast and even within the same cast. (Q3a, T26q, 2-64, 3-66; ST, 17-57)

1494-Q. The Creep Properties of a Silacon-Killed Carbon-Manganese Pressure Vessel Steel. D. S. Wood and P. B. Swift. Paper from "Steels for Reactor Pressure Circuits". no. 69. Iron and Steel Institute, London SW 1, England, 1961, p. 111-126.

Low deformation creep and stress rupture tests carried out on a number of casts of 0.16% C, 1.0-1.4% Mn steel at 350-500° C. In general this steel exhibits a good level of creep resistance but may occasionally show a low level, particularly if a high soluble-aluminum content occurs in conjunction with a low free-nitrogen content. (Q3, 2-60, 2-61, T26q; ST-c, 17-57)

1495-Q. Theoretical Aspects of Radiation Damage and Brittle Fracture in Steel Pressure Vessels. A. H. Cottrell. Paper from "Steel for Reactor Pressure Circuits". no. 69. Iron and Steel Institute, London SW 1, England, 1961, p. 281-296.

Radiation embrittlement of structural steel. Clustered lattice defects produced by knock-on collisions from fast neutrons harden steel by a process analogous to precipitation hardening and it is shown that, for the amount of hardening produced, the increase of the ductile-brittle transition temperature by irradiation is quite normal. (Q26s, Q23n, M26s, N7, T26q, 2-67; ST, 17-57)

1496-Q. The Effect of Neutron Irradiation on the Ductile-Brittle Transition Temperature of Steels and Its Relevance to Reactor Pressure Vessels. D. R. Harries, R. W. Nichols and C. Judge. Paper from "Steel for Reactor Pressure Circuits". no. 69. Iron and Steel Institute, London SW 1, England, 1961, p. 297-327.

Effects of irradiation as a function of temperature of irradiation, integrated neutron dose, strain rate in post-irradiation tests and specimen dimensions assessment of the brittle fracture characteristics of steel plates employed in the construction of a reactor pressure vessel. (Q23r, Q26s, T26q, 2-61, 2-67, 3-68; ST, 17-57)

1497-Q. Practical Neutron Dosimetry for Steel Irradiation Studies. L. E. Steele. Paper from "Steel for Reactor Pressure Circuits". no. 69. Iron and Steel Institute, London SW 1, England, 1961, p. 328-342.

Value of preliminary neutron flux surveys and the problems of measurement and interpretation of flux values. Correlation of neutron flux data with shifts in the ductile-brittle transition temperature for various pressure vessel steels demonstrates how property changes may be useful in assessing the validity of neutron dosage values. (Q23r, 2-67, T26q; ST, 17-57)

1498-Q. Studies of Radiation Effects and Recovery of Notch Ductility of Pressure-Vessel Steels. J. R. Hawthorne. Paper from "Steel for Reactor Pressure Circuits". no. 69. Iron and Steel Institute, London SW 1, England, 1961, p. 343-369.

Charpy V-notch and drop-weight test specimens of various pressure vessel steels and weld metals irradiated in several different nuclear and thermal environments to determine the individual effects of these irradiations on notch ductility and to investigate the effectiveness of post irradiation heat treatment for recovery of material properties. (Q23s, Q22n, 2-64, 2-67, T26q; ST, 17-57)

1499-Q. Neutron Irradiation Effects in Steels. R. G. Berggren. Paper from "Steel for Reactor Pressure Circuits". no. 69. Iron and Steel Institute, London SW 1, England, 1961, p. 370-381.

Changes of notch-impact transition temperature as a function of irradiation at less than 100° C. Varied effects of elevated irradiation temperature and post-irradiation annealing on the mechanical properties of steels are shown to be dependent upon steel composition and heat treatment, neutron flux, dose and spectrum and irradiation temperature. (Q6, Q23r, 2-60, 2-61, 2-64, 2-67; ST)

1500-Q. Influence of Some Metallurgical Variables on Irradiation Embrittlement of Ferritic Steel. L. P. Trudeau. Paper from "Steel for Reactor Pressure Circuits". no. 69. Iron and Steel Institute, London SW 1, 1961, p. 382-392.

Effect of steel purity, carbide phase and grain size on irradiation embrittlement at irradiation temperatures below 100° C. Irradiation near 200° C. (or heating into this temperature region after irradiation at a temperature below 100° C.) accentuates embrittlement. (Q26s, 2-59, 2-60, 2-61, 2-67; ST)

1501-Q. The Effect of High-Temperature Irradiation on the Tensile Properties of a Low-Alloy Steel. A. L. Lowe, Jr., and L. R. Weissert. Paper from "Steel for Reactor Pressure Circuits". no. 69. Iron and Steel Institute, London SW 1, 1961, p. 410-415.

Effects of irradiation temperatures on the mechanical properties of a low-alloy steel were studied. Tensile specimens of 1 1/4% Cr-1/2% Mo steel irradiated to about 2.5×10^{19}; nvt. (to 1 MeV.) from 725-1700° F. Preliminary results from post-irradiation tests conducted at room temperature indicate that above 800° F. the effect of radiation damage is reduced but full recovery of unirradiated properties does not occur until the irradiation temperature equals the annealing temperature. (Q27, 2-62, 2-67; AY)

1502-Q. Progress in Development of Some Improved Steels for Gas-Cooled Reactor Pressure Vessels. I. M. MacKenzie. Paper from "Steel Reactor Pressure Circuits". no. 69. Iron and Steel Institute, London SW 1, England, 1961, p. 437-462.

Three improved steels, a 28-32 tons per sq. in. tensile low-carbon high-manganese steel treated with Al and Mo to combine good notch ductility and high temperature strength; a multiple-alloy high-tensile steel based on a proprietary boiler steel extensively used for pressure vessel construction; a quenched and tempered low-carbon multiple- alloy steel providing high strength and toughness combined with good weldability. (Q-general, T11, T26q, 2-60, 2-62; ST, SGB-a, 17-57)

1503-Q. The Development of a High-Tensile Plate Steel for Use at Elevated Temperatures and Pressures. T. F. Pearson and M. Z. de Lippa. Paper from "Steel for Reactor Pressure Circuits". no. 69. Iron and Steel Institute, London SW 1, England, 1961, p. 463-516.

Two types of steel have been developed from an original Ni-Mo-V steel by an increase of the Ni content to 1.5% reduction of V to 0.1% and additions of either 0.3 or 0.5% Cr. These steels have given encouraging results with respect to combined tensile and impact properties. (Q6, Q27, 2-60, 2-62, 3-74; AY)

1504-Q. Steels for Nuclear Power Plant. K. J. Irvine and J. D. Murray. Paper from "Steel for Reactor Pressure Circuits". no. 69. Iron and Steel Institute, London SW 1, England, 1961, p. 517-533.

From the starting point of an Al-killed fine grain steel which has good impact resistance but poor creep strength both by a Mo-V addition and also by using an increased nitrogen content. The creep strength is increased by both methods but the Mo-V steel is preferred because of greater stability during extended tempering treatments. Creep properties are given for Affreeze III (0.12% C, 1.3% Mn, 0.22% Mo, 0.07% Mo, 0.07% V). (Q3, 2-60, 2-64, T26q; AY, 17-57)

1505-Q. Niobium in Carbon and Low-Alloy Weldable Steels. J. E. Russell. Paper from "Steel for Reactor Pressure

Circuits". no. 69. Iron and Steel Institute, London SW 1, England, 1961, p. 534-548.

Impact properties of carbon manganese steels manufactured to a specification similar to JTA 101 are very considerably improved and results on alloy steels with Mn-Ni-Cr-Mo-V and added Cb suggest that a tensile strength exceeding 40 tons per sq. in. with impact better than 20 ft. lb. at -10° C. are available on plates up to 5 in. thick in the normalized and tempered condition. (Q6, Q27a, 2-60, 2-64; AY, Cb)

1506-Q. How Should You Evaluate High-Strength Materials. G. K. Manning. Metal Progress, v. 80, Sept. 1961, p. 65-66.

Evaluation of high-strength materials based on the measurement of their load carrying abilities in the presence of the maximum stress concentration likely to exist on the finished part. Changing concepts of "adequate ductility"; odd effects at high strengths. (Q-general, Q23p, Q27, 3-66; SGB-a)

1507-Q. Testing Protective Coating on Metals. Paul Smits. Metal Progress, v. 80, Sept. 1961, p. 75-79.

Designed to evaluate anodic coatings on Al, a scrape-abrasion apparatus can also be used to test lacquer, porcelain enamel and other nonconductive coatings. (Q9n; Al, 8-70, 8-71, 8-73)

1508-Q. The Effect of Specimen Geometry on Determination of Elongation in Sheet Tension. E. B. Kula and N. H. Fahey. Materials Research & Standards, v. 1, Aug. 1961, p. 631-636.

Studies of influence of thickness and width on elongation in Cu, AISI 1020 steel and heat treated H-11 steel generate a prediction formula and indicate that area is of greater importance than absolute values of width or thickness. (Q23p, 1-53, 3-73; ST, Cu)

1509-Q. Temperature Effects on Material Characteristics. A. L. Jaumotte, A. H. Lefebvre and A. M. Rothrock. Paper from "Combustion and Propulsion Fourth AGARD Colloquium". Pergamon Press, Inc., New York 22, 1961, p. 362-394.

Temperature and stress resistance of Mo, Cb, cermets, Ni, Co, Cr and graphite are tested and mechanical properties are tabulated for applications in aeronautics and space technology. (Q-general, 2-61, 3-66; Mo, Cb, Ni, Co, Cr)

1510-Q. (Russian.) Influence of Deformation and Heat Treatment on Properties of EI437B Alloy. M. Ya. Dzuhutov and B. F. Vakhtanov. Kuznechno-Shtampovochnoe Proizvodstvo, Mar. 1961, p. 3-7.

Effect of the relative duration and temperature of deformation and heat treatment on the mechanical properties of Ni-base alloy. Testing of impact resistance, yield strength and heat resistance. (Q6, Q23b, P11, 2-61, 2-64, 3-67, 3-68; Ni-b)

1511-Q. Testing of Brazed Joints on Steel Tubes and Sheets. H. Koch and K. F. Zimmerman. Schweissen und Schneiden, v. 13, July 1961, p. 263-270.

Tensile, fatigue, notch-impact, impact-bending and bending tests on cold drawn, brazed (using solder containing 40% Ag and equal amounts of Cu, Zn and Cd) St 35.29 steel tubes and sheets. Comparison of brazed with welded joints. Microscopic and electron microscopic investigation of joint structure. (Q-general, K9n, M21; AY, 7-52)

1512-Q. (German.) New Foreign Developments in the Field of Brittle Fracture. K. Ruhl. Schweissen und Schneiden, v. 13, July 1961, p. 271-278.

Review of American, British and Japanese investigations of brittle fracture of various steels with emphasis on influence of three-dimensional stress state, stress rate and temperature; use of specified temperature ranges in acceptance specifications for steel; difference in behavior of steel in specimen and structural parts; and relations between damage temperature and specimen temperature. (Q26s, 2-61, 3-60; ST, 10-54)

1513-Q. (German.) Influence of Residual Elements on Semi-Killed Steel. Percival Greenway. Stahl und Eisen, v. 81, Aug. 3, 1961, p. 1047-1056.

Review of openhearth refining of semikilled steel for sheets and plates. Investigation of segregation of C, Si and Mn in a 13.5 ton ingot and influence of residual elements on mechanical properties. (Q-general, D2, 2-60, 9-69; ST-k)

1514-Q. Mechanical Properties of an Iron-Carbon Alloy During Allotropic Transformation. M. De Jong and G. W. Rathenau. Acta Metallurgica, v. 9, Aug. 1961, p. 714-720.

Mechanical weakness during allotropic transformation of polycrystalline Fe-0.2% C alloy is investigated by torsional deformation and tensile testing at 600-900° C. The weakness is correlated with the difference in specific volume of parent and product phase resulting in developed internal stress and the average hardness or yield stress of the two phases near the transformation temperature. 19 ref. (Q1, Q24c, Q27, N6p, 2-61, 2-64, 3-66, 3-73; Fe-b, C)

1515-Q. Non-Basal Slip and Twin Accommodations in Zinc Crystals. H. S. Rosenbaum. Acta Metallurgica, v. 9, Aug. 1961, p. 742-748.

An etch pit technique using HBr in ethanol is used to observe dislocation patterns on the basal plane of cleaved specimens after annealing and after deformation by compression at 77-300° K. Deformation modes are analyzed in terms of annealing and mechanical twinning and the accommodation of the resultant stresses by dislocations and the relation of slip band formation to orientation. 13 ref. (Q24a, Q24c, M26b, M-general, 2-61, 3-66, 3-68; Zn, 14-61)

1516-Q. (Italian.) Department of Material Testing. Istituto Sperimentale dei Metalli Leggeri--Rapporto Annuale 1960, 1961, p. 81-89.

Methods for determining corrosion, creep, fatigue, wear and friction resistance, yield strength and hardness of light alloys. (Q-general, R11; EG-a39)

1517-Q. (Italian.) Department of Technology. Istituto Sperimentale dei Metalli Leggeri--Rapporto Annuale 1960, 1961, p. 100-107.

Effect of forming and annealing conditions on mechanic characteristics of Al alloys. Centrifugal casting of Lubral antifriction alloy and results of plastic working (forging) on Ti and its alloys. Microstructure and comparison of tensile characteristics of various light alloys. (Q-general, Q27, 2-64, 3-68, E14, F22, M27; Al-b, Ti, EG-a39)

1518-Q. (Italian.) Improvement of the Workability of Cast Irons. Fonderia, v. 10, July 1961, p. 304.

Influence of nitrogen and ferrosilicon additions on the workability of cast iron. Experiments indicate that nitriding improves cast iron workability but that ferrosilicon has no significant effect. (Q23q, 2-60; CI)

1519-Q. (English.) X-Ray Investigation on the Fatigue Damage of Metals. Shuji Taira and Kazuo Honda. Bulletin of JSME (Japan Society of Mechanical Engineers), v. 4, no. 14, 1961, p. 230-237.

Specimens of carbon steel wire, cast iron and cast steel are stressed alternately in rotary bending and the fatigue process studied by observing the half-value width of X-ray diffraction lines taken from the (310) atomic plane. Changes in half-value breadth are indicated to be functions of microstresses. Nondestructive prediction of fatigue life is considered. 19 ref. (Q5, Q7; ST, CI)

1520-Q. (English.) Investigation on Dynamic Creep and Rupture of a Low Carbon Steel. Shuji Taira and Ryoichi Katerazawa. Bulletin of JSME (Japan Society of Mechanical Engineers), v. 4, no. 14, 1961, p. 238-246.

Dynamic creep and rupture tests are carried out at 450° C. on annealed specimens of 0.15% carbon steel under combined static and alternating stress in order to relate strength under dynamic stress to static creep strength. Dynamic creep rupture strength is predicted from static creep rupture data together with fatigue data. Dislocation oscillation is discussed as influenceing dynamic creep. 26 ref. (Q3m, 1-54; CN)

1521-Q. Some Special Cast Copper-Base Alloys. A. W. O. Webb and A. R. French. British Foundryman, v. 54, Aug. 1961, p. 355-364.

Tensile strength, pressure tightness, electrical conductivity and corrosion resistance are evaluated for selected Cu alloys. (Q-general, P-general; Cu-b, 5, 17-57)

1522-Q. Procedures for the Evaluation of Fracture Toughness of Pressure Vessel Materials. W. S. Pellini and J. E. Srawley. U. S. Naval Research Laboratory, NRL Report 5689, June 8, 1961, 26 p.

Fracture toughness requirements of materials for submarine hull structure, thin-walled aerospace and space

vehicles and thick-walled pressure vessels are evaluated in terms of in-service conditions. Survey of explosion crack starter, hydrostatic, explosive bulge, NDT (Navy drop test) and other test methods applied to low-alloy and structural steels and Al alloys. Data are given for low temperature mechanical properties. 24 ref. (Q23r, Q26s, T26q, T24, 2-63; ST, Al-b, 17-57)

1523-Q. (German.) Fatigue Strength of Low-Carbon Steels for Welding Constructions. C. Schaub. Radex Rundschau, Mar. 1961, p. 569-578.

Fatigue testing of welded steel sheet specimens of various compositions and heat treatment to investigate relations between yield point and fatigue strength as influenced by heat treatment and mechanical working. (Q7, 2-60, 2-64, 3-68; CN-g, 7-51)

1524-Q. Strengthening of Iron-Base Alloys Containing Columbium. E. E. Underwood, E. M. Stein and G. K. Manning. Metallurgical Society of AIME, Transactions, v. 221, Aug. 1961, p. 676-682.

The effect of Cb, C and Ni additions to ferritic and austenitic Fe alloys containing 20% Cr on microstructure, precipitation-hardening characteristics and high-temperature properties are investigated by metallographic, hot hardness and magnetic measurement at 68-2300° F. Strengthening is attributed to an enhanced interaction of Cb and Cr_4C particles dispersed within a stable austenitic matrix. 19 ref. (Q-general, Q29p, M27, N7, N8, P16, 2-60, 2-62; SS, Cb, Ni, C)

1525-Q. Dynamic Effects During Twinning in Alpha Iron. Erhard Hornbogen. Metallurgical Society of AIME, Transactions, v. 221, Aug. 1961, p. 711-715.

Twins are propagated into large annealed crystals of alpha iron-phosphorous and alpha iron-molybdenum solid solutions. Strain fields caused by interaction of the twins are explained by assuming that transmitted and reflected plastic waves are created when a twin strikes an obstacle with high velocity. The twin front itself is regarded as a shear wave that may be able to develop a one-dimensional shock front. The phenomena are related to brittle fracture criteria. 18 ref. (Q24b, Q24j, Q26s, 3-68; Fe-b, Mo, P, 14-67)

1526-Q. The Effect of Striation Substructure on the Critical Resolved Shear Stress of Zinc Single Crystals. J. Rezek and G. B. Craig. Metallurgical Society of AIME, Transactions, v. 221, Aug. 1961, p. 715-720.

The critical resolved shear stress of zone-refined Zn single crystals deformed in tension increases with increasing amount of striation substructure. The increase in strength with numbers of striations is accounted for by a dislocation pileup mechanism. A somewhat different means of plotting stress-strain data is introduced which allows a more unambiguous choice of yield stress to be made. 16 ref. (Q23b, Q24c, M26b, 3-68; Zn, 14-61)

1527-Q. The Strain Rate and Temperature Dependence of the Yield Point in Mo in Torsion. D. Weinstein, G. Sinclair and C. Wert. Metallurgical Society of AIME, Transactions, v. 221, Aug. 1961, p. 732-737.

Yielding and brittle-ductile fracture mechanisms in annealed arc-cast Mo during torsion loading are studied as a function of temperature (-200 to 500° C.) and strain rate (0.25-12.5 per sec.) with determination of the heat of activation of the embrittelment phenomenon as a function of stress. The rate effect in yielding is attributed in part to a site place change of carbon (or other interstitial atom) in the metal. 25 ref. (Q24c, Q26s, 2-61, 3-66, 3-68, 3-69; Mo-a)

1528-Q. Observations on Twinning in Zone-Refined Tungsten. H. B. Probst. Metallurgical Society of AIME, Transactions, v. 221, Aug. 1961, p. 741-743.

Mechanical twins are produced in zone-refined tungsten single crystals by explosive working at room temperature. The twins are parallel to (112) planes and have irregular boundaries rather than the classical plane twin boundaries. These boundaries are grooved surfaced in which the grooves themselves are parallel to a (111) direction and the sides of the grooves appear to be parallel to (110) planes. 5 ref. (Q24b, 3-67, 3-68, 3-72; W, 14-61)

1529-Q. Annealing Twins and Coincidence Site Boundaries in Zone-Refined Aluminum. K. T. Aust. Metallurgical Society of AIME, Transactions, v. 221, Aug. 1961, p. 758-761.

The occurrence of annealing twins in high-purity Al single crystals results in the formation of grain boundaries having orientation relationships which correspond to a high density of coincidence sites indicating that large-angle coincidence broundaries have lower free energies than large-angle noncoincidence boundaries. Observations are presented for the coherent structure of twin interfaces and the importance of interfacial energy in preferred orientation. 15 ref. (M27e, M26c, 2-64; Al-a, 14-61)

1530-Q. Embrittlement of NaCl by Surface Compound Formation. W. H. Class, E. S. Machlin and G. T. Murray. Metallurgical Society of AIME, Transactions, v. 221, Aug. 1961, p. 769-775.

The embrittling effects of oxygen, ozone, nitrogen, air and surface residues on NaCl is studied by microscopy, mechanical testing and X-ray diffraction. The embrittlement by oxygen and ozone exposures is associated with the formation of a $NaClO_3$ surface film. It is suggested that certain atmospheres which inhibit the formation or favor the decomposition of this compound can promote ductility. 8 ref. (Q26s, M-general, 2-66; NM-a33)

1531-Q. The Effect of Surface Removal on the Plastic Behavior of Aluminum Single Crystals. I. R. Kramer and L. V. Demer. Metallurgical Society of AIME, Transactions, v. 221, Aug. 1961, p. 780-786.

Al single crystals are pulled in an electrolytic cell allowing surface removal during the deformation. The extent of Stages I and II of the stress-strain curve is increased and the slope decreased as the rate of metal removed from the surface is increased. An increase of the strain rate causes a decrease in the effectiveness of the metal removal indicating that the workhardening coefficient in Stage I is determined primarily by the conditions which exist on the surface of the crystal. 32 ref. (Q24, Q23a, G23, 3-66, 3-68; Al, 14-61)

1532-Q. The Fracture Behavior of Silver Chloride-Alumina Composites. T. L. Johnston, R. J. Stokes, C. H. Li and K. H. Olsen (Appendix). Metallurgical Society of AIME, Transactions, v. 221, Aug. 1961, p. 792-802.

Investigation of the effect of Al_2O_3 particles on the nucleation and growth of cracks through a AgCl matrix. Fibrous cracking is promoted in dispersion-strengthened AgCl under notch-impact conditions at temperatures at which AgCl alone cleaves brittlely. The modification of fracture behavior is attributed to the relaxation of hydrostatic stress beneath a notch by the nucleation of cavities near Al_2O_3 particles. 14 ref. (Q26q, 2-60; Ag-b, 6-70, Al, 14-68)

1533-Q. Accleration of Deformation by Concurrent Phase Change. A. G. Guy and J. E. Pavlick. Metallurgical Society of AIME, Transactions, v. 221, Aug. 1961, p. 802-807.

The total creep of binary Sn alloys containing 0-8.46% Sb in solid solution at 210-220° C. is observed to decrease with increase in Sb content. However, near the solubility limit an anomalous maximum in deformation is found, in agreement with similar observations by Bochvar. 40 ref. (Q3, Q24, N-general, 2-60; Sn-b, Sb, 14-67)

1534-Q. Some Recovery Characteristics of Zone Melted Iron. J. T. Michalak and H. W. Paxton. Metallurgical Society of AIME, Transactions, v. 221, Aug. 1961, p. 850-857.

The recovery of flow stress following strain hardening of polycrystalline and monocrystalline, zone-melted Fe specimens as a function of the amount and temperature of deformation and the time and temperture of the recovery anneal is studied by stress-strain measurements and X-ray back reflection and transmission metallography. The recovery is characterized by time dependence, increase of activation energy with increase of recovery and increased rates with increased deformation and increased temperature. 34 ref. (Q22r, Q24, M-general, N-general, 2-64, 3-67, 3-68; Fe-a)

1535-Q. Effect of Temperature on Yielding in Single Crystals of the Hexagonal Ag-Al Intermetallic Phase. J. D. Mote, K. Tanaka and J. E. Dorn. Metallurgical Society of AIME, Transactions, v. 221, Aug. 1961, p. 858-866.

Specially oriented specimens of the intermediate phase containing Ag plus 33% Al are tested in tension at 77-800° K. to determine the operative strain-rate-controlling dislocation mechanisms.

Slip, twinning and fracture relations to orientation are observed with yield point phenomena. Critical resolved shear stress is shown to be due to combined Suzuki locking and short-range-order hardening. 18 ref. (Q23b, Q24, M26q, M26b, 2-61, 3-68; Ag-b, Al)

1536-Q. Temperature Dependence of the Yielding Behavior of SAP-Type Dispersion Strengthened Alloys. F. V. Lenel, G. S. Ansell and R. A. Bosch. Metallurgical Society of AIME, Transactions, v. 221, Aug. 1961, p. 892-893.

The 0.2% offset yield stress and the proportional limit for MD 2100 and MD 5100 alloys containing flake shaped Al_2O_3 particles dispersed in a matrix of commercial purity Al are determined as a function of the homologous temperature by tensile testing at -190 to 500° C. Of the terms which determine the theoretically predicted yield stress, only the shear moduli have an appreciable temperature dependence. 4 ref. (Q23b, Q21b, 2-61; Al-b, 6-70)

1537-Q. A Better Acoustical Barrier--Lead Sheet. Product Engineering (Design Digest Issue), v. 32, Sept. 4, 1961, p. 61.

High weight and low rigidity put Pt ahead of other common materials on the decible-loss chart. Comparison of sound transmission loss for various materials. (Q21f; Pb, 4-53)

1538-Q. Selecting and Using Hardness Testing Equipment. L. A. Welt. Metalworking, v. 17, Aug. 1961, p. 14-16.

Brinell, Rockwell and Diamond Pyramid hardness tests are compared in terms of principles and application of the indentation equipment and the relation between hardness values as determined by the methods. Hardness of metals is related to other mechanical properties and machinability. (Q29, 1-52)

1539-Q. Sintered Steel. Metalworking Production, v. 105, Aug. 9, 1961, p. 46-47.

Nickel steel sintered at 1300-1400° C. replaces mild steel forgings, reducing costs in many applications. Properties noted include high ductility, tensile strength, composition, hardness and density. (Q-general, 17-57; ST, Ni, 6-71)

1540-Q. (Spanish.) Impurities in Steel. Jose Maria Palacios Reparaz. Instituto del Hierro y del Acero, v. 14, Apr. 1961, p. 397-419.

Sources and effect of impurities including Ni, Cr, Mo, V, B, Sn, Cu, W, Zn, As, Sb, Al, S, P and N on inclusions, surface quality, impact strength, heat resistance, hot deformability, ductility and hardness depth of carbon steel, manganese-silicon steel and toolsteel. 21 ref. (Q-general, P11, 3-69; ST, CN, TS)

1541-Q. Experimentation, Analysis and Prediction for Environmental Creep. C. J. Giemza. Martin Co. Wright Air Development Div. U. S. Office of Technical Services, Jan. 1961, p. 106. $2.50.

A reliable index for creep behavior characterization cannot be provided by static properties as they are determined for the initial condition of the material or subsequent to some metallurgical change. Within practical design limits, the degradation of a material is a reasonable gradual process and the perception of degradation appears to lend itself to analytical representation. An appreciable increase of the secondary modulus of elasticity can result as the consequence of overaging for 7075-T6 Al alloy. (Q3, Q21; Al-b)

1542-Q. Hot Workability of Stainless Steel Ingots. Takeshi Kato, Toshimutsu Kanai and Haruo Abe. Yawata Technical Report, no. 231, June 1960, p. 101-103.

Hot twist tests on 304 and 430 steel ingots to measure formability as affected by addition of rare earth metals or Ca-Si deoxidizers and by heating before working. (Q23q, 1-66, 2-60, E25; SS)

1543-Q. (German.) Effect of Vibrations on Cutting Tool Wear. P. B. Patarinski and R. Chr. Nikolov. Comples Rendus de l'Academie Bulgare des Sciences, v. 14, Jan. 1961, p. 71-74.

Experimental machining of St. 45 steel using an R9 high-speed steel tool. Wear increases when vibrations of the frequency 5500-6500 cycles per min. are transmitted to the tool. 6 ref. (Q9, G17, T6n; ST, TS)

1544-Q. Relaxation Testing of Steam Turbine Bolt Materials With Simulated Re-tightening. J. H. M. Draper. Metallurgia, v. 64, July 1961, p. 3-6.

Turbine cylinder bolts of 1% and 12% Cr-Mo-V bolt steel are tested by tightening, loading, relaxing, retightening

and reloading. Stress time relationships for creep relaxation tests with reloading and effect of reloading on residual stresses at 625 and 650° C. 5 ref. (Q1c, Q3, Q25h, 3-67, 3-68, T7f; AY)

1545-Q. A New High Temperature Steel. Metallurgia, v. 64, July 1961, p. 14.

Development of a 15% Cr, 10% Ni, 6% Mn austenitic, creep resisting steel known as Esshete 1250. Steel requires resolution treatment for either hot or cold forming. Tensile strength, elongation, proof stress, proportionality limit, reduction of area, modulus of elasticity, stress to rupture and creep properties from 20-700° C. (Q-general, 2-61; SS-e, SGA-h)

1546-Q. Ductility in Internally Oxidized Silver Alloys. J. A. Slade and J. W. Martin. Metallurgia, v. 64, July 1961, p. 23-25.

Effect of small quantities of Ni or Co on intergranular brittleness of internally oxidized binary alloys of Ag with Al. Tensile stress, elongation and hardness. Effect of third element on grain boundary precipitation on internal oxidation. 9 ref. (Q23p, Q-general, N7b, 2-60; Ag-b, Al, Ni, Co)

1547-Q. (Slovak.) Fatigue Strength of Automobile Wheels. Oskar Izdinsky. Zvaranie, v. 10, Jan. 1961, p. 3-5.

Equipment and techniques for testing fatigue strength of riveted and welded wheels. Effect of design on fatigue strength of weldments. (Q7, 1-53, 3-73, T21c; 7-51)

1548-Q. Brittle Failure of Steel Stack. M. Zar and M. H. Goedjen. Welding Journal, v. 40, Aug. 1961, p. 371s-376s.

Investigation of probable stress levels of a 21-yr. old all welded mild steel stack indicates that failure was due to brittle fracture caused by temperature stresses in the plate and the fact that the steel temperature was far below the transition temperature. 10 ref. (Q26s, Q23r, 3-66; ST, 4-53, 7-51)

1549-Q. Dilatometric Characteristics of Welded Steels. L. F. Bubba, H. H. Johnson and R. D. Stout. Welding Journal, v. 40, Aug. 1961, p. 364s-370s.

Specimens of A212, A302, T-1, HY-80 and AISI 4140 steels and E11018 steel weld metal are subjected to a simulated welding thermal cycle. Quantitative measurements for strain accompanying transformation and for net strain imposed by the thermal cycle. Microstructure. 4 ref. (Q25, Q7j, M23b; ST)

1550-Q. (Russian.) Determination of Residual Deformations by the Method of Transparent Optically-Sensitive Films. N. I. Prigorovskii and P. T. Bogdyl'. Zavodskaya Laboratoriya, v. 27, June 1961, p. 721-724.

A polarization microscope is assembled as a double polariscope to measure the residual deformations caused by strains beyond the yield point. Polariscope permits simultaneous viewing of two different photographs. (Q24c, Q25h, M21g, 1-52)

1551-Q. (Russian.) Relaxation and Creep Strength Tests Under Continuous Tensile Loading Until Failure. L. Ya. Liberman and N. V. Volkova. Zavodskaya Laboratoriya, v. 27, June 1961, p. 724-729.

Determination of the plasticity reserve, sensitivity to stress concentration and elongation during repeated tensile loading of E1612 austenitic steel, 20KH1M1F1 construction steel and 28KHVFTS steel. 4 ref. (Q3, Q24h, Q23p; ST)

1552-Q. (Russian.) Development of an Equation for Relaxation of Tensions. L. P. Nikitina. Zavodskaya Laboratoriya, v. 27, June 1961, p. 730-738.

Influence of initial elastic deformation and repeated loading on relaxation during stretching of steel. Concentration of plastic deformation. 7 ref. (Q3, Q24h; ST)

1553-Q. Neutron-Induced Changes in Notch Ductility of Reactor Pressure Vessel Steels. L. E. Steele and J. R. Hawthorne. American Nuclear Society, Transactions, v. 4, June 1961, p. 92-93.

Effect of irradiation, irradiation temperature (200-550° F.) and annealing on ductile to brittle transition temperature of A212B, A302B, A201 and SA336 steels in the form of plates, forgings and weldments. (Q23r, 2-61, 2-64, 2-67; ST, 4-51, 4-53, 7-51)

1554-Q. Application of New Cobalt-Base Alloy in Metallurgical Furnaces. Metal Treating, v. 7, Aug-Sept. 1961, p. 40, 45.

Physical and mechanical properties of UMCo 50 containing less than 0.1% and

1-2% carbon. Applications include water quenching baskets, electrodes for salt-bath furnaces and metallic shields for refractory bricks. (Q-general, 17-57; Co-b)

1555-Q. Porous Metals Get Rid of Foreign Parts. H. F. Johnson. Canadian Metalworking, v. 24, Sept. 1961, p. 44-47.

Controlled porosity metal powders used as filters easily remove particles as small as 2 microns. They have excellent shock resistance and ductility, especially when compared to ceramic type filters. They also give good flow/pressure drop characteristics. (Q-general; 6-71)

1556-Q. (Japanese.) Abrasion Test of High Manganese Point. Akira Yagi. Osaka Industrial Research Institute, Bulletin, v. 12, Jan. 1961, p. 45-53.

Laboratory and outdoor testing of high Mn and chromium-manganese steel used for railroad rails and wheels to determine abrasion characteristics. Test effects on hardness, wear amount, antishock toughness and sliding friction. 11 ref. (Q9, Q29, 1-54, T23; ST, Mn, Cr)

1557-Q. (Japanese.) The Effect of Atmosphere on the Frequency Effect in High Temperature Fatigue of a Carbon Steel. Kichiro Endo. Japan Society of Mechanical Engineers, Transactions, v. 27, July 1961, p. 1107-1112.

Use of dried town gas as an inert environment to study the influence of high temperature oxidation and gas atmosphere on corrosion fatigue at various temperatures and cyclic frequencies. At 550° C. the fatigue strength is higher in gas than in air. 18 ref. (Q7a, R1h, 1-54, 2-62, 2-66; CN, RM-m)

1558-Q. Low Alloy Constructional Steels--The Influence of Chemical Composition on Their Mechanical Properties. A. G. Haynes. Research Applied in Industry, v. 14, Sept. 1961, p. 367-376.

The effects of alloy and impurities on microstructure after heat treatment and on tensile and fatigue strength and impact resistance. Application to 18% Ni-Co-Mo steel with ultra high tensile strength and ductility. 13 ref. (Q-general, N8a, 2-60, 3-69; AY, Ni, Co, Mo)

1559-Q. (Japanese.) X-Ray Study on Fatigue of Metals. Shuji Taira and Kazuo Honda. Japan Society of Mechanical Engineers, Transactions, v. 27, July 1961, p. 1066-1073.

Observation of the half value breadth of intensity distribution curves taken from X-ray diffraction lines. Fatigue sequential stages are analyzed as they relate half value breadth and to the possibility of nondestructive prediction of fatigue life in cast iron and steel. 20 ref. (Q7, S13e; CI, ST)

1560-Q. High Temperature Materials--Today and Tomorrow. Materials in Design Engineering, v. 54, Aug. 1961, p. 127-128, 145-146, 148.

Summary of five AIME papers on the present and future status of Co, Ni, Ta, W, Mo, Cb and their alloys, graphite and refractory compounds and high temperature coatings for Mo, Cb and Ta. Effects of temperature and stress on mechanical properties and structure. (Q-general, M26, 2-61, 3-66; Co, Ni, Ta, W, Mo, Cb, NM-k36, SGA-h)

1561-Q. The Influence of Base-Lubricant Viscosity and Boundary Additions on Surface Contact and Friction During Metal Deformation. L. H. Butler. Institute of Metals, Journal, v. 89, Aug. 1961, p. 449-455.

Compression tests on annealed and workhardened sheet Al testpieces, the die/metal interfaces being either unlubricated or lubricated with pure paraffinic-base and compounded lubricants. Increase of the viscosity of the base lubricant and the presence of small percentages of a boundary additive (oleic acid) decreases the extent of matching between the die and deforming surface, and with it the surface reflectivity and interfacial coefficient of friction. 9 ref. (Q9p, 18-73; Al-b, 4-53)

1562-Q. The Tensile Properties of Heavily Deformed Molybdenum After Neutron Irradiation. D. N. Sethna, A. A. Johnson, K. J. Proud and S. S. Sheinin. Institute of Metals, Journal, v. 89, Aug. 1961, p. 476-478.

The ductile-brittle transition temperature of heavily swaged commercial purity Mo is measured before and after irradiation to doses of up to 4×10^{19} nvt. with tests in a Hounsfield tensometer at a strain rate of 0.88×10^{-4} sec^{-1}. Data are given for tensile strength, yield and brittle fracture stress, elongation and

reduction in area as a function of temperature. 7 ref. (Q27, Q23r, 2-61, 2-67, 3-68; Mo-a)

1563-Q. Hot-Hardness of Aluminium Alloys Containing Various Amounts of $CuAl_2$. E. R. Petty. Institute of Metals, Journal, v. 89, Aug. 1961, p. 478-479.

Vickers hardness tests on extruded wire specimens containing 1-40% Cu and heat treated at the extrusion temperature (530° C.) for 1/2 hr. Effect of composition and resultant $CuAl_2$ dispersion on hot hardness at 20-500° C. 4 ref. (Q29p, 2-60, 2-64; Al-b, Cu)

1564-Q. The Influence of Quenching on Twinning in Zinc Single Crystals. Katsumi Okada and Shigeyasu Koda. Institute of Metals, Journal, v. 89, Aug. 1961, p. 479-480.

Effect of clustering of quenched-in vacancies as a function of quenching strain on twin formation in 99.998% Zn crystal specimens quenched from 320-0° C. Data are given for stress-strain and orientation relations. 5 ref. (Q24b, M26s, N7, 2-64, 3-68, 3-72; Zn, 14-61)

1565-Q. (Japanese.) Relation Between Slack-Quenched Homogeneous Structures and Mechanical Properties of Spring Steel. Michira Uchiyama, Fujio Seki and Kazunori Kamishohara. Tetsu-To-Hagane (Iron and Steel Institute of Japan, Journal), v. 47, Aug. 1961, p. 1163-1169.

Specimens of Si-Mn (SUP6), Mn-Cr (SUP9) and C (SUP3) spring steels with sorbitic, pearlitic, bainitic and martensitic as-quenched structures are tempered to 300-500 Brinell hardness and subjected to torsion, bending, fatigue and impact tests. Mechanical properties, particularly fatigue and proportional limits, are related to microstructures. 22 ref. (Q-general, M27, N8, 2-64, 3-73; SGA-b, ST)

1566-Q. (Japanese,) Effect of Nickel and Boron on Properties of 18CR-12Nickel Stainless Steel. Ryuichi Nakagawa and Yasuo Orghro. Tetsu-To-Hagane (Iron and Steel Institute of Japan, Journal), v. 47, Aug. 1961, p. 1169-1174.

Aging behavior, microstructure, precipitation phenomena, oxidation resistance, creep and tensile properties and Vickers hardness of austenitic stainless specimens containing 0.052-0.207% N or 0.05-0.2% B are investigated by mechanical testing and X-ray diffraction after aging at 600-750° C. and solution treatment at 1100° C. for various times. 6 ref. (Q-general, M27, N7, R1h, 2-60, 2-65; SS-e, N, B)

1567-Q. (Translation-AIP.) The Elastic Properties of Crystals--Review. K. S. Aleksandrov and T. V. Ryzhova. Soviet Physics--Crystallography, v. 6, Sept-Oct. 1961, p. 228-252.

The elastic constants of crystals of 33 elements (and various compounds of these) in the cubic, monoclinic, rhombic, tetragonal, trigonal and hexagonal systems are determined as functions of temperature and stress-strain relations and are analyzed in terms of Raman-Laual theory. 180 ref. (Q21, 10-54; 14-61)

1568-Q. (German.) Internal Friction of Uranium. A. I. Daskovoskij, A. I. Eustjuchin, E. M. Savickij and D. M. Skorov. Kernenergie, v. 4, May 1961, p. 404-408.

Investigation of the influence of temperature and structure in a torsion pendulum under vacuum at 20-850° C. using cold drawn heat treated wires of 0.98 mm. diameter. (Q22, 1-53; U)

1569-Q. Which Carbide Grade Is Best? Production, v. 48, Sept. 1961, p. 72-73.

Comparison of physical and mechanical properties and steel cutting applications of Carboloy grades 78B and 370 carbides. Influences of TaC and Co content and temperature deformation resistance on Rockwell A hardness and transverse rupture strength. (Q-general, P-general, G17, 2-60, 2-62, 17-52; W-b, Ta, Co, 6-69)

1570-Q. (German.) Significance of Relations Between Tensile Testing Data and Bursting Pressure Data of Aluminum Foils. E. Amann and H. Langen. Schweizer Archiv, v. 27, July 1961, p. 313-325.

Tensile testing of hard and soft Al foils (Al 99.5 and Al 99.3) of various thickness and of different rolling directions and bursting tests. Relation between tensile testing data and bursting pressure measurements. 25 ref. (Q27, Q10b, 1-54; Al, 4-56)

1571-Q. (Russian.) Influence of Substructure on Creep of Nickel. V. M. Rosenberg. Fizika Metallov i Metallovedenie, v. 11, June 1961, p. 899-909.

Interference microscopic determination of the influence of polygonization caused by deformation and annealing on the speed of the fine and coarse creep inside the grain and on the relative displacement of the grain on the surface. 25 ref. (Q3, 3-71; Ni)

1572-Q. (Russian.) A Single Equation for Plastic Dilation of Metals. G. P. Zaitsev. Fizika Metallov i Metallovedenie, v. 11, June 1961, p. 910-918.

Development of an equation applicable to any technical metal for determining values of elongation and contraction. Influence of the metal plasticity constants on the relationship between tension and deformation. 7 ref. (Q24, 3-66)

1573-Q. (Russian.) Protracted Hardness of Low Melting Point Alloys at Different Temperatures. V. P. Shishokin and L. N. Baxilevskii. Fizika Metallov i Metallovedenie, v. 11, June 1961, p. 942-943.

Determination of mechanical properties of metals and eutectic alloys by testing their hardness under stress for different periods of time. 6 ref. (Q29, Q-general, 3-66, 3-67)

1574-Q. Alloys for Aircraft Gas-Turbine Rotor Blades. E. Glenny. Foundry Trade Journal, v. 111, Sept. 7, 1961, p. 293-302.

Typical compositions of high temperature Ni-base alloys; stress to rupture and creep properties; short-term tensile properties; mechanical and thermal fatigue characteristics. It is generally agreed that an increase in temperature of some 50-100° C. is the most that can be expected from conventional alloys. 24 ref. (Q-general, T24b, 2-62; Ni-b, SGA-h, 17-57)

1575-Q. (German.) Adhesive Strength of Metal Coatings on Ceramics. J. Kotowski and J. Muschaweck. Vakuum-Technik, v. 10, June 1961, p. 141-145.

Microscopic investigation and measurement of adhesive strength of brazable Mo-Mn coatings on ceramics containing 85% Al_2O_3 as influenced by burning temperature. Technology of sintering of Mo-Mn metal powders on surface of ceramics under hydrogen atmosphere at 1000-1600° C. (Q10c, H14h, 2-62; Al, Mo, Mn, 6-68, 6-70)

1576-Q. (German.) Development in the Field of Reinforcing Steels. Safety Assessments. M. Ros and A. Eichinger. Osterreichisches Ingenieur-Archiv, v. 15, 1961, p. 172-175.

Field point, tensile strength, elongation, bending strength, contraction, stress corrosion resistance, fatigue strength and creep of various steels used to reinforce concrete are considered in terms of safety requirements. (Q-general, R11s, T26; ST, 17-57)

1577-Q. Foil Tester Takes New Approach. Iron Age, v. 188, Sept. 28, 1961, p. 97.

Hydraulic bulge tester cups a punched disk to register the materials' yield plus ductility. Tests show that bulge height at failure is an adequate criterion of ductility. Application to heat treated 17-7 PH stainless steel. (Q10b, 1-52; SS, 4-56)

1578-Q. Reports on Fatigue Failures. British Welding Journal, v. 8, Sept. 1961, p. 70s-78s.

Reports from Commission XIII of the International Institute of Welding on fatigue failure of welded assemblies in service. Failures noted include bottom plating on low-tonnage motor vessels. Welded water tanks of locomotive tenders and truck frame longitudinal member. (Q7b, Q7k, T26, T22g, T26q; 7-51, 11-63)

1579-Q. Observations on the Results of Torsion Relaxation Tests Carried Out on Four Typical Heat-Resisting Steels. P. Brozzo. British Welding Journal, v. 8, Sept. 1961, p. 79s-82s.

Relaxation tests under torsion load for Cr and Cr-Mo heat resisting steels previously heat treated. Relaxation curves plotted which indicate effect of temperature on elastic limit and creep deformation and the influence of stress on the curves themselves. (Q1c, 2-61, 3-66; ST, SGA-h)

1580-Q. Selecting Lightweight Metals. R. E. Johnson. Machine Design, v. 33, Sept. 28, 1961, p. 168-169.

High-temperature properties are tabulated by plotting a strength-cost-density ratio against temperature. Data obtained for Ti-Mo-Co, Ti-Mo,

W-Ta, Al-3 Mo-IV Ti, Rene 41, Inconel X alloys and PH 15-7 Mo stainless steel for applications at temperatures to 2800° F. (Q-general, 2-62; EG-a39, 17-57)

1581-Q. (German.) Investigation of Scattering of Blank Hardness of Alloyed Case Hardenable Steels. Sepp Ammarellar, Walter Knorr and Gerhard Tacke. Archiv fur das Eisenhuttenwesen, v. 32, July 1961, p. 461-466.

Measurement of blank hardness of normalized disk specimens (5, 10 and 20 mm. thick) of 16 MnCr 5 steel with 0.16% C and 20 MnCr 5 steel with 0.2% C and comparison with end-quench hardness. Statistical evaluation of reproducibility of blank hardness test results. (Q29, 2-64; AY)

1582-Q. (German.) Investigation of Hardness as Influenced by Testing Load in the Range of Small Testing Loads. Werner Schmidt. Archiv fur das Eisenhuttenwesen, v. 32, July 1961, p. 467-473.

Microhardness testing of pure iron, high-speed steels (1.2-1.5% C, 4% Cr, 1-3.5% Mo, 4.5-10% Co, 3.5% V, 2% W) and hard metals (6-25% Co, bal. WC) at varying loads using indenters of different shape. Influence of testing load on measured hardness. (Q29q; Fe-b)

1583-Q. (German.) Plastic Deformation of Neutron Irradiated Copper Single Crystals. Uwe Essmann, Siegfried Mader and Alfred Seeger. Zeitschrift fur Metallkunde, v. 52, July 1961, p. 443-454.

Investigation of workhardening by tensile stressing at temperatures from 90-513° K. and microscopic and electron microscopic (replica method) examination of surface phenomena (gliding mechanism) of neutron-irradiated Cu single crystals of the same orientation. Comparison with nonirradiated specimens. (Q23a, Q27, 2-67, 3-68, 3-72; Cu, 14-61)

1584-Q. (German.) Relations Between Stress-Strain Curves and Material Characteristics of Plastic Metallic Materials. Walter Panknin and Galal S. A. Shawki. Zeitschrift fur Metallkunde, v. 52, July 1961, p. 455-461.

Equations for computation of stress-strain curves, tensile strength, workhardening and deformation work are verified by tensile testing of sheets of various materials including V2A steel, AlMn alloy, CuNi alloy (62% Cu, 18% Ni) and brass. (Q27, Q23a, 1-53, 2-60, 3-68; ST, Al-b, Cu-b)

1585-Q. Hydrogen Embrittlement of High Tensile Steels During Chemical and Electrochemical Processing. L. E. Probert and J. J. Rollinson. Electroplating and Metal Finishing, v. 14, Sept. 1961, p. 323-326, 342.

Factors affecting embrittlement including carbon content, ultimate tensile strength and hardness of the steel and contaminating properties of the process involved. Debrittlement heat treatment and effect of differential pressures at the surface of high tensile steels. (Q26s, 2-60, 2-64, 3-74; ST, SGB-a)

1586-Q. Faster, Less Expensive Creep Data. Michael Korchynsky. Materials in Design Engineering, v. 54, Sept. 1961, p. 124-126.

Master diagram correlates material, temperature, stress, creep rate and rupture time. The diagram can be used to choose a material that will operate at a given temperature, stress and creep rate. If the material has already been selected, then the creep rate or rupture time can be determined at given stress and temperature levels. (Q3, 17-57)

1587-Q. Hydrogen Embrittlement of High Strength Steels. Larissa Domnikov. Metal Finishing, v. 58, Sept. 1961, p. 52-55.

Study of brittleness as affected by electrodeposition of Zn, Cd, Cu, Cr, Sn and Pb. Plastic properties are measured as functions of electrolyte solutions, plating time, current density and plating metal. (Q26s, L17c; ST, SGB-a)

1588-Q. (Translation-Brutcher no.5068.) Mechanical Properties of Steel Improved by Combined Heat and Ultrasonic Treatment. E. A. Al'fran. Izvestiya VUZ-Chernaya Metallurgiya, Sept. 1960, p. 160-166.

Previously abstracted. See item 909-Q, 1961. (Q23r, Q29n, M27, 1-74, 2-64; AY)

1589-Q. (Translation-Brutcher no. 4316.) Embrittlement of 20% Cr, 14% Ni, 2.5% Si

Steel During Aging at 500-650° C. A. V. Tikhomirov. Metallovedenie i Obrabotka Metallov, v. 8, Aug. 1958, p. 22-25.

Study of 0.08% C, 1% Mn, 2.5% Si, 20% Cr, 14% Ni, 0.025% P, 0.012% S steel as-delivered, as-austenized and stabilized for susceptibility to embrittlement and intergranular corrosion during 1500 hr. of aging between 930 and 1200° F. Variation of tensile and impact properties during aging; causes of brittleness; impact toughness as criterion. (Q26s, R2h, 2-65; SS)

1590-Q. (Translation-Brutcher no. 5115.) Attenuation of Ultrasonic Waves in Chrome-Nickel Austenitic Steels. P. Midecke. Materialprufung, v. 3, Jan. 1961, p. 1-4.

Previously abstracted. See item 491-Q, 1961. (Q8g, 1-74; SS, 4-51, 5)

1591-Q. (Translation-Brutcher no. 5170.) Effect of Solution Treatment on High-Temperature Properties of 18-8 Ti Steel. K. Ono. Tetsu-To-Hagane (Iron and Steel Institute of Japan), v. 47, Mar. 1961, p. 552-554.

Lack of consistent data on stress-rupture properties of 18-8 Ti stainless. Data on compositions and solution heat treatments. Effect of solution treating temperature on tensile properties, stress-rupture times; rupture strength and grain size of 18-8 Ti versus 18-8. (Q3q, 2-62, 2-64; SS, Ti)

1592-Q. (Translation-Brutcher no. 5236.) Effect of Boron Additions Upon Low-Temperature Impact Toughness of Austenitic Steel. V. V. Levitin. Fizika Metallov i Metallovedenie, v. 11, Apr. 1961, p. 564-567.

Effect of 0.0005 and 0.005% B upon impact toughness of 0.08% C, 18% Cr, 9.3% Ni, 1.2% Mn steel at subzero temperatures after various periods of aging (Tables 1 and 2) at various temperatures. Results of micro-examination; appearance of fracture faces. (Q6, 2-62, 2-60; SS-e, B)

1593-Q. Structural Changes in Metallic Coarse Grains Subjected to Explosive Loads. S. Singh and R. C. Deshpande. Indian Institute of Metals, Transactions, v. 14, Mar. 1961, p. 68-74.

Metallographic observation of deformation modes in strain-annealed 3% Si steel and commercial Al, the steel exhibiting a highly deformed and twinned region adjoining a recrystallized region at the edge of the explosive crater with the Al specimen showing a narrow deformed region. Twin direction and spacing, microhardness and fracture appearance are related to shock velocity and the plastic properties of the metals. 14 ref. (Q24a, Q26, M-general, 3-67, 3-68; Al, Fe-b, Si)

1594-Q. The Abrasion of Materials by Carborundum Paper. A. Selwood. Wear, v. 4, July-Aug. 1961, p. 311-318.

Measurement of the rate of wear of metals including mild steel, brass, Al alloy, Pb, Sb, WC and Ni and of plastic, ceramics, rubber and nylon under standard conditions of abrasion with carborundum paper. Importance of extensibility as well as hardness in determining the resistance to this type of wear. 5 ref. (Q9)

1595-Q. Investigation of Delayed-Cracking Phenomenon in Hydrogenated Unalloyed Titanium. R. A. Wood, H. R. Ogden and D. N. Williams. Defense Metals Information Center, Battelle Memorial Institute, DMIC Memo. 124, Aug. 30, 1961, 18 p.

Study of strain-aging embrittlement effects and the effect of hydrogen and oxygen content on delayed cracking, structure and tensile, stress-rupture and impact strength of vacuum annealed and hydrogenated Ti. 18 ref. (Q26, Q-general, 2-60; Ti-a)

1596-Q. (Translation.) Plastic Deformation of Textured Beryllium. Amoenko, Tukhunskii, Finkel, Azhazha and Shpazin. Soviet Physics--Solid State, v. 3, Sept. 1961, p. 580-584. (Translation of Fizika Tverdogo Tela, v. 3, Mar. 1961).

Be foil of 99.987% purity is obtained by condensation of Be vapor in vacuum (10^{-6} mm. Hg) on a Mo substrate. The texture of the foil is observed as a function of the condition of the substrate, the foil having its basal (001) plane coincident with the condensate for a neutral substrate and a 45° inclination for a rolled, degassed Mo substrate. Temperature variation of plasticity and elongation is determined for three foil textures at 20-800° C. (Q24, C22h, 1-53, 2-61; Be, 4-56)

1597-Q. (Translation.) Mechanism of Brittle Rupture of Metal Crystals. Kochanova, Shchukin and Likhtman. Soviet Physics--Solid State, v. 3, Sept. 1961, p. 656-661. (Translation of Fizika Tverdogo Tela, v. 3, Mar. 1961).

The role of shearing and normal stresses in brittle rupture are analyzed in terms of plastic deformation and resulting stress concentrations. The size of cracks developed in amalgamated Zn monocrystals subjected to various deformations is measured and compared to theoretical values. Breaks resulting from brittle rupture are explained as a function of edge and screw dislocations. (Q26s, M26b, 2-60, 3-66; Zn, 9-72, 14-61)

1598-Q. Complex Stress Creep Fracture of Copper at 250° Under Vibratory Stress. A. E. Johnson, J. Henderson and B. Khan. Engineer, v. 212, Aug. 25, 1961, p. 304-308.

Fracture tests are conducted on Cu under pure and combined stress creep, fatigue and pure stress fatigue conditions. Effect of tensile and shear stress on cracking characteristics are examined by metallographic methods. (Q3, Q26, 3-66; Cu)

1599-Q. (French.) Improvement in the Wear Resistance of Austenitic Steels Containing Manganese. F. J. Maratray and T. E. Norman. Revue de Metallurgie, v. 58, June 1961, p. 489-506.

Study of microstructure and physical properties of austenitic steel with high C and low Mn content, stabilized with Mo. Comparison with Hadfield steel and nickel hard cast iron. 17 ref. (Q9n, M27, P-general; ST, Mn, Mo)

1600-Q. (Japanese.) Mechanical Properties of Molybdenum-Copper Cast Iron Heat Treated Isothermally. Tohei Ototani and Youichi Tokunaga. Imono (Japan Foundrymen's Society, Journal), v. 33, June 1961, p. 404-411.

The S-curve is obtained for 0.4% Mo-1.3% Cu cast iron after austenitizing at 900° C. using dilatometric and metallographic methods with subsequent investigation of mechanical properties after isothermal treatments at 250-675° C. Data are given for tensile strength, hardness, wear resistance and toughness, with properties and microstructure being related to bainitic and pearlitic transition, martempering and isothermal treatment temperatures and stabilizing influence of undecomposed austenite in the matrix. 16 ref. (Q-general, N8g, 2-64; CI)

1601-Q. (Japanese.) The Wear Resistance of Spheroidal Graphite Cast Steel Having Various Matrices. Yoshihiko Abe. Imono (Japan Foundrymen's Society, Journal), v. 33, June 1961, p. 421-427.

Comparative wear in dry abrasion tests of different matrix layers obtained by normalizing, oil quenching and tempering of specimens at 200-850° C. for various times. Effect of tempering temperature, workhardening and oxidizing and nitriding reactions on macro and microstructure and matrix appearance. Influence of combination of identical and extremely different layers on wear. (Q9, M26, N8a, 2-64; ST)

1602-Q. Mechanical Properties of Sandwich Structures. Space/Aeronautics R & D Technical Handbook, v. 4, 1961-1962, p. B18-B20.

Nomographs for determining the allowable bending moment of honeycomb panels, the heat gradient through stainless steel and Al honeycomb panels and the weight of honeycomb panels of PH15-7Mo and 17-7PH. (Q-general, P10, P11k; SS, Al, 7-59)

1603-Q. Cryogenic Materials. Space/Aeronautics R & D Technical Handbook, v. 4, 1961-1962, p. H18-H19.

Mechanical properties for the following materials, for applications to liquid hydrogen temperatures--AISI 301 and AISI 304L stainless steels, ASTM A353 steel and a 6Al-4V Ti alloy. (Q-general; SGB-r, SS, CN-g, Ti-b)

1604-Q. High-Strength Steel Extrusions. Space/Aeronautics R & D Technical Handbook, v. 4, 1961-1962, p. I12-I13.

Mechanical properties, heat treatment and availability of steel extrusions, mainly of the AISI 4100 and 4300 low-alloy series for aerospace applications. Tabulation of parameters governing specification of materials. (Q-general, J-general, T24e; SGB-a, AY, 4-58, 17-57)

1605-Q. (French.) Fatigue Strength of Steel Springs. Pierre Caffier. Mecanique Electricite, v. 45, May 1961, p. 53-58.

Springs of alloy and carbon steel are fatigue tested indicating influences of composition, low temperature (to -50° C.) and surface roughness and establishing parameters for design. 9 ref. (Q7a, 1-53, 2-60, 2-63, 3-71, T7c, 17-51; AY, CN)

1606-Q. (Russian.) Study of Technological Plasticity of Stainless Steels. N. I. Korneev, H. M. Morokhovets, F. I. Filatov and V. P. Manich. Kuznechno-Shtampovochnoe Proizvodstvo, Apr. 1961, p. 9-12.

Testing stainless steels for tensile, compression and impact resistance strengths as a function of temperature (600-1300° C.) and deformation with tabulation of results. (Q-general, 2-61, 3-68; SS)

1607-Q. How Metals React in Space. Steel, v. 149, Oct. 2, 1961, p. 58-59.

Steel rod, vinyl, Cd, Zn, Ti, W, Pt and alloys are tested in simulated outer space conditions to observe changes in tensile strength and brittleness and such phenomena as metal evaporation and cold welding as functions of high temperatures and low pressures. (Q-general, T24e, 2-62, 3-74; 17-57)

1608-Q. (Italian.) Influence of the Graphite Form and Distribution on the Quality of Piston Rings Made of Alloyed Cast Iron. Fonderia, v. 10, Aug. 1961, p. 337-340.

Inoculation and casting of Fe alloyed with Cr, Ni, V and die. Determination of wear resistance and thermal stability as a function of eutectic and lamellar graphite. Brinell hardness, eutectic coefficient, humidty and compression resistance. (Q-general, E-general, N8, 2-60, 3-71; CI, Cr, Cu, Ni, V, 5)

1609-Q. Resonant Strength of a Vibrating Member Having Two Degrees of Freedom With Hysteresis Damping. M. G. Sharma. International Journal of Mechanical Sciences, v. 3, Aug. 1961, p. 118-128.

Comparison of experimental and theoretical damping characteristics of various alloy shafts of Al, Mg, Ti and steel (SAE 1020, SAE 4130). Only hysteresis of material damping is considered in the energy dissipation of the fixed shafts. Fluctuating loads are induced to produce stresses which become critical when resonance occurs in either of the co-ordinates of the vibrating system. 7 ref. (Q21, Q8, 1-54; ST, Al-b, Mg-b, Ti-b)

1610-Q. NBS Conquers Metal Fatigue. Iron Age, v. 188, Oct. 5, 1961, p. 72-73.

Smooth and notched test bars of 4340 steel, Cu-Be alloy, 6061-T6 Al alloy and 17-7 PH stainless steel are coated with dodecyl-alcohol and subjected to fatigue tests which indicate a reduction of fatigue crack propagation rate. Nominal stress amplitude and fatigue life values are listed for clean and coated samples. (Q7, L26; SS, ST, Cu-b, Be, Al-b, NM-b)

1611-Q. (Japanese.) The Wear Resistance of Various Cast Irons Having Different Graphite Shapes. Yoshihiko Abe. Imono (Japan Foundrymen's Society, Journal), v. 33, July 1961, p. 496-502.

Dry abrasion wear testing of malleable, nodular and flake graphite cast irons and nodular cast steel after normalizing at 850° C. for 2 hr. Effect of graphite shape, dimension and distribution in the matrix on wear resistance, surface roughness and Rockwell B microhardness. (Q9, N8s, 2-60, 2-64; CI, ST)

1612-Q. (Japanese.) Damping Capacity and Mechanisms in Cast Iron. Hifumi Hotta. Imono (Japan Foundrymen's Society, Journal), v. 33, July 1961, p. 511-518.

Measurement of damping capacity in gray, nodular, malleable and Meehanite cast irons and cast steel as a function of composition up to 4.05% carbon, bending strain and structural characteristics. Damping capacity is unchanged for up to 3% carbon, but increases sharply thereafter due to the carbon mass effect and is affected by the shape of the graphite in the matrix and by strain amplitude. The high damping capacity of gray iron is attributed to dislocation movement due to stress concentration. 9 ref. (Q8g, M26c, 2-60, 3-66, 3-68, 3-73; CI, ST)

1613-Q. A Summary of the Theory of Fracture in Metals. J. W. Spretnak. Defense Metals Information Center, Battelle Memorial Institute, DMIC Report 157, Aug. 7, 1961, 64 p.

Investigation into discrepancies between theoretical and observed strengths of metals, alloys and minerals including Cu, Al, Fe, Mo, Cr, Mg, Zn, Bi, Te, Al-Zn, Si-Fe and Zn-Cd alloys and rock salt. The relationship of plastic flow to crack initiation is considered in terms of lattice imperfections, polycrystalline aggregate characteristics of metals, anisotropy and shear deformability. 51 ref. (Q-general, 3-71, 3-72)

1614-Q. A Theory for the Occurrence of Intrinsic Resonances in Stressed Solid Materials. S. R. Bodner. Society of Rheology, Transactions, v. 5, 1961, p. 297-316.

Measurement of resonance frequencies in samples of loaded, prestressed Al. Discussion of a theory attributing some of the unpredicted resonances observed to dislocations in the material which make it possible for self-excited oscillations to occur. 21 ref. (Q22, Q8, M26b, 3-66; Al)

1615-Q. Columbium Treated, Mild Carbon, Semikilled Steels. C. L. Altenburger. Paper from "Regional Technical Meetings, 1960". American Iron and Steel Institute, New York 17, 1961, p. 59-78.

Tensile properties, toughness, grain size and hardenability of steels as affected by Cb content. Weldability and formability characteristics in fabrication of steel sheet and plate. (Q-general, J5, M27c, 2-60; CN, Cb)

1616-Q. Cause and Effect of Work Hardening in Austenitic Stainless Steels. H. E. Tomlinson, Jr. Paper from "Regional Technical Meetings, 1960". American Iron and Steel Institute, New York 17, 1961, p. 107-115.

Correlation of tensile properties, Brinell hardness, corrosion resistance and magnetic permeability of these steels with workhardening mechanisms occurring through forming, flattening, cutting, explosive hardening and other mechanical hardening processes. (Q23a, Q-general, 2-64, 3-68; SS-e)

1617-Q. Diaphragm Action in Light Gage Steel Construction. Arthur R. Nilson. Paper from "Regional Technical Meetings, 1960". American Iron and Steel Institute, New York 17, 1961, p. 117-145.

Measurement of the in-plane shear resistance of light gage steel panel with data given for failure shear and net deflection at 50% of failure load for various welded systems. Application of data to lateral bracing of steel buildings and beams and reinforcement of folded plate roof systems. (Q2g, T26, 17-51; ST, 7-51)

1618-Q. On Tensile Properties of the Butt Welds in Alpha + Beta Titanium Alloys at High Temperature and the Beta→Alpha Transformation Process in Its Alloys. Minoru Okada and Shiged Shin. Osaka University, Technology Reports, v. 11, Mar. 1961, p. 155-172.

Hardness and microstructure after beta-solution treatment, quenching and tempering at 450° C. are investigated to derive a mechanism for the transformation and hardening process. 7 ref. (Q27a, 2-64, M27, N7d; Ti-b)

1619-Q. (French.) Measuring the Elongation of Cast Aluminum Alloys. Claude Mascre. Fonderie, no. 184, May 1961, p. 185-190.

Tensile tests on steel and sand or mold-cast Al alloys. Relation between ingot diameter and tensile strength of sample. (Q23p, 1-54, 3-73; ST, Al-b, 5)

1620-Q. (Book.) Toughness and Brittleness in Metals. N. J. Petch, E. A. G. Liddiard, G. M. Boyd and H. M. Finniston. 1961. 103 p. Institute of Metallurgists, 4 Grosvenor Gardens, London S.W., by Iliffe Books Ltd., Dorset House, Stamford St., London, S.E. 1, England.

Papers delivered at the 14th Annual Refresher Course of the Institution of Metallurgists, Eastbourne, 1960. Metallurgical, engineering and environmental factors are discussed including influence of physical and chemical properties, heat treatment, composition and fabrication procedures. Theoretical, testing and metallographic analysis of modes, kinds and causes of fracture failure. 79 ref. (Q23, Q-general, P-general, 2-60, 2-64, 3-68, 10-54)

1621-Q. The Definition and Significance of Toughness and Brittleness in Metals. N. J. Petch. Paper from "Toughness and Brittleness in Metals". Institution of Metallurgists, London, S.W. 1., by Iliffe Books Ltd., London, S.E.1., 1961, p. 3-10.

Influence of stress and stress concentration and strain aging on toughness and brittleness in mild steel and

Al alloys with emphasis on differences between tough and brittle fracture as affected by transition temperature. Theory of ductile-cleavage transition with calculations for stress factors. (Q23, Q26, N7e, 3-66, 10-54; CN, Al-b)

1622-Q. Engineering Aspects of Toughness and Brittleness in Metals. G. M. Boyd. Paper from "Toughness and Brittleness in Metals". Institution of Metallurgists, London, S.W.1., by Iliffe Books Ltd., London, S.E.1., 1961, p. 3-37.

Fractures in steel and Al alloy are classified emphasizing engineering characteristics. Factors affecting brittle fractures in service failure include stress, weldability, temperature, impact, speed, fatigue cracks, notch effects, loading, strain aging, cleavage, composition, inclusions, heat treatment and workhardening. 29 ref. (Q-general, K9s, 2-60, 2-61, 2-64, 3-66, 10-54; ST, Al-b)

1623-Q. Metallurgical Aspects of Ductility and Brittleness in Metals and Alloys. H. M. Finniston. Paper from "Toughness and Brittleness in Metals". Institution of Metallurgists, London, S.W. 1., by Iliffe Books Ltd., London, S.E. 1., England, 1961. p. 67-103.

Review of brittle-ductile transition phenomena as related to plastic deformation and crystal structure, strain-rate effects, stress, workhardening, grain size, additives, irradiation and preferred orientation. Brittleness characteristics of multiphase, heat treatable and precipitation hardening alloys. 30 ref. (Q23, Q26s, M-general, 2-60, 3-68, 3-73, 10-54)

1624-Q. (French.) Choice of Steel Grades. A. V. Frances. Metallurgie et la Construction Mecanique, v. 93, June 1961, p. 527-539.

Strength, ductility, machinability and weldability of low-alloy steels including spring steel, Si, Cr, molybdenum steel and wear resistant steel; and of high-alloy steels including austenitic manganese steel, W and stainless steel. 6 ref. (Q-general, K9s, 17-57; AY, SS, Cr, Mo, Mn, Si, W)

1625-Q. The Fatigue Strength of Vehicle-Engine Crankshafts. E. Gassner and W. Schutz. Engineers' Digest, v. 22, Sept. 1961, p. 79-81.

Comparative fatigue testing of crankshafts of 0.45% carbon steel and spheroidal-graphite cast iron. Determination of fatigue strength under maximum firing pressure in diesel and petrol engines. Evaluation of the relative bending moment at web center as a function of load cycles. 7 ref. (Q7a, T21b; CN, CI-r, 17-57)

1626-Q. The Mechanical Properties of Yttrium, Scandium and the Rare-Earth Metals. C. R. Simmons. Chapter 18 from "The Rare Earths". John Wiley & Sons, Inc., New York 16, 1961, p. 428-452.

Hardness, tensile properties and related elastic constants are determined, where possible, as a function of temperature and of the presence of impurities. 10 ref. (Q-general, 2-61, 3-69; EG-g45)

1627-Q. Titanium Alloys Tensile Modulus of Elasticity. Magnesium Products, Aug. 1961, insert (facing p. 6).

Room temperature elongation and tensile strength for alpha, beta and alpha-beta Ti alloys. Effect of high temperatures (70-1000° F.) on the modulus of elasticity. (Q21, Q23p, Q27, 2-61, 2-64; Ti-b, 11-62)

1628-Q. Lightweight Structures for Space Vehicles. Milford C. Childers and V. B. Koriagin. Society of Automotive Engineers, 420C, 1961, 8 p.

Materials tested from 1-100 hr. at 50-2000° F. include Rene 41, Inco 702 and Hastelloy X. Inflatable, insulated, cooled and sandwich structures are studied with special reference to the design of the vehicle. 20 ref. (Q-general, 2-61, T24e, 17-51; Ni-b, 7-59)

1629-Q. New Alloy Steel from Samuel Fox. Metal Treatment and Drop Forging, v. 28, Aug. 1961, p. 308.

Mechanical properties are summarized for a 15% Cr, 10% Ni, 6% Mn austenite steel with special attention to stress rupture and creep properties, weldability, structural stability and oxidation resistance at elevated temperatures. (Q-general, A-general, K9s, 2-60; AY, SS)

1630-Q. Avoidance of Distortion in Heat Treatment. K. Sacks. Metal Treatment

and Drop Forging, v. 28, Aug. 1961, p. 317-323, 316.

Volume shape and dimensional changes such as stretching, shrinking and warping in martensitic and austenitic stainless steels due to cooling and transformation stresses. Elimination by adjusting alloy content, hardening temperature and quenching treatment. Influence of upset and anistropy on distortion correction. 6 ref. (Q25, J26, 2-61, 9-67, 9-74; SS)

1631-Q. (German.) Influence of Toughness on Behavior of Case-Hardening Steels in Static and Dynamic Bend Testing. Hans Brugger and Gerhard Kraus. Archiv fur das Eisenhuttenwesen, v. 32, Aug. 1961, p. 529-539.

Carburized and case hardened 15 CrNi 6, 20 MnCr 5, C 15 and 100 Cr 6 steels are submitted to testing on a rotary impact machine which permits kinematographic registration of the deformation. Yield and bend strengths are measured as a function of material toughness. (Q5, Q23, 1-53, 2-64; ST)

1632-Q. (German.) Influence of Annealing Temperature on Results of Static Bending Testing on Cutting and Free-Cutting Steels. Hans-Josef Becker. Archiv fur das Eisenhuttenwesen, v. 32, Aug. 1961, p. 557-560.

Measurement of hardness, bend strength and ductile fracture for 90 MnV 8, X 210 CrW 12 steels and BMo 9, DMo 5 and EV 4 free-cutting steels as influenced by annealing at temperatures from 100-640° C. (Q5g, Q23, Q29, 2-64; ST, SGA-k)

1633-Q. (German.) Testing Equipment for Evaluation of Hot Cracking of Metallic Materials. Karl Bungardt, Hans Preisendanz and Otto Mulders. Archiv fur das Eisenhuttenwesen, v. 32, Aug. 1961, p. 561-572.

Resistance to thermal shock by inductive temperature cycling and susceptibility to hot cracking are measured for heat treated X 30 WCrV 53 steel. (Q7j, Q10a, Q26s; ST)

1634-Q. Do It Better, Cheaper With Standards. Steel, v. 149, Oct. 9, 1961, p. 121.

Mechanical properties are tabulated for structural and engineering grades of carbon and low-alloy steel castings. (Q-general; CN, AY, 5)

1635-Q. Tungsten Crystals Are Ductile. Steel, v. 149, Oct. 9, 1961, p. 145.

Production of virtually pure (99.9975%) single crystals up to 10 in. in length and 0.2 in. in diameter having ductility at temperatures down to -330° F. (Q23p, 2-63, N12; W, 14-61)

1636-Q. (Russian.) Hardening of Molybdenum by Exposure to Neutrons. Sh. Sh. Ibragimov and A. N. Vorob'ev. Atomnaya Energiya, v. 11, Jan. 1961, p. 65-66.

Microhardness and electrical resistance are measured to determine the influence of irradiation and of hardening at 805-897° C. for various lengths of time. 4 ref. (Q29q, P15g, 2-64, 2-67; Mo)

1637-Q. Recent Research on Fatigue in Metals. P. G. Forrest. American Society of Naval Engineers Inc., Journal, v. 73, Aug. 1961, p. 519-528.

Survey includes stress distribution, fatigue of thick cylinders, effect of loads of varying amplitude, rate of crack propagation, use of low endurance metals, thermal fatigue at high temperatures, fretting corrosion, influence of inclusions on high-tensile steels and Al alloys and fatigue strength of welded structures. 67 ref. (Q7, R1f, 3-69, 7-51, 10-54, 17-57)

1638-Q. (Russian.) Resistance to Plastic Deformation of Hard Titanium-Zirconium Alloys at Variable Temperatures. V. V. Hlazova and N. N. Kurnakov. Izvestiya Akademii Nauk SSSR--Metallurgiya i Toplivo, Mar. 1961, p. 67-72.

Creep resistance of Ti-Zr alloy at 300, 500 and 700° C. is determined by hot hardness and centrifugal bending tests and relationships are established between creep and composition. 16 ref. (Q3, 2-60, 2-61; Ti, Zr)

1639-Q. Aluminum Structural Engineering in Britain. R. M. Davies. Light Metals, v. 24, Sept. 1961, p. 236-239.

Mechanical strength of Al alloy struts and riveted or welded joints is tested by various techniques and calculations are made to determine failure load stress constants, strut slenderness ratio to stress curves and the relationship of design and joining techniques riveted and welded joint strength. (Q7k, 1-53; Al-b, 7-51, 7-53)

1640-Q. Instability of Semi-Brittle Steels at Room Temperature Under Torsional Impact. J. B. Hunt. Engineer, v. 211, Apr. 7, 1961, p. 551.

Impact, static and dynamic torsional testing of untreated solid mild steel cylindrical specimens. Effect of strain on fracture mechanism and instability. 5 ref. (Q26, 3-68; AY)

1641-Q. Fatigue Tests on "Mustang" Wings and Notched Aluminum Alloy Specimens Under Random Gust Loading With and Without Ground to Air Cycle of Loading. J. Y. Mann and C. A. Patching. Australian Defence Scientific Service, Aeronautical Research Laboratories, Mar. 1961, 26 p.

Determining endurance under a load sequence representative of flight loading both with and without ground to air cycles. The wings are made from 24S-T-Al alloy and the notched specimens from Al alloys D. T. D. 363A, D. T. D. 364B and 7178-T6. 12 ref. (Q7, 1-54, T24a; Al-b)

1642-Q. (Translation-ConBur.) Effect of Cathodically Reduced Hydrogen on the Properties of Metals. Popova and Sanzharovskii. Academy of Sciences of the USSR, Proceedings, v. 136, Jan. 2, 1961, p. 89-93.

Investigation of changes in mechanical properties of rolled iron, rolled nickel and electrolytic nickel, indicating a relationship between residual brittleness and the adsorbed hydrogen. Hydrogen pressure rather than adsorptional effects are responsible for reduction of mechanical strength. (Q26s, 1-54; Fe, Ni)

1643-Q. (French.) Composite Materials. B. Hedde D'Entremont. Mecanique Electricite, v. 45, May 1961, p. 65-69.

The principles that a brittle solid may exhibit the plastic properties of a ductile solid when limited to deformation in only one direction in compressive testing and that a ductile solid can show brittle fracture when exposed to ideal impact are applied to the strengthening of design of structure using nonhomogenous materials (for example, case hardened steel). 9 ref. (Q23, Q26r, 17-51, 17-57)

1644-Q. Nonbasal Glide in Dislocation-Free Cadmium Crystals. Pt. 1. $(10\bar{1}1)$ $(1\bar{2}10)$ System. P. B. Price. Journal of Applied Physics, v. 32, Sept. 1961, p. 1746-1750.

Electron-transparent, dislocation-free plates of Cd are deformed in tension parallel to the basal plane in an electron microscope at 25 to -150° C. The high strain rates causes twinning; slip, glide and edge dislocations are investigated. 10 ref. (Q24, 1-54; Cd)

1645-Q. Nonbasal Glide in Dislocation-Free Cadmium Crystals. Pt. 2. The $(11\bar{2}2)(\bar{1}\bar{1}23)$ System. P. B. Price. Journal of Applied Physics, v. 32, Sept. 1961, p. 1750-1757.

Plates of Cd are deformed under an electron microscope and glide, slip, screw dislocation loops are observed. These are compared with those observed in Zn on the basis of pyramidal glide as well as of loop formation. 19 ref. (Q24, 1-54; Cd, Zn)

1646-Q. Acoustical Study of Quench-Aging in Alpha Cu-Al Alloys. T. J. Koppenaal and M. E. Fine. Journal of Applied Physics, v. 32, Sept. 1961, p. 1781-1782.

The increase of Young's modulus is indicated to be a function of Al content and to correlate with the decrease in electrical resistivity. An effective activation energy for the diffusion is determined. 10 ref. (Q21a, P15g, 2-64; Cu, Al)

1647-Q. Friction of Molybdenum Diselenide. M. T. Lavik, T. Bruce Daniel and A. N. Abbott. Journal of Applied Physics, v. 32, Sept. 1961, p. 1795.

Friction coefficient measured in vacuum is found to vary with stop time from 5 min. to 695 hr. Data are also found for friction in MoS_2 crystals. 4 ref. (Q9p, 1-54, 1-73; Mo, Se)

1648-Q. Charged Dislocations in Ionic Crystals. F. Rueda and W. Dekeyser. Journal of Applied Physics, v. 32, Sept. 1961, p. 1799.

Crystals of NaCl, LiF and MgO are annealed, quenched and etched and measured with an electronic circuit. The etch pit distribution indicating charged dislocations is observed in doped and undoped crystals. Slip planes are observed. (Q24c, 1-54)

1649-Q. Ferritic Steel for Superheater Tubes. Engineering, v. 192, Sept. 15, 1961, p. 351.

Mechanical properties are given for Sandvik HT7, HT8 and HT9 12% chromium ferritic steel alloys for boiler tubes with emphasis on high temperature creep and stress rupture strength as a function of composition and hardening heat treatments. (Q-general, T26q, 2-60, 2-64; AY, 17-57)

1650-Q. (French.) Effect of the High Purity of Iron on Its Ability to Absorb Cathodic Hydrogen and on Its Low Temperature Embrittlement. Simone Besnard. Annales de Chimie, Mar-Apr. 1961, p. 245-283.

Armco iron, electrolytic iron and zone-melted iron are electrolytically polished and immersed in 10 N H_2SO_4 together with a Pb annode. A current of 10 amp. per sq. dm. is passed while the electrolyte temperature is held at -15° C. Hydrogen absorption is influenced by the Fe purity, its microstructure and crystal structure and the addition of sodium sulphide, $SbCl_3$ or As to the electrolyte. Effect of hydrogen on mechanical properties and embrittlement at the temperature of liquid nitrogen. (Q26s, 1-54; Fe)

1651-Q. (Russian.) Influence of Heat Treatment on the Anisotropy of the Mechanical Properties of Forged Steel. V. N. Trubin and I. Ya. Chernikhova. Kuznechno-Shtampovochnoe Proizvodstvo, May 1961, p. 5-9.

Investigation of the anisotropy of forged steel developed by stress, stretching out of nonmetallic inclusions and dendritic segregation. 9 ref. (Q24g, 2-64, 3-66, 3-69; ST, 4-51)

1652-Q. Analysis of Steel Stanchions Bent About Their Minor Axes. H. B. Harrison. Australian Journal of Applied Science, v. 12, Sept. 1961, p. 287-302.

Stress-strain relations, yield stress, flexural buckling and moment ratios are calculated for mild steel columns in terms of axial loads by the use of elasticity theory and approximation calculations. 10 ref. (Q25n, Q23b, 1-54; CN)

1653-Q. Metals and Alloys at Elevated Temperatures. G. J. Danek, Jr., H. H. Smith and M. R. Achter. Report of NRL (Naval Research Laboratory) Progress, Aug. 1961, p. 24. (Available as PB171321 from U. S. Office of Technical Services, Washington 25, D. C.) $1.25.

An optical method based on the determination of the radius of curvature of a strained sheet metal specimen is developed for measuring bending strains in the plastic range at 1500° F. Measurements are compared with those made with a resistance strain gage on Ni, Inconel X and 316 stainless steel. (Q5m, X28j, 2-62; Ni-b, SS, 4-53)

1654-Q. The Contamination of Platinum Metal Thermocouples. H. E. Bennett. Platinum Metals Review, v. 5, Oct. 1961, p. 132-133.

Embrittlement failure of Pt-Rh and Rh-Ir thermocouples heated in H in the presence of siliceous materials is investigated by metallographic methods through heating alloys containing 0.3% Si in H atmospheres at 1400° C. for various times. Hydrogen-influenced grain boundary diffusion of Si and formation of silicides are determined as the embrittling mechanism with prevention of hydrogen contamination by impermeable sheathing being suggested. (Q26s, 2-60, 2-62, 3-69; SGA-a, Pt-b, Rh-b, Ir)

1655-Q. Magnetomechanical Damping in Chromium. M. E. De Morton. Philosophical Magazine, v. 6, July 1961, p. 825-831.

Torsion pendulum testing of ordered specimens at -80 to 80° C. after tensile deformation. Damping hysteresis observed with changing temperature and strain amplitude below 40° C. and a marked reduction of strain-amplitude-dependent damping in this region when a biasing tensile stress is present is correlated with the suggestion that an antiferromagnetic domain structure exists in Cr below 40° C. 14 ref. (Q22j, Q22m, 2-61, 3-66, 3-68; Cr)

1656-Q. Stress Relaxation in Alpha-Iron at Low Temperatures. P. Feltham. Philosophical Magazine, v. 6, July 1961, p. 847-850.

Relaxation of the applied tensile stress at strains of up to 2% is studied at 77-358° K. in vacuum-annealed Fe containing 0.1% C. A relation previously derived for stress relaxation in Cu, in terms of melting temperature, tensile yield stress and the temperature

independent part of the yield stress, is found to be applicable, with the energy associated with the conservative migration of jogs in edge dislocations, equal to 6.4 kcal per g. atom. (Q3a, M26b, N3, 2-61, 3-66, 3-68; Fe-a)

1657-Q. Special-Purpose Brazing Alloys. Engineering Materials and Design, v. 4, Sept. 1961, p. 615.

Tensile strength, elongation, hardness, brazing temperature and industrial applications are given for alloys of Ag-Cu, Au-Cu, Au-Ni, Ag-Cu-Pd, Ag-Pd, Cu-Pd-Ni-Mn, Ag-Pd-Mn, Ni-Mg-Pd and Pd-Ni. (Q-general; SGA-f, 17-57)

1658-Q. (German.) Influence of Dimensions of Notched Tensile Testing and Notched Bending Testing Specimens According to Standard DIN 50127 on Testing Results. Harald Fiehn and Karl Teske. Materialprufung, v. 3, Aug. 1961, 289-296.

Tensile and bending testing of fusion welded butt joints using notched specimens according to DIN 50127 standard and 3-17 mm. thick flat sheet specimens of structural and boiler steel. Tensile strength, yield point, fracture elongation, fracture necking, bending angle and bending elongation as influenced by dimensions and shape of specimens. (Q5h, Q27d, 3-73; ST, 7-51)

1659-Q. (German.) Nondestructive Testing of Brazed Butt Joints of Copper Plates. Hans Krachter. Materialprufung, v. 3, Aug. 1961, p. 297-299.

Investigation of quality of bonding of butt-brazed Cu plates by X-ray and ultrasonic testing, comparative tensile strength and transmitted sound energy. (Q27a, S13; Cu, 7-52)

1660-Q. (German.) Behavior of Technical Titanium Alloys at Elevated Temperatures. K. Rudiger and H. H. Weigand. Metall, v. 15, Sept. 1961, p. 857-862.

Tensile testing at 400-650° C. and stress rupture testing at 400-450° C. of vacuum melted, cast and hot rolled specimens of Ti5Al2.5Sn, Ti8Al2Cb1Ta, Ti8Al8Zr1Cb/Ta, Ti2.7Cr1.5Fe, Ti2Cr2Fe2Mo, Ti5Al1.5Cr1.5Fe1.5Mo, Ti6Al4V and Ti7Al4Mo. (Q3q, Q27, 1-53; Ti-b)

1661-Q. (German.) Development, Production and Properties of Wear-Resistant Rails of Natural Hardness. Walter Janiche and Hedwig von Hye. Stahl und Eisen, v. 81, Sept. 14, 1961, p. 1253-1263.

Statistical investigation of chemical composition, mechanical properties including impact and fatigue strength and failure modes such as shatter cracks, flakes and chipping of steel rails containing 0.50-0.65% C, 0.15-0.50% Si and 1.3-1.7% Mn. Processing operations include adjustment and welding of rails. (Q-general, K-general, T23q, 1-53; ST)

1662-Q. The Influence of Nickel on the Properties of Sand-Cast Gunmetals. J. E. Stolarczyk. British Foundryman, v. 54, Sept. 1961, p. 377-382.

Effect of 0-3% Ni additions on the mechanical and physical properties of gun metal bars, plates, rods and disks, including grain structure, porosity, tensile strength, elongation, creep resistance and hot tearing. (Q-general, N3, P10m, 2-60, 9-71; Cu-b, Ni)

1663-Q. Ductility in Aluminum Casting Alloys. British Foundryman, v. 54, Sept. 1961, p. 410-416.

Mechanical properties, with attention to ultimate tensile strength, 0.1% proof stress, elongation and ductility, of Al sand and chill cast alloys, some specimens being precipitation and solution heat treated. Importance of ductility in producing castings requiring strength and rigidity. 11 ref. (Q23p, Q-general, 2-64; Al-b, 5-60, 5-66)

1664-Q. (Russian.) Shock Waves on Iron and Steel in Vacuum. A. G. Ivanov and S. A. Novikov. Zhurnal Eksperimental'noi i Teoreticheskoi Fiziki, v. 40, June 1961, p. 1880-1882.

Formation of smooth surface splinters on cylindrical specimens by explosive reaction. (Q6q, Q24j; Fe, ST)

1665-Q. (German.) Influence of Cold Working on Age-Hardening of AlCu 3 Alloy. Friedrich Erdmann-Jesnitzer and H. Wenzlaff. Bergakademie, v. 13, May 1961, p. 294-299.

Measurements of hardness, electrical conductivity and microstructure for homogenized (540° C.), quenched, cold rolled (10-60% deformation) and aged (100-540° C.) specimens. Results are given in a three-dimensional diagram: hardness versus aging temperature versus degree of deformation.

(Q29, P15g, M27, N7a, 2-65, 3-68; Al-b, Cu)

1666-Q. The Calculation of Structural Members Subject to Buckling. W. Kerkhofs. Acier Stahl Steel, v. 26, July-Aug. 1961, p. 345-355.

Buckling forces and stresses are calculated within both the elastic limit and plastic range for A-37 and A-52 steel beams of uniform and non-uniform cross sections. Beams are also calculated under stresses by compressive forces varying from one section to another. (Q28k, 1-54; ST, 4-57)

1667-Q. Friction and Lubrication. G. W. Rowe. Chartered Mechanical Engineer, v. 8, Sept. 1961, p. 414-421.

Methods of lubrication by air, liquids, solid-film lubricants, CCl_4, melted glass, graphite, boron nitride, CCl_2F_2 vapor and lamellar solids (MoS_2 and TiI_2) are investigated for metallic surfaces of carbon and stainless steels, for air bearings and for Pt and Ti bars. A new comprehensive theory of friction is advanced. (Q9p, 18-73; CN, SS, Pt, Ti)

1668-Q. (Translation.) Testing of Filamentary Crystals in Tension and Bending. E. M. Nadgornyi and A. V. Stepanov. Soviet Physics--Solid State, v. 3, Oct. 1961, p. 778-782. (Translation from Fizika Tverdogo Tela, v. 3, Apr. 1961.)

Specimens of fused quartz, Cu, Si, Zn, ZnS, KCl, NaCl and hydroquinone are tested over a range of load, temperature and deformation rates, in air and various other media. 5 ref. (Q27, 1-54; Cu, Si, Sn, Te, Zn, NM-a, NM-e)

1669-Q. Orientation Dependence of the Slip and Failure of Beryllium Single Crystals in Tension. R. I. Garber, I. A. Gindin and Yu. V. Shubin. Soviet Physics--Solid State, v. 3, Oct. 1, 1961, p. 832-837.

Study of mechanical properties and crystallographic elements of plasticity and failure at 20° C. with determination of critical shear, fracture stresses and relative elongation. Resultant data agree with rule of constancy of normal and shear stresses in brittle fractures. 14 ref. (Q-general, 3-72; Be, 14-61)

1670-Q. Some Metallographic Observations on the Fatigue of Aluminium Bicrystals. Gilbert Y. Chin and W. A. Backofen. Institute of Metals, Journal, v. 90, Sept. 1961, p. 13-16.

X-ray diffraction study of deformation in isoaxial symmetrical bicrystals of high purity fatigued in pure bending at three levels of constant deflection. Kink bands and critical-slip clusters found at high and intermediate deflections become the sites of intense crystallite formation with subsequent cracking along crystallite boundaries as the predominant factor in fracturing. Deformation at low deflection is characterized by the absence of kink bands, formation of a more diffuse crystallite pattern and appearance of "holes" along primary slip bands associated with cracking. 9 ref. (Q24c, Q26, M22g;Al)

1671-Q. Anomalous Hardness Changes on Recrystallization and Recovery of a Titanium-10% Molybdenum Alloy. T. H. Schofield and A. E. Bacon. Institute of Metals, Journal, v. 90, Sept. 1961, p. 31-32.

Macro and microhardness measurement and X-ray analysis of recrystallized and polygonized regions adjacent to Vickers pyramid hardness impressions made on specimens, followed by beta phase heating (925° C.) for 1/2 hr. with rapid quenching. Relation of higher hardness of recrystallized grains, as compared to polygonized fields, to dislocation annihilation and migration and to nucleation of alpha and omega phases at the sub-boundaries. (Q29c, Q29q, N-general, 1-54, 2-64, 3-71; Ti-b, Mo)

1672-Q. Plastic Flowing (Determination of Plane Strain Fracture Toughness). J. M. Kraft, A. M. Sullivan and R. W. Boyle. Report of NRL (Naval Research Laboratory) Progress, Sept. 1961, p. 33-34. (Available as PB 171322 from U. S. Office of Technical Services, Washington 25, D.C.) $1.25.

Strain energy parameters obtained from tests on centrally notched thin sheets of Al alloys are compared with the plane-strain toughness determined for circumferentially notched tensile rounds. A width effect is observed for the sheet specimens that is almost identical to the diameter effect for the rounds, indicating the applicability of strain energy parameter determinations on the smaller specimens as a substitute for tests

on the larger rounds and thick plates. (Q23r, Q24, Q26, 3-66, 3-73; Al-b)

1673-Q. Metals and Alloys at Elevated Temperatures. G. J. Danek, Jr., H. H. Smith and M. R. Achter. Report of NRL (Naval Research Laboratory) Progress, Sept. 1961, p. 39-40. (Available as PB 171322 from U. S. Office of Technical Services, Washington 25, D. C.) $1.25.

The effect of environment on the high-temperature fatigue properties of Ni, 316 stainless steel and Inconel X is investigated by comparing the fatigue life in air to that in vacuum at 1500° F. of sheet-metal specimens cycled in reverse bending at their resonant frequency. (Q7; Ni-b, SS, SGA-h)

1674-Q. Radiation Damage of Metals (Irradiation Studies in Army Nuclear Power Plant-SM1). L. E. Steele. Report of NRL (Naval Research Laboratory) Progress, Sept. 1961, p. 42-45. (Available as PB 171322 from U. S. Office of Technical Services, Washington 25, D. C.) $1.25.

Charpy V-notch and tensile specimens of eight steels, ASTM A^{212} Grade B, ASTM A^{302} Grade B, ASTM A^{350} Grade B LF-1 (modified), ASTM A^{350} Grade B LF-3, ASTM A^{353}, HY-80 and 304 and 347 stainless, are encapsulated in stainless steel holders under pressure and subjected to neutron bombardment in an operating nuclear reactor for 1-3 years for comparison with neutron-induced changes in properties with property changes occurring in research reactors. (Q6, Q27, P-general, 2-67; ST)

1675-Q. The Andrade Formulae. Pt. 2. S. A. Main. Iron & Steel, v. 34, Oct. 1, 1961, p. 465-470.

Application of the Andrade beta-kappa formula to highly alloyed heat-resisting steels, both ferritic and austenitic. Graphical analysis of creep rate and creep strain versus time. (Q3, 1-53, 3-67; SS, SGA-h)

1676-Q. Review of Recent Developments in the Evaluation of Special Metal Properties. J. E. Campbell. Defense Metals Information Center, Battelle Memorial Institute, DMIC Memo. 128, Sept. 27, 1961, 8 p.

Tests reviewed include the determination of the effects of varying oxygen contents in titanium alloys at temperatures of 78 to -423° F. on the tensile properties and the notched to unnotched strength ratio of the alloy in order to evaluate the alloy for use in liquid-hydrogen tankage; the effects of small cracks in reducing the strength of SAE 4340 steel, H-11 steel and Ti alloy specimens; and determination of H embrittlement in Cd-plated specimens. 7 ref. (Q26s, Q27, 2-60, 10-54; ST, Ti-b, Cd)

1677-Q. Effects of Changing Stress Amplitude on the Rate of Fatigue-Crack Propagation in Two Aluminum Alloys. C. Michael Hudson and Herbert F. Hardrath. NASA (National Aeronautics and Space Administration), TN D-160, Sept. 1961, 24 p.

Constant amplitude and two-step axial loading of 2024-T3 and 7075-T6 sheet. 7 ref. (Q7, Q26q; Al-b, 4-53)

1678-Q. Ball and Roller Bearings. Pt. 6. Power Transmission, v. 30, Sept. 1961, p. 526-529.

Study of bearing failure in terms of fatigue life, loading cycles and stress-strain relations, alignment, lubrication and moisture effects. (Q7, Q9, T7d, 1-54)

1679-Q. Bowing of Cryogenic Pipelines. W. G. Flieder, J. C. Loria and W. J. Smith. Journal of Applied Mechanics (ASME Transactions), Series E, v. 28, Sept. 1961, p. 409-416.

Bowing effects and thermal stresses are examined in stainless steel pipelines carrying cryogenic fluids to determine the effect of temperature distribution on bowing and the effect of bowing on support loads and pipe stress. 6 ref. (Q25p, T26r, 2-63; SS)

1680-Q. Plastic Stress-Strain Relationships--Further Experiments on the Effect of Loading History. J. Parker and J. Kettlewell. Journal of Applied Mechanics (ASME Transactions), Series E, v. 28, Sept. 1961, p. 439-446.

Thin closed-ended tubes of alpha brass (Cu 69.42%, Zn 30.56%, Fe 0.02%) are subjected to various combinations of torque and internal pressure. The effect of loading, unloading and reloading along different paths is investigated. The loading paths are based on a yield function which correlates initial radial loadings for brass, which possesses one degree of anisotropy. 7 ref. (Q23b, Q24h, 1-53; Cu-n)

1681-Q. High Strength Aluminum Alloy Airframe Castings. W. A. Bailey and E.

N. Bassing. Modern Castings, v. 40, Oct. 1961, p. 86-88.

Comparison of mechanical properties of 356, A356 and Tens-50 Al alloy castings to determine effects of composition, casting procedures and heat treatment. (Q-general, E-general, T24a, 2-60, 2-64; Al-b, 5)

1682-Q. Comparison Tests on Various Lubricants and Coatings on Steel. William P. Hayduk. Allen Aircraft Products Inc., Ravenna, Ohio, Engineering Report, no. 32061, 1961, 5 p.

Steel races, both coated (electrolized, lubrited, hard chrome plated and electrofilmed) and uncoated are life tested on a modified MacMillan tester both dry and lubricated (SAE 30 oil, MO_2 and graphite). (Q9p, T7d, 17-57; ST, 8-62, NM-h)

1683-Q. (French.) Cracking Susceptibility of Cast Steel. A. de Sy, J. van Eeghem and R. de Groote. Fonderie Belge, v. 31, July-Aug. 1961, p. 175-184.

Effect of varying amounts of C, P, S and Al on the cracking susceptibility of steel permanent mold and sand castings. Comparison of defects of the two types of castings by microscopic examination. (Q26, E11, E12; ST, C, P, S, Al)

1684-Q. (Italian.) Brittle Fracture. Alberto Nacher. Rivista Italiana della Saldatura, v. 13, July-Aug. 1961, p. 175-198.

Behavior of metallic specimens, crystals and welds subjected to nonfatigue testing in order to determine the start and propagation of brittle fracture as a function of crystal structure and notch geometry. Determination of resilience, yield point and transition temperature. (Q26s, Q23r, 1-54; 7-51, 14-61)

1685-Q. Determine Impact Properties of High Hardness Materials. Materials in Design Engineering, v. 54, Oct. 1961, p. 98-99.

Determination of the dynamic torsional properties of metals using a newly developed kinetic torsion tester. Application to a low-alloy steel containing 0.75% carbon. (Q1, Q6, 1-54; SGB-q)

1686-Q. (German.) Influence of Alloying Elements and Heat Treatment of Stress Rupture Strength of Ferritic Heat Resistant Steels. H. G. Brandt. Schweizer Archiv, v. 27, Aug. 1961, p. 344-351.

Stress rupture testing at 550-600° C. of notched and notchless specimens of alloyed steels of various Cr, Mo, V, Ta and Cb content including 21 CrMoV 5 11, 24 CrMoV 55 and X 22 CrMoV 121 steel after varying heat treatment operations such as hardening at 920-1100° C. and annealing at 600-750° C. (Q3q, 2-60, 2-64; SS-d, SGA-h)

1687-Q. (German.) Effect of Toughness on Lifetime and Fatigue Strength of Case-Hardened Parts. Hans Brugger and Gerhard Kraus. Archiv fur das Eisenhuttenwesen, v. 32, Sept. 1961, p. 627-635.

Fatigue testing of notched and notchless specimens and wear testing of gears of case-hardened 15 Cr Ni 6, 20 MnCr 5 and C 15 steel and of conventionally hardened 100 Cr 6 steel. Fatigue strength and lifetime as influenced by geometrical shape of specimen and steel toughness. (Q7a, Q9, 2-64, 3-73; ST)

1688-Q. Measurement of the Tensile Strength of Brittle Materials. A. Ormerod, R. Berenbaum and I. Brodie. British Journal of Applied Physics, v. 12, Jan. 1961, p. 29-30.

The sensitivity of the bending test to surface conditions is emphasized with acknowledgement of the fact that nonlinearity of the stress-strain relation plays a major part in the case of cast iron and other materials with similar stress-strain curves. (Q5g, 1-54)

1689-Q. Aluminum Alloy L^{65}. T. R. G. Williams, S. W. Hallwood and R. W. Hayden. Metal Industry, v. 99, Sept. 8, 1961, p. 182-185.

Mechanical properties of extruded alloy are investigated with reference to the effect of various preheat homogenization treatments. (Q-general, 2-64; Al-b)

1690-Q. How to Choose a Gunmetal. J. E. Stolarcyzk. Foundry Trade Journal, v. 111, Oct. 5, 1961, p. 407-411, 414.

Effects of structure, microporosity and composition on properties including tensile strength, ductility and elongation. Metallurgical control for common casting applications. 5 ref. (Q23p, Q27a, E25, 2-60, 2-71; Cu-b)

1691-Q. (German.) Hardness and Creep Measurements Under Pressure for Sintered Metal Alloys at Elevated Temperatures. Georg Altmeyer and Otto Jung. Zeitschrift fur Metallkunde, v. 52, Sept. 1961, p. 577-583.

Measurement of hardness at elevated temperatures (200-600° C.) and creep under uniaxial compression stressing at 500° C. for pure Co and tungsten carbide-Co alloys (6-25% Co), which were sintered under vacuum or hydrogen atmosphere at temperatures of 1330-1450° C. (Q3, Q29, 2-62, 3-66; 6-71)

1692-Q. (Czech.) Conchoidal Fracture of Superheated Steel. Jiri Elfmark and Otakar Sedenka. Hutnicke Listy, v. 16, Aug. 1961, p. 546-552.

Steel samples containing 0.14-0.66% C, 0.38-1.20% Mn, 0.21-1.48% Si, 0.017-0.045% S, 0.014-0.036% P, 0.1-1.16% Cr, 0.03-5.02% Ni, 0-58% W and 0-0.15% V are heated in a coke gas-fired furnace up to 1420° C., allowed to cool in air, with a part being subsequently heated up to 560-920° C. and allowed to cool, or heated and quenched from 830-890° C. and then annealed at 560° C. Effect of composition, superheating and subsequent heat treatment on conchoidal fracture and microstructure. 5 ref. (Q26, M27, 2-60, 2-64; ST)

1693-Q. Hydrogen Embrittlement of High Tensile Steels During Chemical and Electrochemical Processing. Pt. 2. L. E. Probert and J. J. Rollinson. Electroplating and Metal Finishing, v. 14, Oct. 1961, p. 356-360, 382.

Detection and effect of hydrogen-liberating process. Discussion of controlling factors including carbon content, ultimate tensile strength, contamination and pressure, hydrogen removal, stress embrittlement and de-embrittlement heat treatment. (Q26s, Q27a, J-general, 2-60; ST)

1694-Q. (Translation-AIP.) Plastic Deformation of Zinc Monocrystals Under Conditions Preventing Basal Slip. Pt. 2. Dislocation Distribution in Specimens, the Direction of Compression of Which Lies in the Basal Plane. A. A. Urosovskaya and V. M. Stepanova. Soviet Physics--Crystallography, v. 5, May-June 1961, p. 879-888.

Crystals are compressed along the basal plane at 20-300° C. and studied by selective etching and Laue back-reflection diffraction patterns to determine prismatic slip, etch figure distribution and longitudinal curvature. Crystallographic diagrams are given, showing compression directions and effective slip elements. 13 ref. (Q24c, Q28, M26b, 2-61; Zn)

1695-Q. Strength of Rim Reinforcements for Manholes in Welded Storage Tanks. R. T. Rose. British Welding Journal, v. 8, Oct. 1961, p. 491-501.

Determination of stress distribution and resistance to yield and fracture when using a tubular rim reinforcement. (Q23b, Q26, T26q)

1696-Q. (French.) New Magnesium Alloys and Their Applications. Maurice Hardouin. Technique Moderne, v. 53, July 1961, p. 49-52.

Tensile properties of castings, sheets and profiles of various Mg alloys containing 0-5.5% Zn, 0-0.7% Zr, 0-3% rare earths, 0-3% Th, 0-1.5% Mn and 0-2.5% Ag at temperatures from 20-350° C. Applications in aircraft. (Q27, 2-60, 2-61, T24; Mg-b, 17-57)

1697-Q. (French.) Failure of Carbon Steels and Low-Alloy Steels Under the Combined Effect of Mechanical Loads and Corrosion. Pt. 1. E. Herzog. Corrosion et Anticorrosion, v. 9, 1961, p. 260-269.

Specimens are creep tested in H_2SO_4 and other corrosive media with and without the use of electrical current to make the straight, notched or gradually section-reduced sample a cathode. Creep strength is measured as a function of composition, shape of sample, corrosive medium, current passage, temperature and surface characteristic. 6 ref. (Q3m, R1, R6, 2-60, 2-61, 2-66, 3-68, 3-73; CN, AY)

1698-Q. Deformation and Fracture. Metal Industry, v. 99, Oct. 6, 1961, p. 265-270.

A review of papers presented at the 53rd Autumn Meeting of the Institute of Metals, Brussels, Sept. 18-22, 1961. Topics include: An analysis of the deformation of Al-4.5% Cu alloy single crystals; hardness indentation pressure in Pb and In single crystals; phase transformations in Co and Co alloys; effects of stress on recovery and recrystallization in high purity Al and Cu; effects of

neutron irradiation on ductile-brittle transition in Mo; and effects of voids on creep rupture behavior of Ni. (Q-general, N-general, 2-67, 3-68, 3-71, 10-54; Al, Co, Cu, In, Mo, Ni)

1699-Q. (Japanese.) Studies on Titanium Alloys. Yutaka Kondo. Sumitomo Light Metal Technical Reports, v. 2, July 1961, p. 15-25.

Hot and cold workability, mechanical properties and heat treatment response are studied for alloys in the Ti-Al-Mn, Ti-Al-Cu and Ti-Mn-Cr to determine feasibility of wrought Ti alloys for use as sheet, bars and forgings. Data are given for Brinell and Vickers hardness, tensile properties, forgeability and machinability, response to shearing and rolling reduction, embrittlement, microstructure and time-temperature-transformation effects for annealed and quenched (200-800° C.) specimens as a function of temperature. 23 ref. (Q-general, F22, 17-52, G17k, 2-61, 2-64; Ti-b, Al, Mn, Cu)

1700-Q. (Japanese.) Effects of Intermetallic Compounds in Extruded Extra-Super Duralumin and 7075 Aluminum Alloys on Their Fatigue Strengths. Seikiti Hukai and Katsuzi Takeuchi. Sumitomo Light Metal Technical Reports, v. 2, July 1961, p. 26-35.

Ultrasonic pulse-echo technique and metallographic methods are used to examine micro and macrostructures and plain and rotating bending fatigue tests are used to determine effect of intermetallic compound and Mn content on fatigue strengthening of large extruded shapes. Correlation is made of the S-N curve with other mechanical properties including Brinell and Rockwell B hardness, yield and tensile strength, elongation, elastic limit, Charpy impact value, true breaking strength, modulus of elasticity and reduction of area. 5 ref. (Q7, Q-general, M26q, 2-60, 9-69; Al-b)

1701-Q. (Japanese.) Bulging-Drawing Combined Formability. Pt. 2. Koichi Yoshii. Sumitomo Light Metal Technical Reports, v. 2, July 1961, p. 53-60.

Heat treated specimens of 70-30 bronze, aluminum O alloy and aluminum 1/2 H subjected to Erichsen clipping, Fukui conical clip, Swift clip-forming and Fukui deep drawing tests using Al-killed steel as standard. Formability rating for bulging and deep drawing are determined as a function of punch profile and diameter, specimen size and strain hardening effects. (Q23q, 2-73; Al, Cu-s)

1702-Q. (Japanese.) Mechanical Properties of Aluminum Alloys at Low Temperatures. Katsuzi Takeuchi and Eiji Tanaka. Sumitomo Light Metals Technical Reports, v. 2, July 1961, p. 78-81.

Data are presented for properties of heat treated 5052, 5056 and 5083 Al-Mg at -200 to 50° C. (Q-general, 2-63; Al-b, Mg)

1703-Q. Which Type of Stress Analysis Method? Nelson A. Crites. Product Engineering, v. 32, Oct. 16, 1961, p. 90-96.

Applications and limitations of methods including brittle coatings, strain gages, photoelasticity, grid systems, X-ray diffraction, acousto-elastic devices and extensometers. (Q25, 1-54)

1704-Q. Review of Recent Developments in the Technology of High-Strength Stainless Steels. D. A. Roberts. Defense Metals Information Center, Battelle Memorial Institute, DMIC Memo. 131, Oct. 13, 1961, 3 p.

Mechanical properties are tabulated for AFC 77 stainless steel, a Ni-Co-Mo steel and a wrought Fe-Al-Mn-C alloy. Tensile testing on 17-7 PH and 12 MoV stainless steel sheet. 4 ref. (Q-general, 10-54; SS, SGB-a)

1705-Q. New Test Methods "Predict" Metal Failure. Richard Turner. Western Metalworking, v. 19, Oct. 1961, p. 36-38.

Eddy current, sonic and ultrasonic testing of Al alloy and steel bearing balls, transducer parts and aircraft and missile components for fatigue cracking, Rockwell hardness, tensile strength and shear modulus. (Q-general, P16s, S13, T7, T24; Al-b, ST, 17-57)

1706-Q. (English.) Rolling Friction on Single Crystals of Copper in the Plastic Range. L. D. Dyer. Acta Metallurgica, v. 9, Oct. 1961, p. 928-936.

Rolling friction and track width are found to vary with crystallographic direction when a sapphire ball is rolled in various directions on the cube face of a Cu

crystal. The topography of the deformed areas is studied by optical and interference microscopy with microhardness measurements made in and around the ends of the tracks to aid in developing an explanation for the observed anisotropies as a function of stress. A dislocation model is presented of plastic flow and workhardening. 16 ref. (Q9, Q-general, M26c, 3-66; Cu, 14-61)

1707-Q. (English.) Work-Softening of Metal Crystals by Alternating the Rate of Glide Strain. B. Langenecker. Acta Metallurgica, v. 9, Oct. 1961, p. 937-940.

Work-softening observed in Al and Zn crystals grown from the melt as a result of unloading after straining at a high rate of glide strain and subsequent loading at a low rate of glide strain at 76-296° K. with and without ultrasonic radiation. Resulting stress-strain curves are compared to those obtained by Cottrell and Stokes and by Blaha and Langenecker. 11 ref. (Q23, Q25, 2-61, 2-67, 3-68; Al, Zn, 14-61)

1708-Q. (English.) The Stored Energy in Deformed Copper: The Effect of Grain Size and Silver Content. R. O. Williams. Acta Metallurgica, v. 9, Oct. 1961, p. 949-957.

Measurements of the total energy of deformation of Cu which remains stored within the material as a function of 0.3 strain, grain size and Ag (0.1-1.0%) additions. There is a slight release of energy immediately following the deformation which appears proportional to the flow stress and is temperature sensitive, but is insensitive to grain size. 16 ref. (Q22n, Q23, Q24, 2-59, 2-60, 2-61, 3-68; Cu-b, Ag)

1709-Q. (English.) Temperature Dependence of the Flow Stress in Quenched Aluminum Crystals. H. K. Birnbaum. Acta Metallurgica, v. 9, Oct. 1961, p. 968-969.

Review of theory and analyses of the nature of dislocation barriers which contribute to the temperature dependent and independent portions of the flow stress in quench hardened and annealed Al single crystals at 77-293° K. 10 ref. (Q23, Q24, 2-61, 2-64; Al, 14-61)

1710-Q. (English.) Occurrence of Longitudinal Cleavage in Stretched Silicon Iron Crystals. R. Honda. Acta Metallurgica, v. 9, Oct. 1961, p. 969-970.

Effect of twinning and slip systems and their intersections on transverse and longitudinal cleavage fracture of 2.9% Si-Fe single crystals deformed in tension at 77° K. along specificied crystallographic axes. (Q26n, Q24, 3-68; Fe-b, Si, 14-61)

1711-Q. The Effect of Zinc Plating on Threaded Fasteners. W. M. Hanneman. Assembly & Fastener Engineering, v. 4, Nov. 1961, p. 47-48.

Torque, twist-tension and tension testing of unplated and 0.00005 in. Zn-plated bolts and nuts indicating tensile strength and elastic limit. (Q-general, T7f; 8-65, Zn, 17-57)

1712-Q. Advantages of the New XC-60 Pipe. A. G. Barkow. Pipe Line Industry, v. 15, Oct. 1961, p. 50-56.

Testing of arc welds and burst, underbead crack, notch and bend testing of steel pipe containing 0.26% maximum carbon, 1.30% maximum Mn and 0.05% maximum Cb provide data on ductility, yield and tensile strengths, elongation and weldability. (Q-general, K9s, T7n; ST, C, Mn, Cb, 17-57)

1713-Q. Metal Bellows Seals. R. W. Blair, D. L. Johnson and J. P. Morley. Lubrication Engineering, v. 17, Oct. 1961, p. 470-475.

Flexure fatigue and tensile testing of seals indicating spring rate variation in terms of temperature, mean diameter and thickness; modulus of elasticity; pressure limits; and amount of cracking. Hydraulic forming and welding of 316, 321, 347, 17-7PH and AM-350 stainless steels, phosphor bronze, beryllium copper, 6061 T-6 Al, Ti and Ni alloys to produce a corrosion resistant seal for use at high and low temperatures. (Q-general, G4, 1-70, K-general, R-general, 1-52, 2-61; SS, Al-b, Cu-b, Ni-b, Ti-b, 17-57)

1714-Q. Materials for Elevated Temperature Piston Ring and Seal Ring Applications (600-1200° F.) Glenn F. Hyde and John H. Fuchsluger. Lubrication Engineer, v. 17, Oct. 1961, p. 476-483.

Wear and oxidation testing indicating weight loss, wear rating and coefficient of friction for carbons, carbides, nitrides, borides, intermetallics, ceramics, cermets, irons, steels, high-temperature alloys and hard facing alloys

with and without surface treatments or coatings such as carbide, oxide and soft and hard metal. (Q9n, T7, 1-53, 17-57, R1h, 2-62, 2-64)

1715-Q. A Study of the Torque Characteristics of Grease Packed R-2 and R-3 Ball Bearings. John C. Lawrence. Lubrication Engineer, v. 17, Oct. 1961, p. 484-487.

Effect of grease content and amount, thrust load and separator configuration on bearing torque characteristics determined at 1-2 and 15,000 rpm. for metal and rubber beaded shields. (Q1, T7d, 1-53; NM-h)

1716-Q. (French.) New Steel Used in Steam Superheaters. M. Caubo and L. Gottignes. Revue de Metallurgie, v. 58, Aug. 1961, p. 637-654.

Samples containing 0.08-0.12% C, 0.2-0.4% Si, 0.9-1.2% Mn, 9-10% Cr, 1.5-2% Mo, 0.4-0.6% Cb, 0.20-0.30% V and 1.8-2.2% Co are austenitized at 1100° C. for 2 hr., cooled at a velocity of 50° C. per min. and subsequently heated and held at 750° C. for 8 hr. Data are given for room temperature tensile properties, corrosion in steam and smoke, microstructure, forgeability and weldability and creep strength at 575-625° C. 14 ref. (Q-general, R-general, W11; ST, 17-57)

1717-Q. The Effects of Interstitial Solute Atoms on the Fatigue Limit Behavior of Titanium. Harry A. Lipsitt and Douglas Y. Wang. Metallurgical Society of AIME, Transactions, v. 221, Oct. 1961, p. 918-923.

A fatigue study in completely reversed axial tension-compression is performed on high-purity Ti and on three high-purity Ti alloys containing approximately 0.75% of a single interstitial element, C, N or O. The results corroborate a previously published theory proposing that strain aging under alternating stress is responsible for the fatigue limit behavior of certain alloys. 20 ref. (Q7b, N7e, 2-60, 3-69; Ti-b)

1718-Q. Determination of the Glide Elements and Recrystallization in InSb. M. S. Abrahams and G. W. Neighbor. Metallurgical Society of AIME, Transactions, v. 221, Oct. 1961, p. 947-951.

The active slip plane in InSb is found to be of the (111) type by the method of two-trace analysis. Measurements of the rotation of the tensile axis as a function of increasing plastic shear strain are used to determine macroscopic slip direction, recrystallization and dislocation density. 8 ref. (Q24a, M26, N5, 3-68; In-b, Sb-b, 14-67)

1719-Q. The Effect of Surface-Active Agents on the Mechanical Behavior of Aluminum Single Crystals. I. R. Kramer. Metallurgical Society of AIME, Transactions, v. 221, Oct. 1961, p. 989-993.

Single crystals of Al are pulled in tension in a solution of paraffin oil and stearic acid with determination of the critical resolved shear stress, creep, stress-strain relation and plastic flow properties. The weakening effect of surface-active agents is attributed to the rate of desorption of the metal soap formed by the reaction of the surface-active agent and the metal surface. 21 ref. (Q-general, P13d, 2-66; Al-a, 14-61)

1720-Q. The Effects of Deformation at 78° K. on the Alloy Cu_3Au. Barton Roessler and Michael B. Bever. Metallurgical Society of AIME, Transactions, v. 221, Oct. 1961, p. 1049-1055.

The effects of deformation by wire drawing at 78° K. on initially ordered and initially disordered specimens are investigated. The resistivity, stored energy, drawing force and microhardness are measured as functions of strain with microstructural changes observed and the results interpreted in terms of the structural imperfections and the changes in atomic configuration resulting from deformation. The effects of room-temperature annealing after deformation at 78° K. are studied and suggest vacancy promoted ordering in disordered alloys. 19 ref. (Q-general, M27, N10, P15g, 2-63, 3-68; Cu-b, Au, 14-68)

1721-Q. The Creep Behavior of Heat Treatable Magnesium Base Alloys for Fuel Element Components. P. Greenfield, C. C. Smith and A. M. Taylor. Metallurgical Society of AIME, Transactions, v. 221, Oct. 1961, p. 1065-1073.

The Mg-Zr alloy, ZA, and Mg-Mn alloy, AM503(S), are shown to have a markedly improved resistance to creep deformation after suitable heat treatments. This improvement makes

them suitable for certain stress-bearing fuel element components in nuclear reactors. The extent of strengthening is described and an explanation of the behavior of both materials is given, based on a combination of strain aging and grain growth. 10 ref. (Q3, N3, N7e, T11g, 2-64; Mg-b, Zr, Mn, 17-57)

1722-Q. Tensile Properties of Hot-Worked Pyrolytic Graphite. W. V. Kotlensky and H. E. Martens. Metallurgical Society of AIME, Transactions, v. 221, Oct. 1961, p. 1085-1086.

Polycrystalline specimens are hot worked at 2750° C. with subsequent tensile testing at 20-2000° C. and X-ray diffraction examination of structures. Data are given for ultimate strength, elongation and stress-strain relations. Dissappearance during testing of a growth cone structure, noted in the microstructure after deformation, is related to strength changes. (Q27, 2-62, 3-68; NM-k36)

1723-Q. The Effect of Cyclic Loading on MgO Single Crystals. A. J. McEvily, Jr., and E. S. Machlin. Metallurgical Society of AIME, Transactions, v. 221, Oct. 1961, p. 1086-1087.

Axial load and unidirectional bend tests on as-cleaved specimens after heat treatment with comparison of yielding and failure behavior to chemically polished specimens. Embrittlement is noted in the as-cleaved specimen with much lower values of yield strength. All specimens fracture by static failure rather than fatigue failure which is attributed to absence of easy cross slip. 6 ref. (Q24, Q26; Mg-b, 14-61, 14-68)

1724-Q. The Influence of Bunton Configuration on the Stress Distribution in and Strength of Buntons. R. S. Loubser and J. R. M. Bull. South African Mechanical Engineer, v. 11, Aug. 1961, p. 13-25.

A theoretical analysis of the defection and the bending moment distribution in a bunton layout in terms of the applied load and the bunton configuration. The properties of end plate welded to diamond-shaped streamlined buntons are established by static and fatigue tests. (Q7, Q25, 3-68, W28h)

1725-Q. A Method for Strengthening Semi-Austenitic Stainless Steels. D. C. Ludwigson. Metal Progress, v. 80, Nov. 1961, p. 78-81.

Both the formability and strength of a semi-austenitic stainless steel can be improved to a degree by mild deformation followed by a stabilizing heat treatment. (Q27, Q23q, J-general; SS)

1726-Q. Malleable Irons. . .Versatile Engineering Materials. Hans J. Heine. Metal Progress, v. 80, Nov. 1961, p. 94-96.

The foundery industry has made significant progress in advancing the technology of malleable irons. More is known about machinability and recent studies confirm excellent stress-rupture properties of these materials to at least 800° F. (Q-general, G17k; CI-s)

1727-Q. A Metal for Service at Both Cryogenic and Ultrahigh Temperatures. H. R. Ogden and I. Perlmutter. Metal Progress, v. 80, Nov. 1961, p. 97-99.

Ta alloys may be useful for parts requiring a combination of toughness at cryogenic temperatures with strength at high temperatures. (Q-general, 2-61; Ta-b, 17-57)

1728-Q. Stainless Steels for High-Strength Welded Structures and Components. Metal Progress, v. 80, Nov. 1961, p. 100-105, 118-121.

Stainless steels, including the more recent precipitation-hardening grades, have become important engineering materials for welded structures due to corrosion resistance and wide range of mechanical properties. (Q-general, K-general, R-general; SS, 17-57)

1729-Q. Testing Steels for Low Temperature Use. Digest of "Welded Ferritic Steel Construction for Intermediate Low-Temperature Service". A. S. T. M. Preprint 80C. A. A. Wells. Metal Progress, v. 80, Nov. 1961, p. 172, 174, 176.

For rating steel to be used in low temperature applications, the notched and welded wide plate tension test gives the most comprehensive results. Minimum values of 35 ft-lb. and 30% fibrous fracture are suggested as specifications for steels in as-welded structures. (Q27,1-53, 2-63; ST, 7-51)

1730-Q. Treating Semikilled Steels With Columbium. Digest of "Columbium-Treated Mild Carbon, Semikilled Steels". Paper presented at the A. I. S. I. Regional Technical Meeting, Buffalo, N. Y., 1960. C. L. Altenburger. Metal Progress, v. 80, Nov. 1961, p. 177-178.

Cb, in amounts up to 0.03%, increases the yield and tensile strengths of plate made of low-carbon semikilled steels. Formability and weldability of the steel are adequate for fabrication. (Q23, Q27a, K9s, 2-60; ST, 4-53)

1731-Q. How Alloys Affect Hot Cracking of Stainless Steels. Digest of "Effects of Alloying Additions on Hot Cracking of Austenitic Chromium-Nickel Stainless Steels". Paper (Preprint 78) presented at the A. S. T. M. annual meeting, June 1960. Frederick C. Hull. Metal Progress, v. 80, Nov. 1961, p. 192.

According to tests, W and Mn reduce hot cracking tendencies, while Si and Ti increase them. (Q26q, 2-60; SS, Mn, Si, Ti, W)

1732-Q. Experimental Investigation at Mach Number 3.0 of the Effects of Thermal Stress and Buckling on the Flutter of Four-Bay Aluminum Alloy Panels With Length-Width Ratios of 10. S. C. Dixon, G. E. Griffith and H. L. Bohon. NASA (National Aeronautics and Space Administration) Technical Note D-921, Oct. 1961, 28 p.

The effect of thermal stress and buckling on skin stiffener panels with various holding geometries is determined at dynamic pressures of 1500-5000 psf. and 300-655° F. 9 ref. (Q25p, Q3c, T24a, 2-61, 3-74; Al-b, 17-57)

1733-Q. Heat of Preferential Adsorption of Surfactants on Porous Solids and Its Relation to Wear of Sliding Steel Surfaces. A. J. Groszek. American Society of Lubricating Engineers, Preprint no. 61 LC-9, 1961, 9 p.

Determination of the heats of preferential adsorption of various wear reducing agents on silica gel, alumina, Fe and activated C surfaces covered with n-heptane or benzene. Examination of heat effect in relation to the wear produced by lubricants under different loads and correlation of the wear reduction of sliding steel surfaces and the heat of preferential adsorption with regard to different lubricants. (Q9, P13d, 18-73; ST)

1734-Q. A Unified Engineering Theory of High Stress Level Fatigue. Sitaram Rao Valluri. Aerospace Engineering, v. 20, Oct. 1961, p. 18-19, 68-69, 71-75, 77-89.

An analytical theory of fatigue for high stress levels is formulated based on a simple model derived from a synthesis of the macroscopic elasto-plastic fracture theory and concepts derived from the dislocation theory of metals. The theory predicts the shape of the stress versus number of cycles curve in fatigue; makes quantitative predictions regarding the residual static strength, changes resulting from changes of stress ratio and cumulative damage due either to multiple step or to random loading; and gives a quantitative theory of acoustic fatigue. 37 ref. (Q7, Q26, Q25, M26b, 3-66, 3-68)

1735-Q. A Direct Radioisotope Method of Investigating the Wear of Wire Drawing Dies. J. Kieszniewski, Likus J. Siewierski and R. Wusatowski. Wire Industry, v. 28, Oct. 1961, p. 991-993.

Comparative testing of mechanical and physical properties of wires made of C steel, D45A, D85A steel and of irradiated sintered carbide drawing dies. Test results show that the effect of drawing speed on die wear is influenced by coating and lubricant. Drawing, patenting, pickling, lime and phosphate coating. (Q9, Q-general, 1-59, T6r, 17-52; ST, 4-61, 6-69, 17-57)

1736-Q. (German.) Quality Assessment of Soft Copper Wire for Windings in Electrical Engineering. Otto Lissner. ASEA Research, no. 6, 1961, p. 93-118.

Comparative testing of soft annealed cold drawn Cu wire by the "coil stretching test" and by conventional mechanical testing techniques with correlation of data for quality assessment. (Q-general; Cu, 4-61)

1737-Q. (German.) Assay on Mechanical Properties of Compound Materials. W. Hofmann and G. Hillmann. Dechema Monographien, v. 39, no. 600-615, 1961, p. 89-98.

Mechanical properties such as bending strength, stress distribution on bending, deformation and surface cracking upon thermal stressing of composite materials including wood steel, austenitic-steel plated ferritic-steel sheet and Pb-plated steel sheet. 9 ref. (Q-general; ST, 8, NM, 7-59)

1738-Q. New Test Data on Aluminum Screw Strength. W. J. Dewalt. Product Engineering, v. 32, Nov. 13, 1961, p. 99-104.

Data on breaking torque values of Al alloy, brass and stainless steel bolts; recommended drill sizes for wood screws; tensile properties of 2024 T4 bolts and stock; hole sizes for 2024 T4 sheetmetal screws; relationship between tension and torque clamping load capacities; shear strength of Al alloys. Effect of lubrication on torque. 6 ref. (Q27, Q1, Q2g, T7f; Al-b, Cu-n, SS)

1739-Q. Refractory Metal Structural Development Program. Fansteel Metallurgy, Oct. 1961, p. 1, 6.

A General Electric F-48 alloy (Cb-15% W-5% Mo-1% Zr) and Fansteel 82 metal (Cb-33% Ta-. 7% Zr) full-scale fin-rudder is spray-dip coated with Al-Cr-Si for protection against oxidation and tested under simulated re-entry conditions. Determination of specimen deflections and load distribution at temperatures from 400-2350° F. (Q24, R1h, 2-62, T24e; Cb-b, W, Mo, Zr, Ta)

SECTION R

CORROSION

1-R. Developmental V-Cb Alloys Have Excellent Corrosion Resistance. S. T. Wlodek. Materials in Design Engineering, v. 52, Nov. 1960, p. 14-15.

Corrosion and oxidation resistance, mechanical properties and strength-to-weight ratio of V-Cb alloys at 1290 and 1830° F. (R-general, Q-general, 1-66; V-b, Cb)

2-R. (French.) Passivation of 18-8 Stainless Steels With Special Reference to Steels Containing Molybdenum. Phillippe Berge. Memoires Scientifiques de la Revue de Metallurgie, v. 57, Sept. 1960, p. 699-704.

Potentials and passivation in 18N H_2SO_4 are measured for a current density of 5×10^{-6} amp. per sq. cm. at a temperature of 18° C., with reference to an electrode formed by a saturated Hg_2SO_4 solution. It is found that the presence of dissolved oxygen does not affect the process of passivation. 19 ref. (R10c; SS, Mo)

3-R. (French.) Study of the Tensile Factor in the Anodic Peroxidizement of Lead. Pt. 1. A. Coustenoble. Metaux, Corrosion, Industries, v. 35, Sept. 1960, p. 309-316.

Rupture testing of Pb frames in positive plates of storage batteries. Behavior of Pb under mechanical stress; corrosion of plates in sulphuric acid in presence and absence of electrical current; process of corrosion fatigue in metals in general and in some Pb alloys. (R1e, Q3q, 3-66; Pb-b, 4-53)

4-R. Oxidation of Zirconium-Columbium Alloys in Oxygen at 525-1090° C. Otto Zmeskal and Mary L. Brey. American Society for Metals, Transactions, Preprint no. 207, v. 53, 1961, p. 415-431.

Alloys of high-purity Zr and Cb are heated in oxygen at pressures lower than atmospheric and temperatures ranging from 525-1090° C. Rates of oxidation at constant pressure and temperature are measured by a volumetric procedure for periods of 2-6 hr. X-ray diffraction patterns are made of the free oxides. 11 ref. (R1h; Zr-b, Cb)

5-R. Preferential Corrosion of Stabilized Stainless Steel Welds. C. L. Angerman and P. M. Kranzlein. American Society for Metals, Transactions, Preprint no. 208, v. 53, 1961, p. 433-446.

Electron metallography of weldments of types 309SCb, 347 and 321 stainless steels after short-term corrosion in a 3. OM HNO_3-0. 075M HF solution and in 65% HNO_3 revealed that the attack occurred by preferential dissolution of Cb or Ti carbide particles located along the dendrite boundaries in the weld. This mechanism was in contrast to the attack of grain boundaries adjacent to chromium carbide particles in sensitized 304 steel. 15 ref. (R2h; SS, 7-51)

6-R. Effects of Alloying on the Oxidation Behavior of Tantalum. W. D. Klopp, D. J. Maykuth and R. I. Jaffee. American Society for Metals, Transactions, Preprint no. 221, v. 53, 1961, p. 637-652.

Studies were conducted on the air-oxidation behavior of Ta binary and ternary alloys at 1000-1400° C. Additions of the Group IV A metals, Ti, Zr and Hf, were most effective in reducing the oxidation rate. The effects of alloying on oxidation behavior can be correlated qualitatively with ionic size and oxide properties of the alloy additions. (R1h, 2-60; Ta)

7-R. Rapid Intergranular Oxidation of 18-8 Stainless Steels by Oxygen and Dry Sodium Chloride at Elevated Temperatures. H. W. Pickering, F. H. Beck and M. G. Fontana. American Society for Metals, Transactions, Preprint no. 232, v. 53, 1961, p. 793-803.

Mechanism is based on the formation of a nonprotective Na_2CrO_4 containing scale from the reaction of NaCl and O_2 with Cr_2O_3, Cr and $Cr_{23}C_6$. The reaction rates involving Cr_2O_3, Cr and $Cr_{23}C_6$ increase in order as listed, the $Cr_{23}C_6$ reaction occurring very rapidly. 4 ref. (R2h, 2-62; SS)

8-R. (French.) Application of a New Electrochemical Technique to the Investigation of the Inhibition of Amines of the Corrosion of Iron. M. Cappelaere and G. Montel. Comptes Rendus, v. 251, Aug. 22, 1960, p. 1007-1009.

Measurement of Fe-Cu and Fe-Zn cells determining activity of local anodes and cathodes formed at surface of Fe electrode in contact with corrosive solution. Effect of solution pH and amine concentration on the anodic inhibition of corrosion. (R10b, 2-66; Fe, Cu, Zn)

9-R. Can Enamels and Ceramic Coats Curb Corrosive Attack? G. L. Geltman. Iron Age, v. 186, Nov. 17, 1960, p. 148-150.

Resistance of coated and uncoated carbon and alloy steels to scaling and embrittlement above 1000° F. Effect of coating on the acid resistance of Ni alloys and steels. (R2q, R2h, 2-62; AY, CN, Ni-b, 8-71)

10-R. The Propagation of Corrosion Pits in Metals. C. Edeleanu. Institute of Metals, Journal, v. 89, Nov. 1960, p. 90-94.

Sample 99.999% Al foil in 3% NaCl solution is examined microscopically to determine the anodic reaction rate on the active portion of a pit during pitting corrosion. 7 ref. (R2j, M21; Al-a, 4-56)

11-R. Selective Corrosion of Inconel. R. Bakish and F. Kern. Corrosion, v. 16, Nov. 1960, p. 89-90.

Sheets, rod and tube samples were tested in the as-received condition by complete immersion in a fused salt bath. Tests were carried out at 800° C. for test times up to 50 days. A layer of porous sponge-like material formed on the surface. Cr and Fe were preferentially leached out of these layers. 4 ref. (R2h; Ni-b)

12-R. Corrosion Problems in the Use of Dense Salt Solutions as Packer Fluids. C. M. Hudgins, J. E. Landers and W. D. Greathouse. Corrosion, v. 16, Nov. 1960, p. 91-94.

Salts considered were $NaNO_3$, $CaCl_2$, $Ca(NO_3)_2$, $ZnCl_2$, $NaNO_3$-$CaCl_2$, $Ca(NO_3)_2$-$CaCl_2$ and $CaCl_2$-$ZnCl_2$. Only slight corrosivities were noted for the first three solutions. However, stress corrosion cracking was encountered in $NaNO_3$ solutions and in some mixtures of $NaNO_3$ and $CaCl_2$. 6 ref. (R6g)

13-R. Stress-Corrosion Cracking of High Strength Oil Country Tubular Goods. R. S. Ladley. Corrosion, v. 16, Nov. 1960, p. 95-98.

Failure experience with N-80, 9% Ni, 9% Cr and AISI 4340 tubing and N-80 casing. 5 ref. (R1d; AY, 4-60)

14-R. New Developments in the Mitigation of Corrosion in the Utility Field. E. H. Thalmann. Corrosion, v. 16, Nov. 1960, p. 99-108.

Use of distributed high Si cast iron anodes for corrosion protection of an underground Pb-covered cable distribution system. Use of well-type ground beds for cathodic protection of buried metallic structures at generating stations; methods of protection of Si rectifiers from damage because of surges. (R10d)

15-R. Cracking of Low Carbon Steel by Ferric Chloride Solutions. Mary Boehm Strauss and M. C. Bloom. Corrosion, v. 16, Nov. 1960, p. 109-112.

Aqueous corrosion of mild steel at 316° C. is greatly accelerated by low concentrations of $FeCl_3$. This can lead to stress corrosion cracking in plastically deformed areas subject to high stress. Analogous results can be obtained with chloride-bearing slurries of the ferric oxides and hydrated oxides gamma-FeOOH, alpha-FeOOH, gamma-Fe_2O_3 and alpha-Fe_2O_3 or from slurries of these compounds in contact with chloride-bearing solutions. (R1d; CN-g)

16-R. Stress Corrosion Cracking of Carbon Steels in Concentrated Sodium

Nitrate Solutions. R. L. McGlasson, W. D. Greathouse and C. M. Hudgins. Corrosion, v. 16, Nov. 1960, p. 113-117.

When locally stressed above the yield point, carbon steels (N-80 and J-55) failed in 150-230° F. concentrated solutions of $NaNO_3$. Mixed concentrated solutions of sodium nitrate and calcium chloride did not produce cracking in either normalized or quenched and tempered N-80 ranging in hardness from Rc 15-Rc 36. 9 ref. (R1d; CN)

17-R. Corrosion of Nuclear Power Plant Tube Materials by Boiler Sludge. E. Howells, T. A. McNary and D. E. White. Corrosion, v. 16, Nov. 1960, p. 127-133.

Inconel is the material most resistant to the test environment with little corrosion effect in evidence. 347-stainless steel is next with surface etching and some random pitting up to 2 1/2 mils deep. Croloy 16-1 is superior to Monel and carbon steel and rated below 347 stainless because it suffered more general pitting up to 2 1/2 mils deep. Monel is still more severely corroded with preferential attack up to 11 mils deep occurring at crevice opening. Carbon steel suffers the deepest attack on all surfaces. (R4c; Ni-b, SS, CN)

18-R. High Temperature Furnace Corrosion of Type 309 Alloy Steel. R. C. Merrick. Corrosion, v. 16, Nov. 1960, p. 134-136.

Severe corrosion occurs on the external surface of tubes and tube supports of 25 Cr-12 Ni alloy steel in a furnace operating at metal temperatures from 1600-2100° F. Corrosion to a depth of 1/2 in. occurs in 6 weeks time. Investigation reveals that the metal loss of furnace parts is accelerated by contaminants fluxing the hot metal surfaces. (R7; SS)

19-R. Factors Governing the Corrosion Testing of Zircaloy-Base Fuel Alloys. S. Kass and R. F. Gessner. Corrosion, v. 16, Nov. 1960, p. 137-141.

High temperature water and steam corrosion behavior of a Zircaloy-2 alloy containing 6.3 wt.% uranium. Corrosion is found not to be influenced by sample size, marking methods or precorrosion exposure surface condition. Corrosion resistance is markedly influenced by heat treatment, with the low temperature heat treatment resulting in less corrosion than the high temperature treatment. 7 ref. (R4a, R4d; Zr-b)

20-R. (Italian.) Behavior of Bronzes for Pump Bodies and Centrifugal Propellers in Corrosive Media. Angelo Azzolini. Fonderia Italiana, v. 9, Sept. 1960, p. 345-360.

Oxidation, corrosion by impact of swiftly moving waters and by microorganisms, pitting and intergranular corrosion in bronze pump components, data for corrosion and general service behavior of components composed of Cu-Ni, Cu-Zn, Cu-Sn, Cu-Si, Be and Al bronzes and Ni-Cu Monel-type alloys. 11 ref. (R-general, W13d; Cu-s, 17-57)

21-R. The Tarnish Resistance of Gold Plating Over Silver. William B. Harding. Plating, v. 47, Oct. 1960, p. 1141-1145.

Accelerated exposure testing to determine the tarnish rate of Au plating over Ag plating. Effect of thickness and porosity of the Au plating on tarnish resistance. (R2r; Ag, Au)

22-R. (English.) A Note on the Paper of A. Mituya and T. Obayashi "On the Deterioration of Platinum Anodes in Acid Solutions". A. N. Frumkin. Hokkaido University, Research Institute for Catalysis, Journal, v. 8, July 1960, p. 10-11.

Measurement of the hydrogen over voltage in 0.1N HCl on Hg at very low current densities allowing for the dissolution of the Pt anode when placed too close to the Hg surface. 5 ref. (R10d; Pt, 17-57)

23-R. Union Carbide Stops Condenser Failures With Bimetallic Tube. William Ashbaugh. Chemical Processing, v. 23, Oct. 1960, p. 52-53.

Bimetallic tubes consisting of a Cu shell over stainless steel pipe are used in heat exchangers to prevent corrosion cracking. (R-general, W13b; Cu, SS, 4-60, 17-57)

24-R. Inhibition of Metallic Corrosion in Aerosols. K. Klausner. American Perfumer, v. 75, Oct. 1960, p. 53-56.

Inhibition of corrosion in metallic aerosol containers by induced polarization of the electrochemical cell. Mechanisms of corrosion and corrosion

protection by various types of inhibitors. (R10b)

25-R. Corrosion--Cathodic Protection Cost Is Fully Justified. Pipe Line News, v. 32, Oct. 1960, p. 70, 72.

Use of Mg anodes or a rectifier system for cathodic protection of steel pipelines from galvanic corrosion. (R10d, R1a, T26r; ST)

26-R. (German.) Tarnishing of Silver, Copper and Copper-Zinc Alloys in the Presence of Cardboard and Paper. G. Schikott and K. Volz. Metall, v. 14, Nov. 1960, p. 1073-1076.

Samples at 18-70° C. are allowed to tarnish in the presence of cardboard containing elementary sulphur. Effect of time and air humidity on tarnishing rate. 10 ref. (R2r, 2-61; Ag-b, Cu-b, Zn-b)

27-R. (German.) Stress Corrosion of Alpha-Brass. K. V. Kamath and F. Erdmann-Jesnitzer. Metall, v. 14, Nov. 1960, p. 1061-1072.

Samples containing 6.1-35.2% Zn are homogenized at 600° C. and cold rolled with 30-90% deformation. Effects of holding time and temperature and of Al, Cr, Sn and Si additions on stress corrosion. 60 ref. (R1d, 2-60, 2-64; Cu-n)

28-R. Cathodic Protection Used to Control Corrosion of Service Station Underground Equipment. M. J. Olive. Corrosion, v. 16, Oct. 1960, p. 9-10, 12, 14-15.

Effect of soil resistivity and ground bed resistance on the corrosion of pipelines and tanks. Use of a cathodic protection system with Mg, Zn or Al sacrificial anodes and of rectifiers and graphite ground beds for protection of underground equipment. 17 ref. (R10, T26r, T26q)

29-R. Corrosion by Urban Cooling Waters. Sidney Sussman. Corrosion, v. 16, Oct. 1960, p. 471t-472t.

Effect of cooling water composition on the corrosion of mild steel coupons in cooling towers and untreated evaporative cooling units. (R4; CN)

30-R. Cooling Water Inhibitor Performance. P. R. Puckorius and W. J. Ryzner. Corrosion, v. 16, Oct. 1960, p. 473t-4785.

Use of polyphosphate and chromate-based inhibitors to provide a protective film for open recirculating water systems. SAE 1010 mild steel coupons are used in laboratory tests. 4 ref. (R10b; CN)

31-R. Cathodic Protection of Water Treatment Plants. F. O. Waters. Corrosion, v. 16, Oct. 1960, p. 487t-490t.

Cathodic protection of moving drives and chains in the chemical mixing and settling basins of a rapid sand water treatment plant by graphite anodes. (R10d, W10h)

32-R. Zinc as a Self-Regulating Galvanic Anode for Ship Hulls. J. A. H. Carson. Corrosion, v. 16, Oct. 1960, p. 491t-496t.

High-purity Zn anodes containing trace amounts of Al and Cd used to control corrosion of steel ship hulls by adjusting current output automatically and stopping current flow before the potential of the hull reaches the H_2 evolution level. Current distribution depends on anode shape, arrangement and location. 16 ref. (R10d, T22g, W3h; Zn, 17-57)

33-R. Chromium Electroplates for Corrosion Protection of Stressed AISI 410 Steel in High Temperature, High Purity Water. Henry Suss. Corrosion, v. 16, Oct. 1960, p. 497t-502t.

410 steel is tempered at 650 and 1125° F. and plated with Cr to a thickness of 0.003-0.005 in. Susceptibility to stress corrosion cracking is measured in oxygenated H_2O at 300° F. (R1d, R4, L17; SS, Cr)

34-R. Corrosion Problems in a Refinery Diethanolamine System. Kenneth L. Moore. Corrosion, v. 16, Oct. 1960, p. 503t-506t.

Corrosion of a stainless and carbon steel piping in a large diethanolamine system for removal of H_2S from refinery gas and liquid propane streams. (R7, T29n; CN, SS)

35-R. Compatibility of Materials With Unsymmetrical Dimethylhydrazine Rocket Fuel. C. W. Raleigh and P. F. Derr. Corrosion, v. 16, Oct. 1960, p. 507t-510t.

Compatibility of Al, Ti and Ni alloys, mild and stainless steels, plastics and elastomers with UDMH rocket fuel. (R7d; Al-b, Ni-b, Ti-b, CN, SS, NM-d)

36-R. Corrosion of Metals in Tropical Environments. C. R. Southwell, B. W.

Forgeson and A. L. Alexander. Corrosion, v. 16, Oct. 1960, p. 512t-518t.

Corrosion of wrought iron, carbon steel and structural steels in fresh and sea waters and inland tropical atmospheres. Corrosion of metallic couples of wrought iron and carbon steel. (R1a, R3, R4; Fe-m, CN, ST, SGB-s)

37-R. Laboratory Investigation of Water-Side Scale and Corrosion in the Presence of High Process-Side Temperatures. Herman Kerst. Corrosion, v. 16, Oct. 1960, p. 523t-529t.

Corrosion tests on seamless steel tubing in a circulating water system and on miniature heat exchangers to determine corrosion attack and $CaPO_4$ scale deposition rates at 130° F. water temperature and 350-395° F. hot side temperatures. (R4, R11, 2-61, W13b; ST, 4-60)

38-R. Use of Alloy Additions to Prevent Intergranular Stress Corrosion Cracking in Aluminum Bronze. J. F. Klement, R. E. Maersch and P. A. Tully. Corrosion, v. 16, Oct. 1960, p. 519t-522t.

Addition of Be, Se, Si, As, Cr, Ni, Ag, Sb, Ti and Sn to different batches of Al bronze to reduce concentration of segregated Al atoms at grain boundaries and prevent intergranular stress corrosion cracking. Cold rolled strips are tested at stresses of 30,000 psi. in 350° F. saturated steam from 160-3000 hr. 12 ref. (R1d, R2h, M27; Cu-s, Al, AD-n)

39-R. A Contribution to the Explanation of Intergranular Corrosion of Chromium-Nickel Steel. U. Cihal and M. Prazak. Corrosion, v. 16, Oct. 1960, p. 530t-532t.

Effect of boiling H_2SO_4 containing $CuSO_4$ on the intercrystalline corrosion susceptibility of heat treated Invar alloy, 18 Cr-9 Ni alloy and stainless steel. (R2h, R6g, 2-64; Ni-b, Cr-b, SS)

40-R. Anhydrous Ammonia Can Halt Internal Casing Corrosion. R. C. Loncaric, D. R. Anthony, M. D. Folzenlogen and Fair Calvin. Oil and Gas Journal, v. 58, Oct. 24, 1960, p. 117-121.

Description of an injection truck for anhydrous ammonia having three main sections: an ammonia reservoir and pump intake system, a glycol-storage tank and nitrogen-pressurizing system and a calibrated gear pump and high-pressure injection and venting system. Casing leaks are eliminated at a fraction of the cost of a well-repair job. Advantages, disadvantages and description of the process. (R10a, 1-52, T28)

41-R. How to Fight Pretreater Corrosion. Kenneth Brooks. Oil and Gas Journal, v. 58, Oct. 17, 1960, p. 127-128.

Use of intermittent water washing, inhibition and ammonia injection for corrosion control in exchanger trains in oil refineries. As a result of the process, carbon steel exchanger tubes can be substituted for alloy steel tubes in the trains. (R10, T29n; AY, CN, 4-60)

42-R. (Japanese.) Acetylene Compounds as Corrosion Inhibitors. Tomio Baba and Tsutomu Yoshino. Chemical Society of Japan, Journal, Industrial Chemistry Section, v. 63, Aug. 1960, p. 1377-1380.

Use of acetylene compounds to inhibit corrosion of thin mild steel plates in acidic solutions. 15 ref. (R10b; CN, 4-53)

43-R. Corrosion Wear of Cylinder Liners of Diesel Engines Using Residual Oil. G. Simonetti. Corrosion Technology, v. 7, Oct. 1960, p. 315-319, 334.

Mechanism of H_2SO_4 attack on diesel cylinder liners occurring through use of residual oil rich in sulphur and ashes. Use of anti-corrosive lubricating oils to prevent corrosion wear of liners during thermal cycle. (R6g, Q9, T21b)

44-R. Corrosion Prevention at Farnborough. Corrosion Technology, v. 7, Oct. 1960, p. 325-326, 334-335.

Corrosion resistance of new products for use in aircraft and missiles including a flexible fuel tank, sealed-in inhibitor tank and polyester radome. (R-general, T24)

45-R. (French.) Corrosion Fatigue During the Anodic Peroxydation of Lead. A. Coustenoble. Metaux-Corrosion-Industries, v. 35, Oct. 1960, p. 379-394.

Corrosion-fatigue testing of Pb-Sb alloys for use in accumulator grids in acid electrolyte to show the effect of corrosion cracking resistance on the rate of anodic peroxidation of Pb. 20 ref. (R1h, R1e; Pb-b, Sb)

46-R. (German.) Corrosion of Silumin and Cast Iron in Radiator Water. Gerhard

Schikorr. Zeitschrift fur Metallkunde, v. 51, Oct. 1960, p. 590-595.

Corrosion of Silumin, an Al alloy containing 9.2% Si and of cast iron engine components by water in radiator cooling system at 10-100° C. (R4, 2-61, T21b; Al-b, CI)

47-R. Slurry Spraying for the Control of Corrosion and Deposits in Oil-Fired Boilers. W. F. Cantieri and R. C. Chappell. American Society of Mechanical Engineers, Paper no. 60-WA-284, 1960, 8 p. $1.

Brief history of additives and description of equipment and application procedures for slurry. 11 ref. (R10g, T26q)

48-R. (German.) Chemical Behavior of Stainless Steel Threaded Inserts in Aluminum and Aluminum Alloys. E. A. Bommer. Aluminium, v. 36, Nov. 1960, p. 653-656.

Corrosion resistance of Cr-Ni stainless steel inserts in Al-Mg_3 alloy sections in normal atmospheres. (R11; Al-b, SS, Mg, 7-55)

49-R. Decorative Plated Coatings of Improved Durability. D. M. Bigge. Plating, v. 47, Nov. 1960, p. 1263-1268.

Corrosion resistance during outdoor exposure of Zn-base die castings plated with Cu, Ni and Cr and steel panels plated with Ni and Cr. 5 ref. (R11, L17; Zn-b, ST, Cr, Cu, Ni, 4-53, 5)

50-R. Moisture: Key to Bromine Corrosion. D. E. Lake and A. A. Gunkler. Chemical Engineering, v. 67, Oct. 31, 1960, p. 136-138.

Corrosion resistance of Ni, Pb, Monel and bronze in Br liquid and vapor. Corrosion rate as a function of Br moisture. (R6q, R-general; Cu-s, Ni, Ni-b, Pb)

51-R. Internal Cathodic Protection. C. Wilson, C. Plumpton and H. M. Powell. Nuclear Power, v. 5, Nov. 1960, p. 101-103.

Principles of the process, mathematical theory and design techniques. Reasons for success or failure in internal applications. (R10d, 10-51)

52-R. (Russian.) Corrosion in Clearance Gaps of Steel Electrolytic Equipment. R. R. Salem, E. M. Zaretski and I. Ya. Klinov. Khimicheskoe Mashinostroenie, no. 2, 1960, p. 30-33.

Distribution and diffusion of oxygen (dissolved in an electrolyte) in the clearance gaps between metal surfaces. Effect of current density and width and depth of the gap on corrosion rate. 4 ref. (R1a; ST)

53-R. Performance of Stainless-Steel Condenser Tubes. Robert H. Pell. American Society of Mechanical Engineers, Transactions, Paper no. 60-WA-217, 1960, 3 p.

Corrosion, wear resistance and heat transfer rate of welded seam 304 stainless steel tubes for power station condensers. (R4, Q9n, P11k; SS, 4-60)

54-R. (Russian.) Effect of Scale Factor on Corrosion Fatigue. G. V. Karpenko. Zavodskaya Laboratoriya, v. 26, Sept. 1960, p. 1134-1135.

Effect of sample dimensions and surface layer defects on corrosion and fatique resistance of samples exposed to water, oil and air media. (R1e, 3-73)

55-R. Reactions of Magnesium With Inorganic Constituents of Heavy Fuel Oil and Characteristics of Compounds Formed. W. D. Niles and H. R. Sanders. American Society of Mechanical Engineers, Paper no. 60-WA-278, 1960, 8 p. $1.

High temperature reactions of Mg with fuel oil-ash studied in static reaction tests to determine the effect of SO_3 partial pressure on the corrosivity of the compounds formed. 10 ref. (R7d; Mg)

56-R. (French.) Low Temperature Corrosion of Oil-Fired Boilers. A. Denis. Corrosion et Anticorrosion, v. 8, Oct. 1960, p. 347-358.

Methods of combatting corrosion of coolest parts of boilers (heat economizers, flues and the like) by SO_3 formed in combustion gases including elimination of sulphur contained in fuel; protective coatings on metal surfaces; use of metals such as cast iron for affected parts; use of neutralizing and inhibiting additives in fuel; and by abrasive shot cleaning. 6 ref. (R-general, R10, T26q)

57-R. (French.) Corrosion at Welds of 18-8 Type Austenitic Stainless Steels in Fuming Nitric Acid. M. L. J. Bernard and N. Flavian. Corrosion et Anticorrosion, v. 8, Oct. 1960, p. 359-370.

Tests in nitric acid at boiling point and room temperature on welded assemblies of a 0.03% carbon steel and a Ti-stabilized steel; and tests at room temperature and under alternating heating and cooling between 40-60°C. on micro-containers filled with nitric acid for resistance to intergranular and knife-edge corrosion in the weld. 11 ref. (R6g; SS-e, 7-51)

58-R. (Japanese.) High Electric Tension Transmission Cables. Kohichi Utsumi. Metals, v. 30, Apr. 15, 1960, p. 16-19.

Corrosion resistance, corona discharge glow and tension of steel reinforced Al aerial cables. Corrosion and electrical resistance, creep and fatigue of Pb sheathed Cu underground cables. (R-general, P15g, Q3, Q7, T1b)

59-R. (Japanese.) Corrosion Resistant Titanium Alloy Containing Palladium. Gohki Hiramatsu. Metals, v. 30, Apr. 15, 1960, p. 20-23.

Effect of Pd content on corrosion resistance and tensile properties of Ti alloy specimens prepared from arc melted castings by forging, rolling and annealing. (R-general, Q27a, 2-60; Ti-b, Pd)

60-R. Factors Influencing the Adherence of Oxides on Metals. R. F. Tylecote. Iron and Steel Institute, Journal, v. 196, pt. 2, Oct. 1960, p. 135-141.

Adherence of oxide films on Fe, Ni, Cr and Co. Ultimate tensile strengths of Ni and Fe oxides at elevated temperatures. Relative thermal expansion coefficients of metals and their oxides. 14 ref. (R1h, 2-62; Co, Cr, Fe, Ni)

61-R. Bimetallic Heat Exchanger Tubes Solve Dual Corrosion Problem. W. G. Ashbaugh and S. E. Doughty. Metal Progress, v. 78, Dec. 1960, p. 115-117, 128, 130, 132.

Cu on the outside prevents pitting and stress-corrosion cracking caused by brackish cooling water; stainless steel on the inside withstands corrosive action of chemicals being processed. (R1d, R2j, W13b, 17-57; Cu, SS, 4-60)

62-R. Protective Coatings for Corrosion Control in Production Operations. R. M. Robinson. Journal of Petroleum Technology, Oct. 1960, p. 20-24.

Control of corrosion of offshore platforms, floating, drilling and production equipment, production tanks, flowlines and subsurface equipment by metallic, bituminous, plastic and resinous coatings. (R10g, T28)

63-R. Some X-Ray Observations on the Oxidation Characteristics of Binary Niobium Alloys. Ralph H. Hiltz. Paper from "Advances in X-Ray Analysis", v. 2. Plenum Press, Inc., New York, 1960, p. 71-77.

X-ray diffraction and fluorescent studies determining the effect of alloying elements on the oxidation resistance of Cb. Alloys containing Ti, Cr, W, Cu, Fe, Ni, Zr, Mo, V, Mn, Al, Co and Si are heated in air at 1000° C. and analysis is made of the scale and the interface between the metal and the scale. 3 ref. (R1h, M22g, S11p; Cb-b)

64-R. (Spanish.) Oxidation of Columbium. Tor Hurlen. Instituto del Hierro y del Acero, v. 13, July-Sept. 1960, p. 714-728.

Rate of reaction of Cb with oxygen as function of time at 150-1000° C. and oxygen pressures between 760 and 10^{-2} mm. Hg. is measured by semi-continuous gravimetric and volumetric measurements. Oxidized specimens are examined by X-ray and electron diffraction, electron microscopy and metallographic techniques to determine composition of the oxides. (R1h, 2-61, 3-67, 3-74, M22; Cb)

65-R. Metallic Materials of Construction for the Chemical Industry. G. W. Brewer. Corrosion Prevention & Control, v. 7, Nov. 1960, p. 35-39.

Corrosion resistance of cast iron, mild and stainless steels, Ni, Cu and Al alloys and Pb in acidic, basic and neutral solutions. Prevention of weld decay. 10 ref. (R6, T29; Al-b, CI, CN, Cu-b, Ni-b, Pb, SS, 17-57)

66-R. New Theory of Rust Formation. Corrosion Prevention & Control, v. 7, Nov. 1960, p. 43.

Corrosion tests on thin pure Fe wires reacting with oxygen and water vapor at 835° F. show that rust formation may be due to penetration of the Fe by hydrogen ion which enlarges the sites where oxygen combines with the metal. (R-general; Fe-a)

67-R. Corrosion Inhibition of Aluminum Cathodic Protection by Impressed Current.

T. L. Ramachar and J. Sundararajan. Corrosion Prevention & Control, v. 7, Nov. 1960, p. 49-50.

Polarization studies on corrosion of commercial and pure Al in acid and alkaline solutions in the presence of inhibitors to determine the effectiveness of cathodic protection under these conditions. 9 ref. (R6g, R6j, R10d; Al)

68-R. Corrosion Problems and Their Treatment. Corrosion Prevention & Control, v. 7, Nov. 1960, p. i-v.

Water treatment, painting, coating, cathodic protection and insulating of steel, cast iron and nonmetallic pipelines. (R10, T26r, CI, ST)

69-R. Latest Developments in Uses of Znic. A. D. MacLellan. Corrosion Prevention & Control, v. 7, Nov. 1960, p. vi-vii.

Preventing corrosion of Fe or steel structures with Zn by hot dip galvanizing, spraying, electroplating, sherardizing and painting. (R10, L-general; Fe, ST, Zn, SGB-s)

70-R. (Russian.) Thin Oxide Films on Titanium, Zirconium, Molybdenum and Titanium Alloys. V. V. Andreeva and E. A. Alekseeva. Doklady Akademii Nauk SSSR, v. 134, Jan. 1960, p. 106-109.

Oxidation kinetics analyzed in polished samples exposed to oxygen and air at 50-400° C. for 6 hr. Oxide film thickness as a function of time and temperature. 12 ref. (R1h; Ti-b, Zr, Mo)

71-R. (Russian.) Corrosion and Electrochemical Behavior of Stainless Steels During Cathodic Polarization in Nitric Acid Solutions. Pt. 3. Effect of Steel Composition. E. N. Mirolyubov, M. M. Kurtepov and N. D. Tomashov. Izvestiya Akademii Nauk SSSR, Otdelenie Khimicheskikh Nauk, July 1960, p. 1185-1190.

Dependence of the corrosion rate in steels and alloys upon Cr, Ni, Ti and Mo concentrations and potential in 3% nitric acid electrolyte at 20° C. Effect of Ni and Cr on the dissolving rate and passivation. 12 ref. (R-general, P15; SS, Ni)

72-R. Aluminum for Sugar Handling and Processing. K. C. Latmir and J. F. Hawkins. Food Processing & Handling, v. 29, Oct. 1960, p. 371-374.

Corrosion resistance of Al alloys used in sugar refinery equipment as compared with that of steel and Cu components. (R7n; Al-b, Cu, ST)

73-R. (Japanese.) The Oxidation of W-Co Layer Electrodeposited on 0.06% C Steel and Its Carburized Surface. Hisashi Yamamoto. Japan Institute of Metals, Journal, v. 24, July 1960, p. 421-424.

Oxide films formed on carburized W-Co electroplate during heating in air at 100-1100° C. are studied by X-ray and electron diffraction. Data are given for deposit hardness, weight gain and composition and microstructure of the W and CO oxide layers. 3 ref. (R1h, M-general; ST, W-b, Co-b, 8-62)

74-R. (Japanese.) A Method of Corrosion Potential Measurement Using Microelectrode. Goro Yokoyama. Japan Institute of Metals, Journal, v. 24, July 1960, p. 445-449.

Corrosion potentials of Zn, Fe, Cd, Sn, Cu, Al and Sb in 10% NaCl and 20% H_2SO_4 solution measured by microelectrodes. 4 ref. (R11m; Zn, Fe, Cd, Sn, Cu, Al, Sb)

75-R. (Japanese.) Application of Microelectrode Method for Measuring Corrosion Potential of Alloy Structures. Goro Yokoyama. Japan Institute of Metals, Journal, v. 24, July 1960, p. 449-452.

Corrosion potentials of three-phase Cd-Sb alloys and a Cu-Zn diffused layer are determined by a microelectrode system which comprises measuring noble, interphase and base metal phases separately and conjunctively. 4 ref. (R11m; Cd-b, Sb, Cu-b, Zn)

76-R. Inorganic Coatings. Harry A. Pearl. Space/Aeronautics, v. 34, Nov. 1960, p. 56-59.

Oxidation and thermal resistance, tensile properties and ductility of Mo, Cb, W and graphite coated with Durak MG and Cr electrodeposits at temperatures above 2000° F. (R1h, Q27, Q23p; Cb, Mo, W, Cr, Mg, 8-62)

77-R. (Swedish.) Corrosion of Steel in the Atmosphere. Uno Tragardh. Teknisk Tidskrift, v. 90, Nov. 4, 1960, p. 1103-1105.

Samples of a carbon steel containing 0.05% C, 0.014% P, 0.039% S, 0.35%

Mn, 0.002% Si, 0.066% Cu, 0.007% Mo, 0.048% Ni and 0.011% Sn are exposed to natural and industrial atmospheres. Effects of humidity and SO_2 content on corrosion velocity. 8 ref. (R3; CN)

78-R. Effects of Alloying on Oxygen Resistance and Mechanical Properties of Columbium. Industrial Heating, v. 27, Nov. 1960, p. 2410, 2416.

Effect of additions of W, Ti, Al, V, Mo, Cr and Zn on oxidation resistance, tensile strength and stress rupture properties of Cb. (R-general, Q3m, Q27a, 2-60; Cb-b, Al, Cr, Mo, Ti, V, W)

79-R. Cathodic Processes on Passive Zirconium. Robert E. Meyer. Electrochemical Society, Journal, v. 107, Oct. 1960, p. 847-853.

Rates of reduction of oxygen, hydrogen, cupric ion and hydrogen peroxide on passive Zr in acidic solutions of sodium sulphate are measured at 25-85° C. Kinetic orders of reduction are determined from measurements of current as a function of concentration. 6 ref. (R10c; Zr)

80-R. Studies in Corrosion of Brass: Corrosion in Aqueous Solutions of Some Acids and Salts. A. M. Trivedi and M. N. Desai. Indian Journal of Applied Chemistry, v. 23, Jan. 1960, p. 2, 10-17.

Dezincification, decuprification and protective film and complex formation during corrosion of brass by solutions of various acids and salts. Effect of concentration of corrosive media and time of immersion on corrosion rate. (R2k, R6; Cu-n)

81-R. A Look at Corrosion-Resistant Fasteners. Robert D. Tuttle. Assembly & Fastener Engineering, v. 3, Dec. 1960, p. 38-40.

Strength/weight ratio, electrical conductivity, temperature resistance and quality of corrosion-resistant fasteners composed of Al, Cu and Ti alloys and stainless steel. (R-general, P15g, Q27, T7f; Al-b, Cu-b, SS, Ti-b, 17-57)

82-R. (Russian.) Radioactive Tracer Study on Oxidation of Liquid Copper by Sulphur. I. I. Pokrovsky and M. M. Pavlyuchenko. Doklady Akademii Nauk SSSR, Fizicheskaya Khimiya, v. 134, Feb. 1960, p. 391-393.

Radioactive isotope S^{35} is introduced into the oxide scale during oxidation of heat treated (at 1000° C.) pure Cu to determine structure of the various scale layers. Sulphide scale formation as a function of mutual diffusion between the metal and the sulphur. 4 ref. (R1h, M23q, N1; Cu, 14-60)

83-R. (Russian.) Corrosion and Electrochemical Behavior of Stainless Steels in Nitric Acid Solutions With Cathodic Polarization. Pt. 2. Cathodic Processes. E. N. Mirolybov, M. M. Kurtepou and N. D. Tomashov. Izvestiya Akademii Nauk SSSR, Otdelenie Khimicheskikh Nauk, July 1960, p. 1178-1184.

Analysis of cathodic polarization curves for stainless steel in entirely dissociated HNO_3 solution at 20° C. Mechanism of self dissolution of the cathode and reduction of HNO_3 to HNO_2 on the activated stainless steel in presence of homopolar molecules of HNO_2. 17 ref. (R6g, R1j; SS)

84-R. Engine Rusting in Service and Dynamometer Tests. P. A. Bennett. Lubrication Engineering, v. 16, Nov. 1960, p. 529-538.

Rusting of internal automobile engine parts under low temperature operation. Effect of physical-chemical properties of lubricants, carburetor air humidity and engine blowby rates on rusting. (R-general, T21b, 2-63)

85-R. (French.) Penetration of Sulphur Corrosion in Steels Placed Under Stress in Sodium Sulphide. E. Hierzog and L. Backer. Comptes Rendus, v. 251, Oct. 17, 1960, p. 1633-1635.

Surface activity, depth of penetration and distribution of sulphur in oil-quenched, tempered test bars of low-carbon steel placed under static bending stress. S^{35} is used as a tracer. (R-general, M27, 1-73; CN-g, S)

86-R. The Volatile Corrosion Inhibitors. Modern Packaging, v. 34, Nov. 1960, p. 116-117.

Chemical coating of packaging for ferrous metal parts to produce invisible vapor that prevents oxygen from combining with metal to form rust. Problems of greasing, shipping, dismantling and degreasing are eliminated. (R10b)

87-R. (Italian.) Preliminary Research on the Behavior of Pure Metals Immersed in Molten Alloys. P. Spinedi and G. Signorelli. Metallurgia Italiana, v. 52, Aug. 1960, p. 202-204.

Corrosion of electrolytic Cu wire immersed in molten Cd-Zn and Sn-Zn alloys of varying compositions; dissolution of specimen metal and appearance of intermetallic phases at liquid-solid interface. 10 ref. (R6m; Cu, Cd-b, Zn, Sn-b, Zn)

88-R. Crystal Growths and the Corrosion of Iron. Earl A. Gulbransen and Thomas P. Copan. Nature, v. 186, June 18, 1960, p. 959-960.

Effect of water vapor on corrosion of Fe is determined by exposing annealed pure zone-refined Fe wires to oxygen, water vapor and several gas mixtures of water vapor and oxygen. Electron microscope and electron diffraction studies. 5 ref. (R4d, M26n, M213, M22h; Fe, 4-61)

89-R. (English.) Selenites and Tellurites as Corrosion Inhibitors. Brahm Dev and B. D. Jain. Journal of Scientific & Industrial Research, v. 19B, Oct. 1960, p. 408.

Corrosion of cold-rolled steel by tap water is inhibited by the addition of 0.05% potassium selenite, 0.5% potassium selenate or 0.2% potassium tellurite. Low concentrations of selenite and tellurite accelerate corrosion. 3 ref. (R10b, R4; ST)

90-R. Keep Rust Off Parts and Subassemblies. George A. Hatfield. Mill & Factory, v. 67, Dec. 1960, p. 100-101.

Procedures for storing metal parts to protect against corrosion and physical damage. Description of various specially treated papers, tapes and plastic sheets now available. (R10e)

91-R. (Italian.) Use of an Electronic Potentiostat in Testing Stainless Steels for Intercrystalline Corrosion. B. Corradi and E. Gasperini. Metallurgia Italiana, v. 52, Sept. 1960, p. 249-254.

Heat treated, bent or welded Cr-Ni stainless steels are mechanically and electrolytically polished, then corrosion tested in NH_42SO4 at steady potentials of 0-5 V. 7 ref. (R6k, 2-64, 3-68; SS, Cr, Ni)

92-R. The Mechanism of Erosion of Ductile Metals. Iain Finnie. 3rd. U. S. National Congress of Applied Mechanics, Proceedings, 1958, p. 527-532.

Derivation of equations which predict weight loss from erosion by considering the behavior of a single abrasive grain impinging on the surface. Experimental results for SAE 1020 steel, low carbon steel, Cu and Al eroded by diamonds, silicon carbide grains and steel shot. (R1c, R11r; Al, Cu, CN, ST)

93-R. (Japanese.) Effect of Si on High Temperature Oxide Films in Heat-Resisting Alloys. Masataka Sugiyama and Tadayuki Nakayama. Japan Institute of Metals, Journal, v. 24, Aug. 1960, p. 541-544.

Electron and X-ray diffraction studies of initial oxide films formed on the surface of 302 B, 19-9 DL, Durimet 20 and Nichrome oxidized in air at 700-900° C. and subsequently reheated to 1300° C. Relation of the formation of special heat resisting films of amorphous SiO_2 to the initial stages of oxidation and the Si content of the alloy. 9 ref. (R1h, 2-60, 2-62, M22; SGA-h, SS, Ni-b, Si, 14-62)

94-R. (Translation-BWRA.) Investigation of Corrosion Resistance of Aluminium Welds. N. N. Skvortsov. Welding Production, Nov. 1959, p. 52-55.

See item 281-R, May 1960. (R11; Al, 7-51)

95-R. (French.) Trans-Passive State of 18/8 Austenitic Stainless Steels. I. Epelborn, M. Froment and Ph. Morel. Corrosion et Anticorrosion, v. 8, Nov. 1960, p. 383-393.

Steels with 0.02-0.23% C, 0.1-0.71% Mn, 0.1-0.48% Si, 17.2-19.1% Cr, 8.8-12.6% Ni and 0-0.54% Ti are made the anode in a IN solution of H_2SO_4 with applied voltage of 1-1.7. It is found that the appearance and degree of secondary passivation depend on the carbon content. 10 ref. (R10c; AY)

96-R. (French.) Low-Alloy Corrosion Resistant Steels. E. Herzog. Corrosion et Anticorrosion, v. 8, Nov. 1960, p. 394-406.

Steels containing 0-0.2% Cu, 0.001-0.03% S, 0-4.18% Cr, 0-0.78% Al and 0-1.12% Ni are corrosion tested in atmospheres containing SO_2, CO_2 and to marine and industrial atmospheres of varying humidity by exposure to coal, $(NH_4)2SO4$ and silica dusts and to fresh and sea waters. Effect of alloying elements and stress on corrosion resistance. (R-general, R11, AY)

97-R. (German.) Anodic Passivation of Metals. K. Schwabe. Electrochimica Acta, v. 3, Oct. 1960, p. 186-194.

A kinetic treatment of the passivation of ferrous metals is developed on the premise that porous films do not constitute a necessary requirement for the passivation of metals, especially Ni and Fe and that hindered dissolution of the metals leads to the formation of chemisorbed oxygen layers. 18 ref. (R10c; Fe, Ni)

98-R. Thermodynamics of Corrosion in Fused Chlorides. C. Edeleanu and R. Littlewood. Electrochimica Acta, v. 3, Oct. 1960, p. 195-207.

Effect of the mobility of the metal, stability of the chloride, initial redox potential of the melt, pressure over the system and presence of impurities on the corrosion of Ni and Cr in molten-chloride systems. 10 ref. (R7h; Cr, Ni)

99-R. Rapid Pitting Corrosion on Gas Scrubber. Corrosion, v. 16, Dec. 1960, p. 9-11.

Attack is evident in only three weeks of operation from salt accumulation on areas not washed down by water showers. Titanium and Hastelloy C exhibit excellent resistance to corrosive attack, but none of the materials tested show better resistance than 316 stainless. Monel, Inconel and Ni failed rapidly in the scrubber exposure, probably because of the traces of SO_2 in the gases. (R2j; Ti, Ni-b, SS)

100-R. Impressed Current Anodes for Cathodic Protection. Corrosion, v. 16, Dec. 1960, p. 79-84.

Data for calculating anode resistance to earth. Recommendations for installing anodes for various soil conditions. Advatages are given for deep ground beds in high resistivity soil and in urban areas. Use of Pb alloy and Pt anodes for underwater use. (R10d)

101-R. High Temperature Corrosion in Refinery and Petrochemical Service. Corrosion, v. 16, Dec. 1960, p. 85-92.

Problems of oxidation, sulphidation and carburization in relation to the effects of condensate corrosion and residual oil ash corrosion. Contributions of various alloying elements in the common engineering alloys to their physical and mechanical behavior as well as to their corrosion resistance at elevated temperatures. (R7a, 2-62)

102-R. Internal Carburization and Oxidation of Nickel-Alloys in Carbon Monoxide Type Atmospheres. Corrosion, v. 16, Dec. 1960, p. 100-104.

Tests show that the rate of internal carburization and oxidation of Ni-Cr alloys attains a maximum at 1500-1750° F. Attack is slight at 1330 and 1830° F. The presence of carbon dioxide, water vapor and hydrogen in the carbon monoxide does not significantly affect the rate of penetration. (R2s; Ni-b, Cr)

103-R. (German.) Influence of Palladium Additions to Titanium and Titanium Alloys on Corrosion Resistance and Passivation. U. Zwicker. Metalloberflache, v. 14, Nov. 1960, p. 334-337.

Hot rolled, descaled and degreased sheet specimens of pure Ti and of TiAl4V4, TiAl6V4, TiCr5Al3 and TiAl9V3 alloys; with and without 0.1% Pd addition, are corrosion tested for 2-1000 hr. in 20% HCl + 0.0013-1.3% HNO_3 at room temperature (22-25° C). (R-general, R10c, 2-60; Ti-b, Pd)

104-R. (Russian.) Resistance of Hydroturbine Materials to Cavitation Erosion. N. I. Pylaev. Energo-Mashinostronie, Sept. 1960, p. 28-31.

Turbine blades face hardened by carbon, low alloy and stainless steels are tested for cavitation erosion during operation and under laboratory conditions. 4 ref. (R2m, L24, T7h; AY, CN, SS)

105-R. Aluminum Reactions With Water Vapor, Dry Oxygen, Moist Oxygen and Moist Hydrogen Between 500 and 625° C. P. E. Blackburn and E. A. Gulbransen. Electrochemical Society, Journal, v. 107, Dec. 1960, p. 944-950.

Rate of reaction of Al in water vapor and in mixtures of water vapor with hydrogen or oxygen is studied in a Kanthal resistance furnace. Effect of corrosive atmosphere and oxide film formation and treatment in HCl solution on reaction rates. (R1h, 2-66; Al)

106-R. Dissolution of Copper in Sulphuric Acid Solutions. D. P. Gregory and A. C. Riddiford. Electrochemical Society, Journal, v. 107, Dec. 1960, p. 950-956.

Rate of reaction of brass and amalgamated Cu disks rotating in H_2SO_4 solution is measured as a function of temperature, stirring speed, acid concentration and surface preparation. 20 ref. (R6g, 2-61, 2-66; Cu-n)

107-R. Microtopography of Oxide Films Formed on Tantalum. R. E. Pawel, J. V. Cathcart and J. J. Campbell. Electrochemical Society, Journal, v. 107, Dec. 1960, p. 956-960.

Structures of the oxide films formed by oxidation of Ta in air at 300-700° C. are studied by optical and electron microscopy. 5 ref. (R1h, M27, M21, 2-61; Ta, 14-62)

108-R. The Role of the Oxygen Concentration Cell in Crevice Corrosion and Pitting. G. J. Schafer, J. R. Gabriel and P. K. Foster. Electrochemical Society, Journal, v. 107, Dec. 1960, p. 1002-1004.

It is proposed that, for any particular metal, steady-state pitting and crevice corrosion occur by identical mechanisms involving both the action of differential acid and differential oxygen concentrations. Arguments are given against the differential aeration cell mechanism as the sole agent responsible for localized corrosion. 17 ref. (R1b, R2j)

109-R. Copper Sulphide Creep on Porous Electroplate. M. S. Frant. Electrochemical Society, Journal, v. 107, Dec. 1960, p. 1009-1011.

Growth of CuS films on Cu plated with Sn and other metals and Cu coated with nitrocellulose and acrylic lacquers. 9 ref. (R1h; Cu, 8-62, 8-70)

110-R. (Japanese.) High Temperature Oxidation of Zirconium and Zirconium Alloys in Carbon Dioxide. Tatsuo Maekawa. Japan Institute of Metals, Journal, v. 24, Sept. 1960, p. 608-611.

The oxidation rate of reactor-grade pure Zr and 2.5% Sn and 0.24% FeZr alloy in CO_2 measured at 650-850° C. and 15-760 mmHg pressure using the weight gain method. 8 ref. (R1h, 2-62; Zr-b)

111-R. (Japanese.) Oxidation of Zirconium and Zirconium Alloys. Pt. 2. Tadao Sano, Shosuku Imoti and Mungyu Kang. Japan Institute of Metals, Journal, v. 24, Sept. 1960, p. 604-607.

Effects of Te additions on oxidation of Zr, Zircaloy 2 and Zircaloy 3 at 750-850° C. Relation to vacancy mobility and concentration, valency and ionization potential. 6 ref. (R1h, M26s, P15m, 2-61; Zr-b, Te)

112-R. (Japanese.) High Temperature Oxidation of Zirconium and Its Alloys in Water-Vapor. Tatsuo Maekawa and Junjiro Kai. Japan Institute of Metals, Journal, v. 24, Sept. 1960, p. 581-584.

Rates of oxidation and hydrogen absorption measured at 650-850° C. for iodide processed high purity Zr, commercial grade Zr, Kroll processed reactor-grade Zr and alloys containing 2.5% Sn and 0.24% Fe. 13 ref. (R1h, P13d; Zr-b, H)

113-R. (Russian.) Effect of Tantalum on the High Temperature Oxidation of Columbium. R. F. Voitovich and V. A. Lavrenko. Fizika Metallov i Metallovedenie, v. 10, Apr. 1960, p. 554-559.

Cb-Ta alloy samples of various composition are oxidized at 500-900° C. in recrystallized and strain hardened state (deformation 33%). Additions of Ta improve corrosion resistance at temperatures up to 800° C. Evaporation of volatile scale components takes place above 800° C. and is believed to be influenced by deformation. 5 ref. (R1h, 2-60, 2-61; Cb-b, Ta)

114-R. (Russian.) Basic Problems in Study of Oxidation Mechanism. S. Mrovets and T. Veber. Fizika Metallov i Metallovedenie, v. 10, Apr. 1960, p. 574-580.

Mechanism of two-layer sulphide scale formation on Cu and Ag. Process of "inert marking" using Pt wire for study of diffusion between metal-metalloid. Structure and activity of the layers. 48 ref. (R1h; Cu, Ag)

115-R. Stress-Corrosion Cracking of Alpha-Brass and Similar Alloys. C. Edeleanu and A. J. Forty. Philosophical Magazine, v. 5, Oct. 1960, p. 1029-1040.

Microscopic examination of brass single crystals immersed in ammonia, after deformation by bending. A mechanism consisting of local embrittlement followed by a cleavage-like fracture is suggested for crack propagation in stress corrosion. 10 ref. (R1d, Q26s; Cu-n, 14-61)

116-R. (Russian.) Mechanism of Sulphide Corrosion of Iron. P. V. Held and A. K. Krasovskaya. Zhurnal Fizicheskoi Khimii, v. 34, Aug. 1960, p. 1721-1727.

Sulphidization of Armco iron samples in a quartz tube from 500-800° C. Determination of micro and macrostructure of the sulphide scale; influence of size and curvature of a sample on the thickness of the scale. Mutual diffusion of S and Fe in the scale and formation of pyrrhotite. 10 ref. (R6p; Fe-a)

117-R. (Russian.) Resistance of Cr-Ni-Mo-Cu Steels to Corrosion in Etching Solutions. E. V. Zotova. Metallovedenie i Termicheskaya Obrabotka Metallov, Nov. 1960, p. 14-15.

Influence of various additions of Ni and Cr on corrosion rate in H_2SO_4 solutions of 5-20% concentration at 80° C. for 100 hr. Evaluation of steel compositions suitable for use in etching equipment. (R6g, M20q, 2-60; ST, Cr, Cu, Mo, Ni)

118-R. (Russian.) Structural Changes and Corrosion Resistance in Kh17N2 Stainless Steel. A. P. Akshentseva. Metallovedenie i Termicheskaya Obrabotka Metallov, Nov. 1960, p. 7-12.

Hardness, structure, impact strength and corrosion resistance of welded samples normalized at 800-1300° C. for 1-5 min., then annealed at 300-900° C. Annealing of weldments at 680-700° C. for 1 hr. to provide complete removal of stresses, formation of stable Cr carbides on the grain boundaries and intercrystalline corrosion resistance. (R-general, Q-general, M27, 2-64; SS)

119-R. (Russian.) Protection of Low Alloy Pearlitic Steels Against High Temperature Gas Corrosion. A. V. Ryabchenkov and V. I. Velemitsina. Metallovedenie i Termicheskaya Obrabotka Metallov, Nov. 1960, p. 39-42.

Corrosion and frictional wear resistance, hardness and bend strength of 15KhMFKR steel electroplated by Ni-P at 92° C. and subsequently heat treated at 400° C. Application to parts operating in superheated vapors. (R-general, Q29n, Q5g; ST, 8-62)

120-R. (Polish.) Kinetics and Mechanism of Reaction Between Sulphur and Silver-Zinc Alloys. Stanislaw Mronec, Krystyna Wallisch and Teodor Weber. Archiwum Hutnictwa, v. 5, Apr. 1960, p. 323-344.

The rate of sulphurization as a function of temperature (300-444° C.) and Zn concentration in Ag-Zn alloy. Structure of scale layers is analysed by the inertial marking method. Data on values for activation energy and parabolic constants. 27 ref. (R2r, 2-60, 2-61; Ag-b, Zn-b)

121-R. New Corrosion-Testing Service Solves Pipe-Valve Problems. Iron Age, v. 186, Dec. 22, 1960, p. 64-65.

Description of a corrosion test in which test rods composed of type 304 or 316 stainless, Aloyco 20 or Aloyco 25-12S are mounted inside processing lines to determine their corrosion resistance and therefore their effectiveness as pipe and valve materials. (R11, T7b, T26r; SS, 17-57)

122-R. (Japanese.) Oxidation of Molten 85-5-5-5 Red Brass. Shigeo Oya, Umewa Honma and Hiroshi Nakazima. Imono (Japan Foundrymen's Society, Journal), v. 32, Sept. 1960, p. 648-657.

Oxidation of red brasses containing approximately 85% Cu, 5% Pb, 5% Sn and 5% Zn is studied by X-ray diffraction and electron microscopy analysis and by fracture tests of cast chill blocks. Data are given for oxidation pattern and effect of time, temperature, grain size and composition. 9 ref. (R1h; Cu-n)

123-R. Corrosiveness of Indoor Atmosphere. T. Henry Turner. Engineer, v. 210, Dec. 2, 1960, p. 935.

Test specimens composed of bare low alloy or mild steel or of mild steel coated with Zn or Al are exposed to various types of indoor factory atmospheres for a period of one year. Effect of plant humidity and acid fumes and of Zn or Al coating on the corrosion rate of the specimens. (R3n; AY, CN, 8)

124-R. Stress Corrosion Cracking of Ti-5Al-2.5 Sn. Hiram Brown. Light Metal Age, v. 18, Dec. 1960, p. 4-7.

Stress corrosion testing of bent Ti alloys at 1150-1500° F. in air, trichloroethylene and cutting oil media to determine the cause of cracking during fabrication of complex assemblies. (R11s, R1d; Ti-b, Al, Sn)

125-R. Corrosion Protection of Magnesium in Electronic Equipment. Harold Shapiro. Light Metal Age, v. 18, Dec. 1960, p. 7-10.

Evaluation of organic finishes to prevent electrolytic corrosion of Mg with emphasis on plastisols and organosols. Methods of Sn plating and immersion Zn coating. (R1a, L17; Mg, Sn, Zn, NM-d30)

126-R. (Japanese.) Corrosion of Copper Alloys in High Temperature Water and Steam. Pt. 2. Takemichi Otsu and Shiro Sato. Japan Institute of Metals, Journal, v. 24, Oct. 1960, p. 637-641.

Corrosion tests on 5-40% Zn-Cu alloys, as cold rolled and annealed strip in saturated water and steam at 300° C. for 250 hr. Data for effect of corrosion on tensile strength and elongation, corrosion penetration and corrosion mechanisms and nature of the Cu-Zn-ZnO corrosion product. 5 ref. (R1h, R4, R10, Q-general, 2-62; Cu-b, Zn)

127-R. (Japanese.) Effect of Halide Ions on the Anodic Passivation of Zirconium. Akimi Vmezono and Susumu Morioka. Japan Institute of Metals, Journal, v. 24, Oct. 1960, p. 680-684.

Anodic polarization curves for Zr in acid, neutral and alkaline solutions containing F, Br, Cl and I ions and small quantities of oxidizing agents. Effect of halide ion concentration, pH oxy-anions and general anions on pitting corrosion. 5 ref. (R10c, R1h, R2j, 2-66; Zr)

128-R. An X-Ray High-Temperature Oxidation Study on Iron-Copper. H. J. Goldschmidt. Iron and Steel Institute, Journal, v. 196, Dec. 1960, p. 390-393.

Use of a high temperature X-ray diffraction camera to follow oxidation sequences on Fe-Cu powder compacts. Determination of types and proportions of pure metal and oxide phases with changes in time and temperatures up to 1000° C., at low air pressure. 11 ref. (R1h, M22g, M24b, 2-62; Cu-b, Fe-b, 6-72)

129-R. Marker Movements in the Oxidation of Iron and Some Other Metals. R. F. Tylecote and T. E. Mitchell. Iron and Steel Institute, Journal, v. 196, Dec. 1960, p. 445-453.

Study of Swedish charcoal iron APC, copper NPE, Zr and Ti samples, marked with Pt wire and oxidized at 750-1000° C. for 1/2 to 65 hr. Effects of diffusion mechanism, oxide film plasticity and adherence of the film to the metal surface on movement of the marker inward with the metal interface or outward with the oxide/air interface. 17 ref. (R1h, N1; Cu, Fe, Ti, Zr)

130-R. Relation Between Boiler Cleanliness and Feedwater. F. U. Neat. American Society of Mechanical Engineers Paper no. 60-WA-216, 1960, 11 p. $1.

Corrosion of steel boiler and of condenser tubes composed of Cu, Cu-Ni alloy, Monel, Inconel, brass and stainless steel by dissolved oxygen and ammonia. Influence of boiler water pH. (R4c; Cu-b, Ni-b; SS, 4-60)

131-R. Protective Coatings. Francis Scofield. I/EC (Industrial and Engineering Chemistry), v. 52, Oct. 1960, p. 879-880.

A literature review covering protective organic coatings which show increasing resistance to chemicals, abrasion and corrosion. New applications for structural steel. 72 ref. (R-general, Q9n; SGA-s, ST, 8-69)

132-R. Titanium. H. B. Bomberger and H. A. Clampett, Jr. I/EC (Industrial and Engineering Chemistry), v. 52, Oct. 1960, p. 886-888.

Chemical properties and corrosion resistance of Ti and its alloys. Use of Ti in electrodes, heat exchangers and impellors. (R-general, W29h, W13b; Ti, 17-57)

133-R. (English.) Cavitation Erosion of Screw Propellors. Nils Christian Astrup. Acta Polytechnica Scandinavica, Mechanical Engineering Series, no. 7, 1960, 16 p.

Mechanism and hydrodynamics of cavitation. Types described include "sheet", "tip vortex", "cavern", "worm-eaten" and super cavitation. Suggested precautions to avoid cavitation erosion. (R2m, T22h)

134-R. (German.) Material Requirements of Mechanical Precision Engineering. K. Franz. VDI Berichte, no. 46, 1960, p. 7-16.

Detection of defects caused by improper materials including intercrystalline corrosion of Zn die castings caused by Sn, Cd or Pb impurities, dimensional changes in high-accuracy parts, cold creep of Zn wire, corrosion of Cu, brass and Zn sheet caused by nonstabilized PVC (polyvinylchloride) insulation, stress

corrosion on brass parts and electrolytic corrosion of electric coils. (R-general, Q3; Cu-b, Zn, Cd, Pb, Sn)

135-R. (German.) Weathering of Precision Apparatus With Particular Reference to Metallic Materials. A. Eckstein. VDI Berichte, no. 46, 1960, p. 17-25.

Definition of testing conditions and operations necessary to obtain results significant for different climates. Reaction mechanisms of metallic corrosion. Corrosion protection by, and control of coating thickness in, electroplating and plastic coating. (R3, L17, L26p)

136-R. (German.) Corrosion Testing of Electrical Contacts. J. Weissler. VDI Berichte, no. 46, 1960, p. 27-30.

Permanent wire wrap connections and non-permanent (edge connector, switch contact) contacts are corrosion tested in a 3% NaCl solution spray test under tropical, European and industrial climatic conditions. (R11j, T1d)

137-R. (German.) Corrosion of Steels in Hot Gases. Hans Keller. Chemie-Ingeniur-Technik, v. 32, Sept. 1960, p. 582-584.

Corrosion of ferritic X10CrAl24 and austenitic X15CrNiSi 2520 steel tubes through which coal grains are flowing under nitrogen atmosphere containing small amounts of CO_2 and sulphur at 800-1000° C. Corrosion of steel by oil containing vanadium at over 660° C. (R6; SS)

138-R. Evaluation of Aluminum Enamels. A. W. Brace. Institute of Vitreous Enamellers Bulletin, v. 11, Nov. 1960, p. 21-27.

Selection of suitable Al grades for vitreous enamelling and methods of surface preparation. Tests for spalling, acid and alkali resistance and abrasion resistance in relation to firing conditions and coloring oxide used. 9 ref. (R6, Q9n; Al, 8-71)

139-R. Nickel-Chromium Plated Aluminum Sheet. R. C. Spooner and D. P. Seraphim. Metal Finishing, v. 58, Dec. 1960, p. 40-44.

Atmospheric corrosion resistance of 3S Al alloy panels plated with bright Cr (Cu-Ni-Cr deposit) after pretreatment with phosphoric acid anodizing, zincate or Vogt processes. (R3; Al-b, Cr, Cu, Ni, 8-62)

140-R. Measurement of Thickness and Porosity of Oxide Films on Iron and Aluminum. K. F. Lorking. Journal of Applied Chemistry, v. 10, Nov. 1960, p. 449-456.

Capacity measurements obtained with an a-c. bridge are used to determine thickness of nonporous oxide films on Fe and Al surfaces and to show the effect of both the solvent action of aqueous solutions and electrochemical processes on the thickness of these films. 14 ref. (R1h; Al, Fe)

141-R. A Comparison of the Corrosiveness of Indoor Atmospheres. J. F. Stanners. Journal of Applied Chemistry, v. 10, Nov. 1960, p. 461-470.

Corrosion testing of bare, pickled mild steel, bare, pickled low-alloy steel, mild steel coated with Al and mild steel coated with Zn in industrial atmospheres to determine corrosion rate as a function of humidity and amount of ventilation. 7 ref. (R3n; AY, CN, 8-67)

142-R. Stress-Corrosion Failure of Austenitic Stainless Steel. A. B. Chatterjea and B. R. Nijhawan. NML Technical Journal (National Metallurgical Laboratory, India), v. 2, Aug. 1960, p. 20-25.

Industrial failure of austenitic stainless steel in H_2SO_4 and $(NH_4)_2SO_4$ at 90-100° C. is investigated and attributed to stress-corrosion attack. (R1d, R11s; SS-e)

143-R. Hardening by Internal Oxidation As a Function of Velocity of the Oxidation Boundary. J. L. Meijering. Metallurgical Society of AIME, Transactions, v. 218, Dec. 1960, p. 968-971.

Oxidation hardening in cylindrical and spherical specimens of Ag-Mn, Ag-Be, Ag-Mg, Cu-Be and Cu-Be alloys at 800-1200° C. Oxidation hardening first decreases with depth below the surface, but then increases again as the center is approached. This is in agreement with the view that change in hardness is mainly determined by the change in velocity of the oxidation boundary, which affects oxide dispersion. 6 ref. (R2s, Q29n; Cu-b, Ag-b)

144-R. Corrosion and Electrode Potential Studies of Nickel-Chromium Coatings. A. H. DuRose. Paper from "American Electroplaters' Society, Technical Proceedings", 1960, p. 83-89.

The outdoor corrosion weight loss for bright Ni foil is only slightly greater than that for sulphur-free Ni but the number of perforations is much greater for bright Ni and Cr intensifies the degree of perforation. Potential, galvanic and polarization data are given for bright Ni, sulphur-free Ni and Cr. 26 ref. (R-general; Ni, Cr, 8-62)

145-R. A Progress Report on Experiences in Improving Corrosion Resistance of Automobile Parts. J. C. Thomas, D. W. Hardesty and C. F. Nixon. Paper from "American Electroplaters' Society, Technical Proceedings", 1960, p. 90-95.

Correlation of CASS Test results and performance of plated parts. Reliability and reproducibility of test results. 7 ref. (R11, T21c)

146-R. New Data on the Performance of Nickel and Chromium Plated Zinc Die Castings. W. H. Safranek, H. R. Miller, R. W. Hardy and C. L. Faust. Paper from "American Electroplaters' Society, Technical Proceedings", 1960, p. 96-104.

New accelerated corrosion data show that a combination of duplex Ni and thicker than normal, crack-free type Cr provides a more prolonged corrosion resistance than a composite of duplex Ni and ordinary Cr or a composite of bright Ni and thicker, crack-free Cr. 14 ref. (R11; Zn, 5-61, Ni, Cr, 8-62)

147-R. Experience in the Operation and Performance of Dual Chromium Systems. W. E. Lovell, E. H. Shotwell and J. Boyd. Paper from "American Electroplaters' Society, Technical Proceedings", 1960, p. 215-225.

CASS tests on dual Cr plated automobile parts and roofs; minimum Cu and Ni thickness requirements; factors favorable to good anticorrosion performance. (R11, T21)

148-R. Epoxide Resins for Corrosion Resistant Applications. G. J. Powell. Current Engineering Practice, v. 3, Sept. 1960, p. 22-24.

Coating of structural steel and concrete with an amine cured paint composed of coal tar pitch and epoxide resin to prevent corrosion. (R10g, L26p; ST, 4-57)

149-R. (Translation-ConBur.) The Mechanism of Hydrogen Peroxide Formation in the Corrosion of Metals. T. M. Abramova, I. L. Gankina and A. S. Fomenko. Academy of Sciences of the USSR, Proceedings, Physical Chemistry Section, v. 129, Nov-Dec. 1959, p. 1021-1024.

The change in the isotopic compositon of H_2O_2 formed during the corrosion of Zn, Mg, Cd, Al and Sn in oxygen and water is determined by a radioactive tracer technique. (R4, R1h, S11q; Al, Mg, Sn, Zn)

150-R. (Translation-ConBur.) An Electronographic Study of Passive Films on Zinc. A. I. Levin, M. E. Prostakov and G. D. Susloparov. Academy of Sciences of the USSR, Proceedings, Physical Chemistry Section, v. 129, Nov-Dec. 1959, p. 995-998.

Structures of surface films formed on Zn by liquid alkaline oxidizing media and by anodic treatment in solution of pure alkalism are determined by X-ray diffraction. (R1h, L19, M27, M22g; Zn)

151-R. (Translation-ConBur.) Protection of Steel Against Gaseous Corrosion by Glass-Metal Coatings. E. A. Antonova and A. A. Appen. Journal of Applied Chemistry of the USSR, v. 32, Nov. 1959, p. 2536-2541.

Steel protected with glass-Cr layers remains almost unoxidized in air up to 1000° C. General properties of such coatings make them more advantageous than silicate enamels or protective layers produced by thermal diffusion of Si or Cr. 14 ref. (R10g; ST)

152-R. (Translation-ConBur.) Influence of Temperature on the Effect of Polarization in the Corrosion Cracking of V-95 Alloy in a 0.1 N Solution of H_2SO_4 + 35 g. Per Liter of NaCl. V. V. Romanov and V. V. Dobrolyubov. Journal of Applied Chemistry of the USSR, v. 32, Nov. 1959, p. 2556-2559.

Temperature substantially influences shape of polarization curve. Current density, required for protection of the alloy from corrosion cracking, increases linearly as temperature rises. Influence of anodic polarization is most effective at 20 and 35° C., less effective at 50° C. and absent at 70° C. 4 ref. (R1d, R6, 2-61; Al-b)

153-R. (Translation-ConBur.) Corrosion of Lead in Contact With Graphite. V. A. Titov and E. N. Semkova. Journal of Applied Chemistry of the USSR, v. 32, Nov. 1959, p. 2560-2565.

When graphite is combined with Pb in HCl solutions an electrochemical couple

is formed in which Pb acts as anode and graphite as cathode, contact of graphite with Pb increases its corrosion more than 100% in 20% HCl and about 50% in 35% HCl. Corrosion rate increases exponentially with temperature. Admixtures of methyl chloroformate in HCl affect the corrosion in different ways depending on the acid concentration. 20 ref. (R6g, 2-60; Pb)

154-R. Internal Cathodic Protection. Pt. 7. Line Anodes in Cylindrical Tanks; the Edge Effect. C. Plumpton and C. L. Wilson. Corrosion Prevention & Control, v. 7, Dec. 1960, p. 33-35, 60.

Mathematical investigation of current flow patterns of line anodes fitted in cylindrical containers, taking into account the rounding off of anode edges which occurs during operation and is predicted by the re-entrant angle theorem. (R10d)

155-R. Corrosion-Inhibition of Aluminum-Zinc Alloys. J. Sundararajan and T. L. Rama Char. Corrosion Prevention & Control, v. 7, Dec. 1960, p. 38-39.

Corrosion rates of aircraft DTD 687 Al alloys and pure Al in NaOH solutions containing gum acaciae, agar agar, gelatin, dextrin and glue as inhibitors. Effect of current density and time on corrosion rate. 10 ref. (R10b; Al-b, Zn)

156-R. Corrosion Prevention. Pt. 4. T. Henry Turner. Corrosion Prevention & Control, v. 7, Dec. 1960, p. 40-42.

Corrosion resistance of galvanized steel, Sn coated metals, Ni alloys and stainless steel in rural and industrial atmospheres and in salt water spray. Applications in food and cutlery industry. (R3, R11j; Ni-b, SS, ST, 8)

157-R. Conditions for the Cathodic Protection of Metals. M. Pourbaix. Corrosion Prevention & Control, v. 7, Dec. 1960, p. 43-48.

Thermodynamic and kinetic conditions required for passivation of 18-8 stainless steel, Ag, Cu, Pb, Fe, Sn and Zn. 11 ref. (R10c; Ag, Cu, Fe, Sn, SS, Zn)

158-R. Anodic or Cathodic. P. de Waele. Corrosion Prevention & Control, v. 7, Dec. 1960, p. i-ii, viii.

Study of the fundamental differences between galvanic and electrolytic cells in relation to cathodic protection of metals. (R10d)

159-R. Corrosion Problems and Their Treatment. Pt. 4. Corrosion Prevention & Control, v. 7, Dec. 1960, p. iii-viii.

Galvanizing, painting, coating, spraying and cathodic protection of steel structures to prevent corrosion. Relation of surface preparation to adherance of coatings. (R10, L16, L26; ST, 4-57)

160-R. (German and French.) Corrosion of Semi-Finished Aluminum Products During Shipment and Storage. H. Greutert. Aluminium Suisse, v. 10, Nov. 1960, p. 282.

Corrosion caused by frictional contact between products during shipment by truck, where shaking of load is greater than in railroad cars and by condensation of water in cold weather when materials are transferred from means of transport or outside storage areas to heated interiors. Preventive measures. (R1f, R4, R10; Al-b)

161-R. Protection of Gas Plant and Equipment. Corrosion Technology, v. 7, Nov. 1960, p. 360-367.

Abstracts from British Gas Industry Corrosion Symposium covering principles and applications of cathodic protection, cast iron and corrosion in the gas industry, Cu and Al appliances, sprayed metal coatings (Zn, Al) and organic protective coatings. 3 ref. (R10, L23, W16; Al, CI, Cu)

162-R. Caustic Stress Corrosion Tests on Stainless Steel. E. Howells. Corrosion Technology, v. 7, Nov. 1960, p. 368-369.

Testing U-bend specimens composed of 347 stainless steel in a caustic-stress corrosion environment to produce cracking. Yield-strength determinations are made in NaOH solutions at 650° F. and 26,400-17,600 psi. for 36-600 hr. Concentration tests are made in NaOH solutions at 850-650° F. for 1-30 days. (R11s, Q23b; SS)

163-R. Corrosion Resistance of Austenitic Chromium-Nickel Stainless Steels and Some Nickel Alloys. R. Butcher. Ingenieur, v. 72, Nov. 11, 1960, p. 235-244.

Resistance to general surface attack, pitting, crevicing and galvanic, stress and intergranular corrosion and acid resistance of precipitation hardening and

austenitic alloys. Effect of composition on corrosion resistance. 7 ref. (R-general, 2-60; SS-e, Ni-b)

164-R. (German.) Experiences Gained With an All-Aluminum Road Bridge. Dietrich Fuchs. VDI-Zeitschrift, v. 102, Dec. 11, 1960, p. 1749-1752.

Corrosion resistance of a 25 tón AlMgSiF32 alloy bridge situated over a canal in an industrial area. (R3n, T26p; Al-b, Mg, Si)

165-R. Protective Films on Metals. W. J. Copenhagen. South African Industrial Chemist, Aug. 1960, p. 144-157.

Protection of outdoor and underground structures composed of steel, Al, Cu, Zn, Mg and Ti by metallic and nonmetallic films, phosphate coatings, silicate films, thermoplastic and thermosetting plastic films, rubber derivatives, inhibitive greases and wrappings and cathodic films. (R10, L-general; Al, Cu, Mg, ST, Ti, Zn)

166-R. (English.) Stress Corrosion Cracking of Austenitic Stainless Steels. Masaki Watanabe and Yoshihiko Mukai. Osaka University, Technology Reports, v. 10, Mar. 1960, p. 439-452.

Initiation and propagation of stress corrosion cracking of 304L, 308L and 18-8 austenitic stainless steel plates, rods and weldments in boiling solutions of 42% $MgCl_2$ investigated by microscopic observation and tensile tests at 20-200° C. after various heat treatments. 3 ref. (R1d, 9-72, Q-general; SS-e, 4-53, 7-51)

167-R. (Italian.) Corrosion Protection of Boilers and Tubing Systems for Water or Steam by Adding Hydrazine to the Water. Rassegna Chimica, v. 12, July-Aug. 1960, p. 41-42.

Deoxidation of water by hydrazine additions. Removal of already existing oxides from boiler and tubing walls is possible, because hydrazine passes easily from aqueous solution into steam. (R10, T26q; AD-r)

168-R. (English.) Electrochemical Polarization of Iron in Concrete. M. Takihara and K. Naito. Railway Technical Research Institute (Japan), Quarterly Report, v. 1, June 1960, p. 3-5.

Potential-time curves and polarization curves are obtained on steel wire at constant current in saturated solution $Ca(OH)_2$ and in cement mortars to simulate corrosion of reinforcing steel in concrete. Corrosion is influenced by passivity potential of Fe, dissolved oxygen concentration in uncombined H_2O, electrical conduction of concrete and surface oxide of the wire. (R6n; Fe, 4-61)

169-R. Minimizing Corrosion on Trucks Through Design. C. O. Durbin. Preprint no. 248A, Society of Automotive Engineers, 485 Lexington Ave., New York 17, N. Y. 1960, 4 p.

Truck designs which permit the accumulation of road dirt and de-icing salts from wheel splash accelerate corrosion of electrical components, wiring, body and chassis. Corrosion is reduced by insulating paints, minimizing exposure to wheel splash, sealing and, in the case of electrical components, installing positive ground terminals. (R10, T21e)

170-R. Water Resistant Coatings. Materials in Design Engineering, v. 53, Jan. 1961, p. 71-75.

Advantages and limitations of coal tar enamel, coal tar epoxy, epoxy resins, vinyl resins, chlorinated rubber, phenolic tung oil, concrete and Zn-Pb silicate coatings on steel and concrete in water exposures. Chemical, abrasion and weather resistance of various coatings. Applications. (R10g, R4, Q9n; ST, 8)

171-R. Nickel-Chromium Plated Aluminum Sheet. R. C. Spooner and D. P. Seraphim. Metal Finishing, v. 59, Jan. 1961, p. 37-41.

Corrosion resistance in industrial atmospheres of Ni-Cr coated 3S Al alloy panels prepared by zincate, phosphoric acid anodizing and Vogt processes. 23 ref. (R3n; Al, Ni, Cr, 4-58, 8-62)

172-R. New Theory for Rusting of Iron. Role of Hydrogen Ions in Promotion. Metallurgia, v. 62, Dec. 1960, p. 269.

Pure Fe wires are reacted with oxygen and water vapor at 835° F. The resulting corrosion is studied under an electron microscope to determine the effect of hydrogen ions in the

water vapor on the area of chemical reaction between the oxygen and Fe and consequently on the corrosion rate. (R1h, R4d; Fe, 4-61)

173-R. Oxidation of Titanium. Tor Hurlen. Institute of Metals, Journal, v. 89, Dec. 1960, p. 128-136.

Reaction of sheet Ti with oxygen at 300-700° C. at pressures of 10^{-2}-760 mm. Hg. Oxidation/time curves are determined by gravimetric and volumetric methods and oxidized specimens are studied by X-ray diffraction, electron diffraction, electron microscopy and metallographic technique. 35 ref. (R1h, M-general, 2-61; Ti, 4-53)

174-R. (Swedish.) The Microstructure of Scale on Iron and Steel. Sten Modin. Jernkontorets Annaler, v. 144, Nov. 1960, p. 799-812.

Effect of temperature and atmosphere on the formation of scale on rimmed and killed steels and electrolytic iron is measured at 1000-1300° C. in air and oil gas. 6 ref. (R2q, 2-61; Fe-a, ST)

175-R. (Swedish.) Structure of Scale and the Mechanism of Scale Formation During Heating of Steel. Sten Modin and Erik Tholander. Jernkontorets Annaler, v. 144, Nov. 1960, p. 813-833.

Electrolytic Fe and three carbon steels, one unkilled with 0.1% carbon and the other two Si-killed with 0.2 and 0.7% carbon respectively, are heated in air atmospheres to 1000-1300° F. to determine microstructure and adherence of the resulting scale. 8 ref. (R2q, M27; CN, Fe-a)

176-R. Corrosion Engineering: Cathodic and Anodic Protection of Metals. J. Sundararajan and T. L. Rama Char. Current Engineering Practice, v. 3, Oct. 1960, p. 7-16.

Preventing or minimizing corrosion in Fe and steel structures using Zn, Mg and Al sacrificial anodes. Use of an impressed current in conjunction with both permanent and consumable anodes. 41 ref. (R10d; Al, Mg, Zn, 17-57)

177-R. Anaerobic Corrosion Processes. Pipes and Pipelines, v. 5, Dec. 1960, p. 36.

Mechanisms of anodic solution of Fe and cathodic depolarization during anaerobic corrosion of steel pipes through the formation of elemental sulphur and H_2S. (R8; ST, 4-60)

178-R. Protective Coatings for Pipes. Pipes and Pipelines, v. 5, Dec. 1960, p. 44-45.

Protection of metals immersed in water by coal tar enamel, resin paints, phenolic paints and of buried steel pipe by spun glass reinforced coal tar enamel and cement mortar. Corrosion testing of interior protective linings for steel pipe. (R10g, L-general; 4-60)

179-R. Cupro-Nickel Sheathing Will Increase Utility Pole Life. Inco Nickel Topics, v. 14, Jan. 1961, p. 5.

Use of 90-10 Cu-Ni alloy sheathing of 20 mils thickness on wooden power line poles to improve resistance to salt water corrosion and marine borer attack. (R10e, R4b; Cu-b, Ni, 17-57)

180-R. How Good is Uranium as a Steel Addition. Canadian Machinery and Metalworking, v. 72, Jan. 1961, p. 55, 65.

Review of research on the effect of uranium additions on the corrosion resistance of carbon steels. Use of uranium to replace W and V additions in tool, open, rimming and effervescing steels. (R-general; ST, U, AD-n32)

181-R. Protection of Steel Parts by Vacuum Deposition of Cadmium. Machinery, v. 97, Dec. 21, 1960, p. 1411-1413.

Corrosion protection for high-tensile steel parts is obtained by a Cd coating deposited in vacuum, a method which avoids hydrogen or chlorine embrittlement which may result from acid pickling and electroplating. (R10, L25g, 1-73; ST, Cd)

182-R. New Theory for Rusting of Iron. Electrochemical Design, v. 4, Dec. 1960, p. 56.

Pure iron wires are reacted with oxygen and water vapor at 835° F. under controlled conditions to test the theory that hydrogen ions from the water vapor cause rusting. (R1h; Fe-a)

183-R. The Oxidation of Tin. Pt. 1. The Kinetics of Oxidation of Pure Tin and the Effects of Temperature and Oxygen Pressure. W. E. Boggs, R. H.

Kachik and G. E. Pellissier. Electrochemical Society, Journal, v. 108, Jan. 1961, p. 6-12.

Rates of oxidation of pure Sn are determined at 150-220° C. in oxygen at 0.003-500 mm. Hg below 1 mm. using a vacuum microbalance. (R1h, 2-61, 3-74; Sn)

184-R. The Oxidation of Tin. Pt. 2. The Morphology and Mode of Growth of Oxide Films on Pure Tin. W. E. Boggs, P. S. Trozzo and G. E. Pellissier. Electrochemical Society, Journal, v. 108, Jan. 1961, p. 13-24.

Oxide films formed during the oxidation of pure Sn, at 150-220° C. and 0.003-500 mm. Hg, are examined by electron microscopy and electron diffraction. Extraction replication techniques make possible the removal of intact oxide films as well as observation of the top and bottom surfaces of the film. Only one oxide, alpha-SnO, is formed under all conditions. 21 ref. (R1h, M21e, M22g; Sn)

185-R. The Oxidation and Corrosion of Zirconium and Its Alloys. Pt. 5. Mechanism of Oxide Film Growth and Breakdown on Zirconium and Zircaloy-2. B. Cox. Electrochemical Society, Journal, v. 108, Jan. 1961, p. 24-30.

Theories of the mechanism of film growth and breakdown on Zr and Zircaloy-2 are discussed in relation to data on corrosion of specimens in steam at 550-750° F. (R1h, R4d; Zr-b)

186-R. A Study of the Formation of Anodic Oxide Films on Uranium. Pt. 1. An Optical Reflectivity Method for Determining the Kinetics of Film Growth. A. E. Stebbens and L. L. Shreir. Electrochemical Society, Journal, v. 108, Jan. 1961, p. 30-36.

Multiple-beam interferametry and polarized light methods are used to measure the refractive and absorption index of uranium and its anodic oxide. The intensity of monochromatic light reflected normally from the surface of the specimen is measured during anodization, providing a continuous method of estimating film growth. 17 ref. (R1h, M21c; U)

187-R. Electrochemical Behavior of the Magnesium Anode. J. L. Robinson and P. F. King. Electrochemical Society, Journal, v. 108, Jan. 1961, p. 36-41.

Study of the anodic transient behavior of Mg in aqueous electrolytes. An explanation of the aqueous electrochemical behavior of Mg is developed, based on the concept that the inherent high reactivity of Mg is masked by a highly protective film of $Mg(OH)_2$. 17 ref. (R1j; Mg)

188-R. Electrochemical Behavior of Iron. Tor Hurlen. Acta Chemica Scandinavica, v. 14, July 1960, p. 1533-1554.

Use of a slow amperostatic technique to investigate the kinetics of $Fe/Fe^{++}aq$ electrodes in acid chloride solutions at 20° C. Measurement of rates of anodic dissolution and cathodic deposition of Fe and cathodic evolution of hydrogen as affected by pH and ferrous ion activity. 67 ref. (R1j, T1f; Fe)

189-R. Corrosion of Iron. Effect of pH and Ferrous Ion Activity. Tor Hurlen. Acta Chemica Scandinavica, v. 14, July 1960, p. 1555-1563.

Application of the theory of mixed potentials for corrosion processes to data obtained using $Fe/Fe^{++}aq$ and $H_2(Fe)/H^+aq$ electrodes in acid and alkaline solutions. Effects of pH and ferrous ion activity on the corrosion potential and corrosion rate of Fe. 34 ref. (R6, T1f; Fe)

190-R. Combined Cathodic Protection and Cleaning for Heat Exchangers. M. J. Olive. Corrosion, v. 17, Jan. 1961, p. 9-11.

Cathodic protection system is used to supplement water treatment; 20 condensors are protected by anodes at $800 per year, whereas cleaning and repair costs had been $2000 per year, a saving of $1200 in labor costs alone. Cathodic cleaning is cheaper than chemical cleaning. (R10d, W13b)

191-R. Pipeline Cathodic Protection Economics. Frank A. Therall. Corrosion, v. 17, Jan. 1961, p. 12-13.

Analysis of corrosion cost, estimated cost of metal loss on pipe, estimated cost of cathodic protection and comparison between costs of protecting bare and coated pipe. Comparison of installation and operation costs of conventional and deep groundbed facilities. (R10d, T26r)

192-R. Unusual Problems Encountered in Cathodic Protection of Miami Seaquarium. Edwin J. Tilton. Corrosion, v. 17, Jan. 1961, p. 16-18.

Problems involved working under water because tanks cannot be drained and on account of damage to anodes and their leads by large fish and sea turtles. Details of anodes, conduits and volume of impressed current. (R10d)

193-R. Automatic Control of a Platinum Anode Cathodic Protection System. Roy C. Francis and Leon S. Birnbaum. Corrosion, v. 17, Jan. 1961, p. 20-22.

Components used for automatically controlled system on a Navy ship using Pt-Pd alloy anodes, silver-silver chloride reference electrodes. (R10d)

194-R. Corrosion-Erosion of Sensitized AISI Type 304 Stainless Steel in a Thorium Dioxide-Uranium Trioxide Slurry. D. C. Vreeland. Corrosion, v. 17, Jan. 1961, p. 93-96.

Sensitized, nonpickled 304 stainless is not attacked intergranularly and exhibits about the same corrosion rate as as-received 304 stainless. Sensitized and pickled 304 is attacked at appreciably higher rates than as-received or than sensitized, nonpickled 304 stainless. 4 ref. (R6; SS)

195-R. Corrosion Studies of Aluminum in Chemical Process Operations. E. H. Cook, R. L. Horst and W. W. Binger. Corrosion, v. 17, Jan. 1961, p. 97-102.

Particular attention is given to Al alloys for handling 83% ammonium nitrate solutions at elevated temperatures. Applications of Al in handling and production of aliphatic acids, sour crude oil, amines, hydrogen peroxide, fuming nitric acid, liquids at cryogenic temperatures and high purity water. 23 ref. (R7, T29; Al, 17-57)

196-R. Inhibition of Corrosion of Commercial Aluminum in Alkaline Solutions. J. Sundararajan and T. L. Rama Char. Corrosion, v. 17, Jan. 1961, p. 111-116.

Corrosion rates for commercial Al containing 4% Mn and 3% Fe determined in sodium hydroxide solutions. Effect of agar-agar, gum acaciae, dextrin, gelatin and glue as inhibitors. 27 ref. (R10b; Al)

197-R. Methods and Experience in Underground Cathodic Protection. Pt. 1. Lead Sheathed Communication Cables. Oliver Henderson. Corrosion, v. 17, Jan. 1961, p. 117-118.

Controlled and forced drainage systems; use of rectifiers, Mg anodes and Mg ribbon to overcome anodic conditions. (T26r, R10d)

198-R. Methods and Experience in Underground Cathodic Protection. Pt. 2. Bare Steel Pipe Lines. L. H. West. Corrosion, v. 17, Jan. 1961, p. 118-120.

Methods for the detection of galvanic "hot spots" along bare steel pipe lines; correlation of these data with actual failures and galvanic anode installation. (R10d, T26r)

199-R. Methods and Experience in Underground Cathodic Protection. Pt. 3. Gas Transmission and Distribution Lines. P. P. Skule. Corrosion, v. 17, Jan. 1961, p. 120-121.

Review of various protection methods. (R10d, T26r)

200-R. Design for Prevention of Pipe Line Corrosion Based on Survey of Ground Potential Distribution. Shigeo Fukuta, Shin-Ichi Kondo, Nobuo Usami and Shigeki Sekimoto. Corrosion, v. 17, Jan. 1961, p. 122-124.

Specifications for pipe coatings, locations of cathodic protection or drainage systems and their current ratings. (R10d, T26r)

201-R. Cathodic Protection of Water Heaters. Platinum Metals Review, v. 5, Jan. 1961, p. 12.

Use of Pt protected Ti anodes in the cathodic protection of glass-lined domestic water tanks. (R10d, W3h; Ti, 17-57)

202-R. Polarization Studies of Mild Steel in Cultures of Sulphate-Reducing Bacteria. G. H. Booth and A. K. Tiller. Faraday Society, Transactions, v. 56, Nov. 1960, p. 1689-1696.

Cathodic and anodic polarization curves for steel electrodes in two cultures, containing organisms which cause anodic stimulation by sulphide ion production and anodic polarization by protective sulphide film formation. Discussion of results in relation to anaerobic corrosion of metals. (R1g; CN)

203-R. Corrosion of Cast Iron Pots Used for Fusing Caustic Soda. S. Rao Addanki, A. K. Lahiri and T. Banerjee. NML Technical Journal (National Metallurgical Laboratory, India), v. 2, Nov. 1960, p. 6-9.

Corrosion of cast iron crucibles containing caustic soda solution heated to 72-520° C., with oxidation, absorbtion of hydroxide by graphite and formation of sodium carbonate above 500° C. being the factors responsible for corrosion. (R6j; CI)

204-R. Behavior of Tin Alloy Coatings. S. C. Britton. Tin and Its Uses, no. 50, 1960, p. 6-8.

Evaluation of Sn, Sn on Zn and Sn-Zn alloy coatings on steel in relation to thickness and resistance to atmospheric corrosion. (R3; ST, Sn-b, 8)

205-R. Resistance of Tinplate to Rust and Corrosion. S. C. Britton and K. Bright. Tin and Its Uses, no. 50, 1960, p. 12-15.

Influence of the cold reduction process for manufacture of steel and the electrolytic method of Sn coating on the corrosion resistance of tinplate for the canning industry. (R-general; ST, Sn, 8-62)

206-R. Maintenance Painting of Structural Steel. S. C. Frye. Federation of Societies for Paint Technology, v. 32, Dec. 1960, p. 1642-1645.

Prevention of atmospheric corrosion in A-7 structural steel by wire brush and blast cleaning and by painting on a periodic schedule with inorganic and organic base paint. (R3, L10h, L26n; ST, 4-57)

207-R. Minimum Paint Thickness for Economical Protection of Hot Rolled Steel Against Corrosion. Walter Bosch. Federation of Societies for Paint Technology, v. 32, Dec. 1960, p. 1602-1610.

Atmospheric corrosion resistance of hot rolled steel panels coated with varying thicknesses of vinyl, alkyd, oil and phenolic base paints. (R3; ST, 4-53, 8-70)

208-R. (German.) Investigation on Oxidation of Reactor-Grade Zirconium. G. Saur, H. J. Laue and H. Borchers. Metall, v. 15, Jan. 1961, p. 9-18.

Oxidation of Zr bars and sheets in porcelain crucibles under static air at 200-900° C. with oxide formation determined by weighing. X-ray diffraction examination at 20 and 1100° C., hardness measurement and microscopic investigation of Zr oxide film to determine structure and film thickness. (R1h, M22g, M27; Zr, 4-53)

209-R. (German.) Europium and Its Alloys. R. Lesser and E. Erben. Metall, v. 15, Jan. 1961, p. 30-33.

Thermic and epithermic neutron absorption data for B, Cd, Hf, Gd, Sa and Eu, with emphasis on Eu. Investigation of ternary alloys of Eu with Mg, Al, Ti, Zr, Nb, Ta, Fe, Ni, Cu, Ag, Cd, Sn, Pb and Sb to determine a composition not susceptible to corrosion in water. Corrosion testing of Ag-Cd-Eu alloys containing 0-10% Eu in distilled water at 360° C. under 190 atm. pressure. Workability, mechanical properties and microstructure of Ag-Cd-Eu alloys. (R4, P18j, Q23q, Q-general, M27, M24c; Eu-b, Ag, Cd)

210-R. (German.) New Investigation on Stabilized, Nonstabilized, Acid Resistant Austenitic Steels. Herbert Krainer. Berg- und Huttenmannische Monatshefte, v. 105, Nov. 1960, p. 280-291.

Investigation of intercrystalline corrosion of austenitic CrNi steels by Hatfield and Huey tests and of stress corrosion in boiling 42% $MgCl_2$ solution. Influence of oxides, oxygen, carbon, Si and inhomogeneities on results of Huey test. (R2h, R1d, 2-60, R11; SS, Cr, Ni)

211-R. (Japanese.) On the Corrosion of Aluminium in Reactor Corrosion Test. Suco Nomura. Atomic Energy Society of Japan, Journal, v. 2, 1960, p. 19-26.

Effect of pile irradiation on corrosion of 2S Al in flowing water is studied under specific water, temperature, time, and irradiation conditions. (R4, 2-67, T11; Al)

212-R. Influence of Water Movement on Corrosion--Nonferrous Metals. N. V. Nowlan. Corrosion Technology, v. 7, Dec. 1960, p. 397-399.

Effects of low, medium and high rates of flow on corrosion of nonferrous metals in marine environments. Deposit and impingement attack and cavitation erosion. 6 ref. (R4; EG-a38)

213-R. Bibliographic Survey of Corrosion 1956, Publication no. 60-12. National Association of Corrosion Engineers,

1061 M & M Building, Houston 2, Texas. 1960, 248 p. $27.50.

Collection of 2136 abstracts of technical literature published during 1956 relating to corrosion and corrosion control arranged according to the NACE Abstract Filing Index. A subject index is also provided. (R-general)

214-R. Stress Corrosion of Ferrous Materials (Other Than Austenitic Stainless Steel). E. H. Phelps. Engineering Sciences, v. 7, no. 71, 1960, p. 2-4.

Susceptibility to stress corrosion of carbon, alloy, ferritic and martensitic steels in alkaline, nitrate, sulphide and other chemical environments. Effect of heat treatment and addition of inhibitors on stress corrosion. (R1d, R6, 2-64; AY, CN, SS)

215-R. (Japanese.) Corrosion and Corrosion Protection of Steel During Urea Dewaxing Processes. Yuzo Koga. Japan Oil Chemists' Society, Journal, v. 9, Nov. 1960, p. 611-614.

Investigation of corrosion inhibitors for preventing urea decomposition product attack of chemical processing equipment during extraction. Corrosion of mild steel test specimen is decreased by addition of 0.1% $(NH_4)_2HPO$ to the urea mixture. (R7j, R10b, T29; CN)

216-R. (Japanese.) Corrosion Testing of Condenser Tubes by Model Condenser at Osaka Power Station. Pt. 1. Takemichi Otsu and Shiro Sato. Sumitomo Light Metals, Technical Reports, v. 1, Oct. 1960, p. 260-383.

Specimen tubes composed of Al brass, Albroc, Alumi-Brass and 10% cupronickel are exposed to brackish sea water containing various N, Fe and Cu ions and organic compounds for periods to seven months. Data are given for corrosion rate and tensile properties of specimens and microstructure and composition of corrosion product. 5 ref. (R4b, Q-general; Cu-b, Al, Ni, 4-60)

217-R. Removal of Scale From Steel Rod by Stretching. K. Sachs and T. Pitt. Iron and Steel Institute, Journal, v. 197, Jan. 1961, p. 1-8.

Wire rods of different carbon contents are oxidized at 700-900° C. Scale is spalled off by stretching in a tensile machine, then weighed and screened. Influence of time and temperature of oxidation and carbon content of the rod on the amount of scale formed is determined by statistical techniques. (R1h, L10h, 2-60, 2-61; CN, 4-55)

218-R. Weapon in the Fight Against Rust. P. J. Macken. Copper, no. 10, Winter 1960, p. 24-25.

Alloying of structural Fe and steel with 0.2-0.3% Cu as a means of reducing the rate of rusting and increasing the life of the structure 50-100% without increasing cost. The Cu addition alters the characteristics of the rust which is formed to give a hard, abrasion resistant deposit. (R1h; Fe-b, ST, Cu, SGA-g, SGB-s)

219-R. Corrosion of Superheaters and Reheaters of Pulverized-Coal-Fired Boilers. Pt. 2. Carl Cain, Jr., and Wharton Nelson. American Society of Mechanical Engineers, Paper no. 60-WA-180, 1960, 7 p.

An 18 Cr, 8 Ni, Ti stabilized stainless steel component is corroded by molten complex alkali sulphates to determine effect of temperature on rate and methods for distinguishing liquid phase from gas phase attack. (R7k, 2-61, T26q; SS-d, Cr, Ni)

220-R. Some Corrosion Effects in Accelerated Cavitation Damage. W. C. Leith and A. Lloyd Thompson. Journal of Basic Engineering (ASME Transactions, Series D), v. 82, Dec. 1960, p. 795-807.

Corrosion and erosion of 410, 420, 430 and 302 stainless steels, cast iron, Al, red bronze, yellow brass and Al bronze by accelerated cavitation in a magnetostriction machine. Effects of distilled H_2O and tap H_2O flow velocity, temperature, chemical additives, pressure and vibration amplitude on hardness, metallurgical structure and corrosion-fatigue limit of the metal. 21 ref. (R2m, Q29n, M27, Q7; Al, Cu-b, CI, SS)

221-R. On Cathodic Protection in Cavitation Damage. M. S. Plesset. Journal of Basic Engineering (ASME Transactions, Series D), v. 82, Dec. 1960, p. 808-820.

Effect of cathodic currents on cavitation damage in mild steel, 4340 steel and 17-7 PH stainless steel specimens during cathodic protection testing in a

3% NaCl solution or buffered distilled H_2O (pH 8) using Pt anodes. 8 ref. (R2m; R10d; CN, SS)

222-R. An Experimental Study of Cavitation in a Mixed Flow Pump Impeller. G. M. Wood, J. S. Murphy and J. Farquhar. Journal of Basic Engineering (ASME Transactions, Series D), v. 82, Dec. 1960, p. 929-940.

Effect of cavitation on hydraulic performance of a mixed flow centrifugal pump impeller made from 316 stainless steel investment castings. Impeller is tested in a closed water loop containing degassed H_2O. 12 ref. (R2m, T7h; SS, 5)

223-R. Corrosion Resistance of Cast Nickel-Molybdenum-Iron Alloys. G. N. Flint. Metallurgia, v. 62, Nov. 1960, p. 195-200.

Corrosion and mechanical tests demonstrate influence of composition and heat treatment on hardness of Ni-Mo and Ni-Mo-Fe alloys and their corrosion resistance to strong acid media. 6 ref. (R6g, Q29n, 2-60, 2-64; Ni-b, Mo-b, Fe)

224-R. The Oxidation of Titanium in Oxygen at High Temperatures. J. Stringer. Acta Metallurgica, v. 8, Nov. 1960, p. 758-766.

The oxidation rate and nature of the oxidation product for alpha Ti oxidized in pure oxygen at 850-1000° C. are examined by thermodynamic analysis and X-ray diffraction methods. Gaseous diffusion of oxygen through the porous scale forming on the specimen is determined as the rate controlling process, the oxidation rate being at first parabolic and then linear. 11 ref. (R1h, 2-62; Ti-a)

225-R. The Effect of Pressure on the Second Stage Parabolic Rate in the Oxidation of Titanium. J. Stringer. Acta Metallurgica, v. 8, Nov. 1960, p. 810-811.

Linear dependence of the parabolic oxidation rate constant on oxygen pressure is accounted for in terms of the gaseous diffusion model for specimens of Ti and a Ti-4% Fe alloy oxidized at 910-1025° C. at varying oxygen flow rates. (R1h, 3-74; Ti-b)

226-R. Use of the Marker Method in Studying the Mechanism of Oxidation of Metals. S. Mrowec and T. Werber. Acta Metallurgica, v. 8, Nov. 1960, p. 819-821.

Factors influencing marker location and consequent accuracy of test results in oxidation studies, using Cu-S and Ag-S alloys and Fe as examples. Effect of diffusion, oxide layer structure and porosity, oversaturated solution formation and crack initiation. 14 ref. (R1h, Ni; Fe, Cu-b, Ag-b, S)

227-R. (German.) Corrosion Resistance, With Emphasis on Corrosion-Fatigue, of Gas-Nitrided Titanium Steels. M. Tomory-Ronay. Metalloberflache, v. 14, Dec. 1960, p. 360-365.

Corrosion fatigue tests in tap water, salt water spray and a climate chamber at 45° C. and 96% humidity on 600° C. NH_3-nitrided steels containing 0.11-0.48% C, 0.54-1.50% Ti, 0-1.4% Cr, 0-0.9% Al and 0-0.24% Mo. Microstructured investigation of nitrided case. Measurement of internal stresses by X-ray back reflection. (R13, M27, Q25; ST, Ti)

228-R. Aspect of the Corrosion of Mild Steel by Combustion Gases. T. K. Ross, A. J. Macnab and B. E. Leyland. Institute of Fuel, Journal, v. 33, Nov. 1960, p. 540-543.

Corrosion of mild steel specimens in mixtures of nitrogen and sulphur dioxide at 300-700° C. Effect of introducing hydrogen or oxygen on rate and nature of attack. (R6q, 2-61; CN)

229-R. Corrosion Engineers Meet in San Francisco. Metal Progress, v. 79, Feb. 1961, p. 146-148, 150, 152, 154.

Brief summaries of papers presented in the fall of 1960 at the 10th Annual Corrosion Conference. Topics covered include stress corrosion cracking of austenitic stainless steel, corrosion resistance of Fe-Al alloys in petroleum refinery operations and corrosion of Ni-base alloys in high-temperature nitrogen environments. (R-general)

230-R. Anti-Corrosion Measures for South African Gold Mines. F. P. A. Robinson. South African Mining and Engineering Journal, v. 71, Nov. 18, 1960, p. 1257-1260.

Resistance to corrosion by mine water of Al, Cu, stainless steel, vinyl-coated Al and carbon steel and Al and Zn-sprayed carbon steel. (R4g; Al, CN, Cu, SS, 8)

annealing of 18/8 CrNi steel in containers filled with furnace dust at 1000° C. Elimination of failures by decreasing Ni and increasing Cr content in the steel. 4 ref. (Q7; SS, Cr, Ni)

1122-Q. Velocity of Sound in Liquid Lead-Tin Alloys. Robert B. Gordon. Paper from "Physical Chemistry of Process Metallurgy". Pt. 1. v. 7. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1959, p. 461-470.

A constant, linear decrease in the velocity of sound with increasing temperature is found with no indication of presolidification phenomena. An anomaly appears in the dependence of the sonic velocity, its temperature coefficient and the adiabatic compressibility on alloy composition. (Q21f; Pb-b, Sn-b, 14-60)

1123-Q. (Japanese.) Studies on Heat Treatment of TiC 50 Ni-Cr-Co-Mo Cermets. Masataka Sugiyama and Hisashi Suzuki. Japan Institute of Metals, Journal, v. 25, Mar. 1961, p. 167-170.

Vacuum sintered specimens of 50% TiC, 30% Ni, 10% Cr and 5-9.5% Co, with 0.5-5% Mo substituted for Co, are tested and examined metallographically after vacuum heat treatment and quenching from 950-1280° C. Data are given for creep rupture, Vickers hardness, density, Curie temperature, ductility, microstructure and phase dispersion and stability as a function of heat treatment time and temperature. 4 ref. (Q-general, J-general, 1-73, 2-62; Ti-b, Ni-b, C, Cr, Co, Mo, 6-70)

1124-Q. (Japanese.) Relation Between Heat Treatment and Hardness and Torsional Strength of Ni-Cr Structural Steel at Room and High Temperatures. Pt. 5. The Austempering of Structural Special Steels. Hideji Hotta. Japan Institute of Metals, Journal, v. 25, Mar. 1961, p. 174-177.

Isothermal transformation curves for 20-900° C. are constructed from micro-vickers hardness measurement, dilatometry and micro-examination of specimens after tempering to 860° C., quenching and austempering from 300-600° C. Torsional strength, Charpy impact value and Rockwell, Brinell and Taniguichi-Yeda impact hardness are determined with transformation microstructures as a function of heat treatment temperature. 4 ref. (Q-general, J26p, N8g, 2-62, 2-64; AY, Ni, Cr)

1125-Q. (Japanese.) Tensile Strength of Ni-Al-W Alloys at High Temperatures. Takeshi Miyazaki and Yuki Shirakawa. Japan Institute of Metals, Journal, v. 25, Mar. 1961, p. 188-191.

Measurement of tensile strength and specific electric resistance from 20-800° C of vacuum annealed wire specimen of Ni alloy containing 0.73-4.15% Al and 0.89-5.10% W with Co additions. Tensile and resistance properties are improved with Al content increase of 3.50% and decrease with temperature increase. (Q27, P15g, 2-60, 2-62, 2-64, Ni-b, Al, W, Co, 4-61)

1126-Q. (Japanese.) Torsion Test as a Method for Measuring Toughness of Gray Cast Iron. Hiromu Tanimura, Kiichi Taniguchi and Yuji Nagamatsu. Japan Institute of Metals, Journal, v. 25, Mar. 1961, p. 198-201.

Comparative tensile, Charpy impact and torsion tests on gray iron specimens of various graphite structures and compositions for evaluating the agreement of the methods in measuring toughness as a function of resilience. Data are given for elongation, stress-strain relations, shear, elastic moduli impact values and tensile and torsional strength. 4 ref. (Q23s, Q1, Q-general; Ci-n)

1127-Q. (Czech.) Effect of Heat Treatment on the Fracture of Cast Steel. Adolf Lorenc. Slevarenstvi, v. 9, Apr. 1961, p. 132-138.

30KhN3MA steel and austenitic steel containing 12% Mn are cast into test pieces which are broken in the cast state, after austenitization followed by quenching, annealing at a temperature below the Ac_1 point or homogenization. Relationships between structure and fracture, previous heat treatment and ductility. 11 ref. (Q26, 2-64; ST, 5)

1128-Q. (Czech.) Effect of Molybdenum Sulphide on the Sliding Properties of Cast Iron Used in Thrust Bearings. V. Sevcik. Strojirenstvi, v. 11, Apr. 1961, p. 283-289.

Friction tests are carried out with the pair, cast iron-steel, using powdered MoS_2 or a suspension of MoS_2 as a lubricant. Effect of the lubricants on friction and wear of uncoated or phosphate coated cast iron. 12 ref. (Q9, 18-73, T7d; CI, ST, 17-57)

1129-Q. Stress Rupture Unit Uses Electron Beam Heating. Al Donlevy and Jack K. Y.

Hum. SAE Journal, v. 69, July 1961, p. 60-61.

Electron beam heating is used as a heat source in stress rupture testing of Cb, Mo, Ta, W and their alloys at 2400° F. Work must be done in a high vacuum and, at present, 2200° F. is the low test temperature limit. (Q3q, X24f; Cb, Mo, Ta, W)

1130-Q. (Japanese.) Influence of Temperature History on Creep. Shuji Taira, Masateru Ohnami and Mizune Sakato. Japan Society of Mechanical Engineers, Transactions, v. 27, Apr. 1961, p. 373-380.

Transient stage creep in 0.15% carbon steel as dependent on strain increment and change in internal yield stress, recovery or aging, as a function of fluctuation and related time intervals in thermal cycling tests in tension from 300-900° C. 13 ref. (Q3s, 2-62, 3-68; CN-g)

1131-Q. (Japanese.) Creep Under Step-Wise Temperature Cycling. Shuji Taira, Masateru Ohnami and Syoichi Sugioka. Japan Society of Mechanical Engineers, Transactions, v. 27, Apr. 1961, p. 380-386.

Creep curves are determined for low-carbon steel, 18-8 stainless and 13% chromium steel as a function of time, cycle and temperature for thermal cycling tests from 450-650° C. under fixed tensile stress. A theoretical analysis is made in terms of a "mechanical equation of state in solids". 5 ref. (Q3, 2-62, 3-66; ST)

1132-Q. (Japanese.) Accelerated Stage Creep and Creep Rupture Under Temperature Cycling. Shuji Taira and Masateru Ohnami. Japan Society of Mechanical Engineers, Transactions, v. 27, Apr. 1961, p. 387-395.

Influence of thermal cycling from 600-700° C. on creep and rupture life, embrittlement and elongation of 318 stainless steel specimens. 20 ref. (Q3s, 2-62; SS-e)

1133-Q. (Japanese.) Dynamic Creep and Fatigue of an 18-8 Molybdenum-Columbium Steel at Elevated Temperature. Shuji Taira, Ryoichi Koterazawa and Susumu Kaji. Japan Society of Mechanical Engineers, Transactions, v. 27, Apr. 1961, p. 396-402.

Creep and fatigue test data for specimens at 650° C. are correlated with data for rupture and hardness tests and electron microscopy examination. Precipitation hardening characteristics are related to strength values as a function of alternating stress. 11 ref. (Q3, Q7, Q-general, N7, 2-62, 3-66; SS-e)

1134-Q. (Japanese.) Effect of Notch on Fatigue Strength of Steel at Elevated Temperature. Minoru Kawamoto, Tsuneshichi Tanaka and Mitsunori Miyake. Japan Society of Mechanical Engineers, Transactions, v. 27, Apr. 1961, p. 403-410.

Rotating bending fatigue tests on 0.21% carbon steel with various circumferential notches to determine the effect of test temperature, strain rate and notch sharpness on the fatigue strength and notch factor. Relation of fatigue strength to temperature induced blue brittleness. 12 ref. (Q7c, Q23s, Q26s, 2-62, 3-68; CN-g)

1135-Q. (Japanese.) Effects of Holding Time on the Thermal Fatigue of 18-8 Columbium Steel. Noritada Kato. Japan Society of Mechanical Engineers, Transactions, v. 27, Apr. 1961, p. 410-423.

Effect of variation in the temperature cycle, holding time, stress amplitude and cyclic plastic strain on thermal fatigue strength of specimens tested at constant mean temperature of 350° C. for varied temperature ranges and times. Influence of composition on hot ductility. 5 ref. (Q7j, Q23p, 2-62, 3-67, 3-68; SS-e)

1136-Q. (Czech.) Heat Resistant 15Cr35Ni3W Steel. Josef Vodsedalek. Hutnicke Listy, v. 16, Apr. 1961, p. 270-275.

Steel containing 0.04-0.08% C, 0-1.23% Mn, 0-0.63% Si, 0-0.008% P, 0-018% S, 14.53-15.33% Cr, 33.49-37.16% Ni, 2.05-3.8% W, 0-1.24% Mo, 0.45-1.77% Ti, 0.12-6.88% Al and 0-0.21% B is mechanically tested at 20-800° C. after solution annealing at 1150° C. and subsequent aging at 700-750° C. for 20-2000 hr. Creep strength as a function of Ti and Al contents, microstructures. 7 ref. (Q3m, 2-60, 2-61, 3-71; SS, SGA-h)

1137-Q. (Swedish.) Yield Stress of Carbon and Low-Alloyed Tube Steels for Pressure Vessels From 20-500° C. B. Lofblad, E. Lowgren and L. Roslund. Jernkontorets, Annaler, V. 145, Mar. 1961, p. 143-172.

Investigation to obtain a basis for calculation of values for standardized carbon and low-alloyed tube steels including ST 35, ST 45, 1 Cr/0.5 Mo and 2.25

of the USSR., Proceedings, Physical Chemistry Section, v. 130, Jan-Feb. 1960, p. 25-28.

Mechanisms of retarding dissolution of 18-8 stainless steel in H_2SO_4 by chloride, bromide and iodide ions in terms of their promotion of passivation. (R6g, R10b; SS)

249-R. (Translation-ConBur.) The Effect of pH on the Electrode Potential of Stainless Steel. Yu. M. Korobin and I. B. Ulanovskii. Journal of Applied Chemistry of the USSR., v. 33, Jan. 1960, p. 162-165.

Test pieces are polished, degreased, dried and tested at pH 8.5-1 in. sea water; change in pH is found to shift the electrode potential, a process which can be eliminated or reduced by controlling chemical composition. 5 ref. (R4b, P15m, 2-66; SS)

250-R. (Translation-ConBur.) The Effect of Polarization on the Corrosion Cracking of an Alloy of the System Mn-Cu-Ni. Journal of Applied Chemistry of the USSR., v. 33, Jan. 1960, p. 167-171.

Effect of polarization on rate of corrosion cracking, shape of the cracks, electrode potential and alloy expansion in 0.5 N NaCl solution. 5 ref. (R6k, 9-72, P17g; Mn-b, Cu, Ni)

251-R. (Translation-ConBur.) Effect of Ultrasound on the Anode Formation of Lead Dioxide. F. I. Kukoz and M. F. Skalozubov. Journal of Applied Chemistry of the USSR., v. 33, Jan. 1960, p. 172-176.

Effect of ultrasound with a frequency of 1.4 Mc and an intensity of 1-5 w/cm^2 on the anode charge curve and the passivation process. The depolarizing action of the ultrasound is connected with its interspersing action and the change in concentration state in the near anode layer. 16 ref. (R10c, 1-74; Pb, 14-68)

252-R. (Translation-ConBur.) The Effect of Chlorine on the Corrosion of Metals by Hydrochloric Acid. Kh. L. Tseitlin and Yu. I. Sorokin. Journal of Applied Chemistry of the USSR., v. 33, Jan. 1960, p. 157-161.

Corrosion rates of Pb, steel, Ag and a Ni-Mo alloy are measured in HCl as a function of temperature (20-100°C.) and free chlorine content. 11 ref. (R6g, 2-60; Ag, Mo-b, Ni-b, Pb, ST)

253-R. (Translation-ConBur.) Oxidation of Steel During Firing of Primary Enamel Coating With and Without Boron. G. I. Belyaev. Journal of Applied Chemistry of the USSR., v. 33, Jan. 1960, p. 91-97.

Effect of enamel composition, firing conditions and oxygen potential on the corrosion of Fe during firing. Effect of alkaline earth oxide additions on the acidity of molten enamels which must be increased to decrease boiling off and burning through of coatings. 18 ref. (R1h; ST, 8-71)

254-R. (Translation-ConBur.) Effect of Temperature and Microgeometry of Metal Surfaces on the Rate of Atmospheric Corrosion. L. M. Lapides. Journal of Applied Chemistry of the USSR, v. 33, Feb. 1960, p. 392-396.

Cu-Zn and Cu-Al pure metal pairs with polished or sand blasted surfaces are covered by a thin layer of 0.01 N NaCl solution and corroded at 5-50° C. to show the effect of temperature and surface condition. 9 ref. (R3, 2-61, M28; Al, Cu, Zn)

255-R. (Translation-ConBur.) Corrosion of Stressed Steel in Nitric Acid. V. A. Titov. Journal of Applied Chemistry of the USSR., v. 33, Feb. 1960, p. 397-402.

Corrosion rate of stressed steel wires in 1-60% HNO_3 at 17-22° C. and the variation of the electrode potential are measured under alternating stress. Micrographic analysis is used to study the development of corrosion fatigue cracks. 4 ref. (R1e, R6g, P15m, 3-66; ST, 4-60)

256-R. (Translation-ConBur.) The Influence of Cathodic Polarization on the Stability of Tantalum in Hydrochloric Acid. Kh. L. Tseitlin, V. A. Strunkin and E. K. Revazov. Journal of Applied Chemistry of the USSR., v. 33, Feb. 1960, p. 342-345.

A negative potential is applied to a Ta specimen immersed in a pure 20% solution of HCl to determine crack susceptibility as a function of current density and temperature. 9 ref. (R6g, Q26, 2-61; Ta)

257-R. Intergranular Corrosion of Austenitic Steels Containing 24% Cr and 19% Ni. Vladimir Cikal, Pavel Grobner, Jaroslav Jizek and Rudolf Pospisil. Metal Treatment and Drop Forging, v. 28, Jan. 1961, p. 5-13.

Electron-microscope study of 24 Cr-19 Ni steel austenitized at 1100° C. and precipitation heat treated at 550-850° C. for 5-810 hr. Thermochemical stability of chromium carbide; kinetics of the precipitation of the carbides and distribution and morphology of carbides in the steel. 17 ref. (R2h, N8r, J27, J22, M21e; SS-e)

258-R. (German.) Anticorrosive Effect of the Gaseous Inhibitor Dichan (Dicyclohexylamine Nitrite) on Iron in Neutral Solutions. K. Schwabe and G. Muller. Zeitschrift fur Physikalische Chemie, v. 215, Mar-Apr. 1960, p. 143-157.

Electrode potential measurements are made on structural steel electrodes (0.08% C, 0% Si, 0.44% Mn, 0.12% P and 0.048% S) in Dichan, $NaNO_2$ and dicyclahexylamine solutions at 25° C. and under continued access of atmospheric air to determine effect of inhibiting agent. (R10b; ST, SGB-s)

259-R. (German.) Formation and Growth of Pitting Spots on Passive Iron Electrodes. G. Herbsleb and H.-J. Engell. Zeitschrift fur Physikalische Chemie, v. 215, Mar-Apr. 1960, p. 165-175.

Spot formation and growth on open-hearth steel sheet electrodes (0.065% C) in H_2SO_4 is investigated for varying Cl-ion concentrations by photographic methods and electrode potential measurements. Results are interpreted in terms of a time law and resistance polarization. (R6g; Fe)

260-R. (German.) Influence of Alloying Elements on Electro-Chemical Properties of Chemically Resistant Steels. H. J. Angell and T. Ramchandran. Zeitschrift fur Physikalische Chemie, v. 215, Mar-Apr. 1960, p. 176-184.

Evaluation of passivation and dissolution current densities by current density and potential measurements on cast steels (18% Cr, 10% Ni and 27% Cr, 4% Ni) containing 0-6% Cu in 1-2 n H_2SO_4 at 80 and 50° C. Influence of Ni, Cu and Mo on passivation and chemical resistance of steel. (R10c, P15, 2-60; ST)

261-R. (German.) Some Construction Rules for Protection Against Natural Corrosion. J. Elze. Konstruktion, v. 12, Dec. 1960, p. 485-489.

Protection of Al, Cu, Zn and steel structural materials is achieved by electroplating, anodic oxidation, galvanizing and lacquering. (R10g, L-general; Al, Cu, ST, Zn, SGB-s)

262-R. (German.) Reaction of Iron With KCl-$TiCl_2$ Melts in Titanium Vessels. K. Blankenstein. Technische Mitteilungen Krupp, v. 18, Aug. 1960, p. 9-18.

Experimental production of protective Ti^{2+} coatings for Fe and investigation of the diffusion of Ti into Fe, using Swedish muck bars in salt melts in forged Ti vessels under an argon atmosphere at temperature to 1800° C. Chemical and radiographic investigation of the diffusion phases, evaluation of diffusion constants and activation energy and determination of the microhardness and corrosion rate. 22 ref. (R2r, N1, M-general, P13a; Fe, Ti)

263-R. The Corrosion of Condenser Tubes. D. G. Kingerley. British Chemical Engineering, v. 6, Jan. 1961, p. 20-25.

Identification, mechanism and prevention of corrosion of nonferrous Al brass and Cu-Ni condenser tubes. Corrosion types considered are intercrystalline penetration, corrosion-erosion, deposit attack and dezincfication. 19 ref. (R4; Cu-b, Al, Ni, 4-60)

264-R. Do You Need Cathodic Protection? Herbert C. Van Nouhuys. American Gas, Journal, v. 188, Feb. 1961, p. 29.

Required cathodic protection for newly installed coated gas line distribution systems. Table classifies pipe coatings with respect to the average current density required to produce cathodic protection in high resistivity soils. (R10d, T26r)

265-R. Physical Metallurgy of Refractory Metals (The Effect of Oxygen Solution on the Oxidation of Niobium). R. A. Meussner and C. T. Fujii. Report of N. R. L. (Naval Research Laboratory) Progress, Dec. 1960, p. 31-35. $1.25. (Available as PB 161288 from U. S. Office of Technical Services, Washington 25, D. C.)

Oxidation rates and nature of oxide products of low oxygen and oxygen presaturated Cb sheet specimens exposed

to dry oxygen at 700-1000° C. are examined by weight gain measurements and by X-ray diffraction powder and metallographic analysis. 5 ref. (R1h, 2-60; Cb, EG-d37)

266-R. Corrosion Mechanism (The Effect of Nonadherent Corrosion Products on Localized Attack of Steel Exposed to Aqueous Media at Elevated Temperature). M. Krufeld and M. C. Bloom. Report of N. R. L. (Naval Research Laboratory) Progress, Dec. 1960, p. 35-39. $1.25. (Available as PB 161288 from U. S. Office of Technical Services, Washington 25, D. C.)

Mild steel specimens covered with corrosion products, Fe_3O_4, gamma-FeOOH and alpha-Fe_2O_3, in localized area are subjected to corrosion in aqueous solutions of distilled H_2O, 0.001 molar NaOH and 4% H_2O_2 at 600° F. for 4 wk. Accelerated corrosive attack is attributed to an oxygen concentration cell. (R1h; CN)

267-R. Catastrophic Oxidation of Stainless Steel in the Presence of Lead Oxide. John C. Sawyer. Metallurgical Society of AIME, Transactions, v. 221, Feb. 1961, p. 63-67.

VMS 201 stainless and 21-12 stainless specimens coated with various (21) oxides are heated in air and PbO vapor at 1300° F. to show that similar reactions occur during oxidation of stainless steel in the presence of MoO_3, V_2O_5 and PbO. The three named oxides accelerate the normal oxidation process by chemically altering the normally protective oxide film formed on the base metal. 15 ref. (R2b; SS)

268-R. (Italian.) Choice of Corrosion-Resistant Alloys. Fonderia, v. 9, Nov. 1960, p. 501, 503.

Corrosion properties of steels, ferrous alloys and Ni alloys. (R-general; Fe, ST, Ni-b)

269-R. Zirconium Alloys: Corrosion Resistance and Strength Are Improving. R. J. Van Thyne. Materials in Design Engineering, v. 53, Feb. 1961, p. 10-13.

Data are given for corrosion resistance in hot water, acid, alkali and chloride media and for tensile strength at 1200° F. (R-general, Q27a, 2-61; Zr-b)

270-R. Deposits and Corrosion From Combustion Gases. N. Y. Kirby. Australasian Engineer, Dec. 1960, p. 60-62.

Mechanisms of boiler pitting and corrosion caused by ash, alkali, phosphate, sulphate and sulphuric acid which form during combustion of coal containing mineral impurities. (R7d, T26q)

271-R. Passivity and Corrosion Resistance of Titanium and Its Alloys. N. D. Tomashov, R. M. Altovsky and G. P. Chernova. Electrochemical Society, Journal, v. 108, Feb. 1961, p. 113-119.

Measurement of corrosion resistance of Ti and its binary and ternary alloys containing minor amounts of Cr, Mo and Pd in boiling and 18° C. sulphuric and hydrochloric acids. Electrochemical properties of the elements and alloys are determined and correlated with the corrosion data. 27 ref. (R6g, R1a; Ti, Cr, Mo, Pd)

272-R. Oxidation of Copper Between 250 and 450° C. and the Growth of CuO "Whiskers". E. A. Gulbransen, T. P. Copan and K. F. Andrew. Electrochemical Society, Journal, v. 108, Feb. 1961, p. 119-123.

Oxidation of Cu at low pressure is studied to determine crystal structure of the oxide film and size and surface density of the CuO whiskers formed. 24 ref. (R1h; Cu)

273-R. The Oxidation of Tin. Pt. 3. The Mechanisms of Oxidation of Pure Tin and Their Dependence on Time and Oxygen Pressure. William E. Boggs. Electrochemical Society, Journal, v. 108, Feb. 1961, p. 124-129.

Discussion of kinetic data and reaction mechanisms as indicated by data. 20 ref. (R1h, 3-67, 3-74; Sn)

274-R. The Oxidation and Corrosion of Zirconium and Its Alloys. Pt. 6. The Mechanism of the Fission Fragment Induced Corrosion of Zircaloy-2. B. Cox, K. Alcock and F. W. Derrick. Electrochemical Society, Journal, v. 108, Feb. 1961, p. 129-133.

Mechanisms of corrosion of Zircaloy-2 in high-temperature uranyl sulphate solutions as influenced by irradiation. 19 ref. (R6k, 2-67; Zr-b)

275-R. The Effect of Surface Preparation on Oxide Films on Cr and Fe Alloys. D.

Coplan, Alma Harvey and M. Cohen. Electrochemical Society, Journal, v. 108, Feb. 1961, p. 134-138.

High-temperature oxidation rate of Fe, Cr, Fe-26% Cr, Fe-11% Cr and Fe-26% Cr-0.5% Si is studied as a function of surface preparation. 10 ref. (R1h, 9-71; Cr-b, Fe-b)

276-R. An Apparatus for the Continuous Measurement of Dissolution of Metals. T. S. de Gromohoy and L. L. Sheir. Institute of Metal Finishing, Transactions, v. 36, 1958-1959, p. 153-158.

An apparatus which measures the increase in the electrical resistance of a metal wire as its cross-sectional area decreases during dissolution in a corrosive solution is applied to the measurement of the dissolution rate of pure Al wire during chemical cleaning in a 75% phosphoric acid-nitric acid solution. 6 ref. (R2g, L12g, 1-54; Al, 4-61)

277-R. An Electron-Microscopic Study of the Corrosion of Electroplated Nickel. Rolf Weil. Plating, v. 48, Feb. 1961, p. 163-167.

Panels of low-carbon steel, Ni plated in Watt's bath with various addition agents, are subjected to one year outdoor corrosion tests. Pitting effects on grain boundaries, crevices, pores, crystal orientation and brightness are observed by electron microscopy. (R3, L17, M21e; CN-g, Ni)

278-R. The Nature, Cause and Effect of the Porosity in Electrodeposits. Fielding Ogburn and Wm. H. Roberts. Plating, v. 48, Feb. 1961, p. 168-169.

Radial flow corrosion currents associated with pitting corrosion and corrosion at pores or pits in plated coatings are detected by observing the motion of electrolytic solutions surrounding a magnetic field. Method is illustrated on Ni plated steel in H_2SO_4. (R11a, R6g; ST, Ni, 8-62)

279-R. Relative Corrodibility of Zinc and Steel in Unpolluted Atmospheres. K. S. Rajagapavan and G. Ramaseshan. Journal of Applied Chemistry, v. 10, Dec. 1960, p. 493-496.

Atmospheric conditions under which Zn corrodes faster than mild steel are investigated with reference to well defined temperature and humidity conditions and in relation to the period of exposure. 14 ref. (R3, R11k; ST, Zn)

280-R. The Nature of the Oxide Film Formed on Stainless Steel Immersed in Concentrated Hydrogen Peroxide. J. Diederichsen. Journal of Applied Chemistry, v. 10, Dec. 1960.

Rate of formation, composition and stability of the resulting oxide film are investigated by chemical analysis and electrometric methods. (R1h; SS)

281-R. Role of Hydrogen in the High Temperature Corrosion of Zirconium and Its Alloys. Pt. 2. Oxidation of Unalloyed Zirconium in Steam and in Oxygen. D. R. Silvester and J. M. Wanklyn. Journal of Applied Chemistry, v. 10, Dec. 1960, p. 511-520.

Comparison of film capacities and weight gains of specimens of Kroll Zr exposed to steam and dry oxygen at 325°. Comparisons of oxidation rates at late stages of oxidation show discrepancies in relation to the initial oxidation rates. 13 ref. (R1h, R4d; Zr)

282-R. Galvanic Cells. Donald F. Taylor. Corrosionomics, v. 5, May 1960, p. 2-3.

Study of hydrogen embrittlement and corrosion of Ta and galvanic reactions of Ta couples in H_2SO_4 using Pt, graphite, Pb and silicon iron. Results show that in H_2SO_4 Ta is cathodic to clean Pb and clean Si but anodic to Pt and graphite. (R1a, R6g; Ta)

283-R. (Japanese.) Corrosion of Mild Steel in Alkaline Solutions at High Temperature and Pressure. Jiroh Katoh and Tadashi Arai. Chemical Society of Japan, Journal, Industrial Chemistry Section, v. 63, Sept. 1960, p. 1576-1579.

Composition and structure of mild steel corroded in various kinds of alkalies at pH 11 are determined by microscopic and diffraction methods. Mechanism is explained by thermodynamic calculations. (R6j, M27, M21, M22; CN)

284-R. A Simple Stress-Corrosion Cracking Test for Copper Alloys. D. H. Thompson. Materials Research & Standards, v. 1, Feb. 1961, p. 108-111.

Test methods for determining the resistance of Cu alloys to stress corrosion cracking in moist ammoniacal atmosphere based on determining the per cent of relaxation in tear drop shaped loops of alloys in NH_4OH vapors at 20° C. 6 ref. (R11s, R6j; Cu-b)

285-R. Developments in the Protection of Magnesium. J. K. Wilson and F. D. Waldron-Trowman. Light Metals, v. 24, Feb. 1961, p. 38-39.

Corrosion testing of Mg alloy castings and panels which have been anodically cleaned with fluoride, anodized and surface sealed with sprayed epoxy resin coatings. (R-general; Mg-b, 5, 8-67)

286-R. Engine Corrosion. Light Metals, v. 24, Feb. 1961, p. 51.

Corrosion resistance of Al alloy (0-3.5% Cu, 0-7.0% Si, 0-0.35% Mg and 0-6.5% Zn) cylinder heads in contact with cast iron blocks as affected by various antifreeze compositions. (R7f, T21b; Al, 17-57)

287-R. (Japanese.) Mechanism of the Dissolution of Passive Nickel in Sulphate Solutions. Norio Sato and Go Okamoto. Japan Institute of Metals, Journal, v. 24, Nov. 1961, p. 735-739.

Effect of concentration of H, Ni and sulphate ions on the dissolution rate in acidic and alkaline solutions. The observed dissolution decreases with the increase of pH in the acidic region, independent of Ni or sulphate ion concentration and increases with increasing pH in the alkaline solution. 12 ref. (R2g; Ni)

288-R. (Japanese.) Study of the Surface States of Tungsten Powder. Oxidation of Tungsten Powder. Shigetoshi Takayanagi. Japan Institute of Metals, Journal, v. 24, Nov. 1960, p. 756-760.

The surface oxidation of tungsten powder is studied at 150-400° C. and 10-400 mm. Hg pressure, using a vacuum microbalance technique with BET method and electron microscopy analysis. Data are given for oxidation rate and kinetics and oxide film growth, structure and composition, as a function of particle size and specific surface area, doping, heat treatment and oxygen pressure. 13 ref. (R1h; W, 6-68)

289-R. Gases in Steel (Rates of Corrosion of Some Structural Alloys in Molten Sodium Sulphate). A. J. Pollard and A. J. Edwards. Report of NRL (Naval Research Laboratory) Progress, Jan. 1961, p. 29-30.

Weight losses as a function of time are determined for Armco iron and 304, 416, 24% Cr-3% Al and 20% Cr-20% Ni stainless steel to assay susceptibility to corrosion by oil-ash deposits (containing sodium sulphate) in marine boilers. (R6m, N15e; Fe-a, SS)

290-R. A Corrosion-Proof Metal Body... Why Not Now? Herbert D. Van Sciver. SAE Journal, v. 69, Mar. 1961, p. 38-39.

Effects of the forming process on the mechanical properties of corrosion resistant materials such as 1010 steel, stainless steel and Al are shown to illustrate the plausibility of producing a corrosion proof automobile body. Spot and arc welding methods for assembly of sheet steel and Al. (R-general, Q-general, K1, K3n, T21a; Al, SS, 17-57)

291-R. Coatings Protect Materials From Flight Heat. A. G. Lucas. SAE Journal, v. 69, Mar. 1961, p. 78-79.

Use of static and ablatine coatings to protect graphite and Mo and other refractory metals from oxidation during aerodynamic heating. Mo is protected by $MoSi_2$ and graphite by a composite of graphite, $MoSi_2$ and graphite by a composite of graphite, $MoSi_2$ and TiB. Ablatine coatings in use include phenolic-asbestos, epoxy-fiberglass and molded Teflon. (R1h; EG-d37, 8)

292-R. (French.) Study by Diffraction and by Electron Microscope of the Oxidation and Carburization of Thin Aluminum Films. J. J. Trillat, L. Tertian and M. Bonnet-Gros. Revue de l'Aluminium, v. 37, Oct. 1960, p. 1115-1123.

The kinetics of the oxidation of Al, the transformation into gamma Al_2O_3 and the formation of C_3Al_4 are observed for vapor deposited Al and C-Al thin films on an inert parlodian supporting membrane inside a microscope or diffractograph after heating. 11 ref. (R1h, N-general, M21e, M22h; Al-b, C, 14-62)

293-R. The Corrosion Behaviour of Non-ferrous Metals in Sea Water. T. Howard Rogers. Institute of Marine Engineers, Transactions (Canadian Div. Supplement), no. 2, Dec. 1960, p. 31-37.

Survey of the sea water corrosion resistance of Al alloys, brasses, bronzes, cupro-nickel alloys, Cu-Ni-Fe alloys, gun metals, Cu, Monels and Sn and Pb alloys. (R4b; Al-b, Cu-b, Ni-b, Pb-b, Sn-b)

294-R. (French.) Influence of Pressure on Oxidation of Iron and Steels by Carbon Dioxide. Michel Colombie. Comptes Rendus, v. 251, Dec. 19, 1960, p. 2938-2940.

Oxidation experiments at 535° C. on carbon steels, steel with 3% Cr and on Fe under partial pressure of CO_2 between 1-16 kg. per cm^2. 8 ref. (R1h, 3-74; Fe-b, ST)

295-R. High Temperature Vanadium-Columbium. Corrosion Technology, v. 8, Jan. 1961, p. 1-2.

Vanadium-base alloys containing 20-50% Cb are tested in oxidizing and reducing environments at 700-1200° C. under 12,000-100,000 psi. of pressure to determine high-temperature strength, corrosion resistance in water, stress-rupture properties and ultimate tensile strength. (R4, Q27, Q3m, 2-61; V-b, Cb)

296-R. Influence of Water Movement on Corrosion of Ferrous Materials. G. Butler. Corrosion Technology, v. 8, Jan. 1961, p. 5-7.

Discussion of the relationship between movement of the water and the thickness of the boundary diffusion layer is illustrated by corrosion of Fe in oxygenated water under cathodic control. 10 ref. (R4; Fe-b)

297-R. Columbium Base Alloys. Corrosion Technology, v. 8, Jan. 1961, p. 7.

Oxidation resistance of Cb-base alloys containing 28-20% W, 10-7% Ti, 3% Al, 3% V, 3% Mo, Cr and Zr is measured at 2550-1500° F. and 40,000 psi. pressure. (R1h, 2-61; Cb-b, W, Ti)

298-R. Corrosion Resistance in Chemical Plant. S. Baker. Corrosion Technology, v. 8, Jan. 1961, p. 8-12.

Data are given for mechanical and electrical properties and corrosion resistance in water, acids, alkali salts and organic substances of Cu and its alloys. (R4, R6, R7, Q-general, P15; Cu-b)

299-R. Corrosion and Incrustation From Use of Blast Furnace Gas in Gas Turbines. Corrosion Technology, v. 8, Jan. 1961, p. 13-14.

Pilot plant corrosion testing in steelworks of gas turbines made of austenitic steel. Determination of corrosion losses and incrustation produced by hot blast furnace gas at inlet temperatures of 263-750° C. (R7g, W11m; SS, 17-57)

300-R. Automobile Body Corrosion Control Problems. Harold A. Webster. Corrosion, v. 17, Feb. 1961, p. 9-12.

Corrosion control measures that can be taken through use of more resistant materials, improvement of body design, protective coatings, treatment of environment (inhibitors for de-icing salts) and continued maintenance by car owners. 5 ref. (R-general, T21)

301-R. A Close Look at Some Auto Corrosion Problems. Corrosion, v. 17, Feb. 1961, p. 14-18, 22-24.

Analysis of problems connected with Cr trim on cars, cooling and exhaust systems. Measures taken by automobile manufacturers to minimize corrosion; air pollution and de-icing salt exposure as principal factors in causing corrosion. 25 ref. (R-general, T21)

302-R. Some Corrosion Problems of Missiles in Silo Storage. Leo E. Gatzek. Corrosion, v. 17, Feb. 1961, p. 28-29.

Problems in controlling atmosphere inside the silo and the missile to prevent corrosion; corrosion control measures and techniques used to measure corrosion. 15 ref. (R-general, T24e)

303-R. Design Change Beneficial in Reducing Domestic Hot Water Tank Corrosion. P. J. Sereda. Corrosion, v. 17, Feb. 1961, p. 30-32.

Temperature is an important factor affecting corrosion. Cu piping has an influence on corrosion, especially if a Cu dip tube is used inside the tank. Results from tests using corrosion inhibitors are inconclusive probably because the concentration of about 10 ppm. is too low. (R10b)

304-R. Chloride Stress Corrosion Cracking of Stainless Steel Deaerator Trays. N. D. Groves, L. R. Scharfstein and C. M. Eisenbrown. Corrosion, v. 17, Feb. 1961, p. 75-76.

Trays fabricated from Type 201 and Type 329 stainless steels failed by chloride stress corrosion cracking after several months's service. Cracking of 201 stainless is very severe. Annealing after welding the 329 stainless trays would improve resistance to cracking. (R1d; SS)

305-R. Influence of Reactor Radiation on the Oxidation of Niobium. J. V. Cathcart and F. W. Young. Corrosion, v. 17, Feb. 1961, p. 77-79.

No measurable change is detected either in the rate of oxidation or in the nucleation process associated with the oxidation of Cb. On the basis of estimates of the extent of radiation damage in thin oxide films, it is concluded that the damage resulting from irradiation at currently available neutron flux levels is unlikely to change the number of oxide lattice defects sufficiently to produce a significant change in the oxidation rate. 4 ref. (R1h; Cb)

306-R. Corrosion Effects of Liquid Fluorine and Liquid Oxygen on Materials of Construction. F. W. Fink and Earl L. White. Corrosion, v. 17, Feb. 1961, p. 80-82.

Although both of these elements are very reactive, most of the common metals are sufficiently resistant for many applications. The compatability of these oxidizers is discussed in relation to alloys of Fe, Ni, Cu, Al, Mg, Ti and Zr. 9 ref. (R6; Fe, Ni, Cu, Al, Mg, Ti, Zr)

307-R. Practicality of Establishing Threshold Values to Eliminate Stress Corrosion Failures in Metals and Alloys. Henry Suss. Corrosion, v. 17, Feb. 1961, p. 83-88.

Review of the significance of many factors which could affect the stress corrosion behavior of materials. These include such items as method of test, slight variations in test environment or metallurgical structure of the metal, accelerated corrosion attack (galvanic or crevice), residual stress and nature of corrosion attack. 31 ref. (R1d)

308-R. Effect of Flow Rate on the Galvanic Corrosion of Low Carbon Steels in Sea Water. Eino Uusitulo. Corrosion, v. 17, Feb. 1961, p. 89-92.

Study by recording current-potential curves and measuring the potentials, current strengths and weight losses of galvanic cells formed by the steels in pairs. Corrosion of the steels forming galvanic cells is up to 15 times as great at high rates of flow as in standing sea water. 9 ref. (R1a; CN-g)

309-R. Accelerated Corrosion Test for Tin Plate in Grapefruit and Other Juices. P. R. Carter and T. J. Butler. Corrosion, v. 17, Feb. 1961, p. 94-98.

Use of an alloy-tin couple (ATC) test. Effect of Sn (II) additions to the electrolyte, of the source of the Sn anode, variations in sample and anode area, resistance of the external and internal circuit and of scratches on the sample surface. 8 ref. (R6g; ST, Sn, 8)

310-R. Corrosion Resistance of Electrolytic Tin Plate. Pt. 1. Electrochemical Studies of Tin, Iron-Tin alloy and Steel in Air-Free Acid Media. G. G. Kamm and A. R. Willey. Corrosion, v. 17, Feb. 1961, p. 99-106.

Failure is described in terms of tin-steel potential and current relationships. Potential and polarization measurements indicate that inhibition by Sn^{++} is not a plating-out process. Polarization studies identify the Fe-Sn alloy as an important factor in tin plate corrosion. 26 ref. (R-general; ST, Sn, 8)

311-R. Corrosion Resistance of Electrolytic Tin Plate. Pt. 2. The Alloy-Tin Couple Test - a New Research Tool. G. G. Kamm, A. R. Willey, R. E. Reese and J. L. Krickl. Corrosion, v. 17, Feb. 1961, p. 106-114.

New 20 hr. electrochemical test which measures the current flowing between pure Sn and Sn plate detinned to the alloy layer, coupled in deaerated grapefruit juice, shows good correlation with rate of detinning in grapefruit juice test peaks. 13 ref. (R11m; ST, Sn, 8)

312-R. Influence of Area of the Steel Component on Behavior of a Tin-Steel Couple. S. C. Britton and K. Bright. Corrosion, v. 17, Feb. 1961, p. 120-124.

Tinned steel specimens with the coating removed from selected areas are corroded in anearobic citric acid. Even with very small areas of exposed steel some dissolution of Fe occurs, but the rate of dissolution increases sharply when the steel area is increased sufficiently to cause the current density on it to fall below an effective protective value. 7 ref. (R6g; ST, Sn, 8)

313-R. A Comparison of Stainless Steel and Zirconium for Use in Pressurized

Water Reactor. Charles J. Baroch. Mines Magazine, v. 51, Feb. 1961, p. 17-22.

Examination of the density, ductility, thermal conductivity, yield strength and corrosion rate of Zircaloy-2 and stainless steel claddings over cores composed of U^{235}, UO_2B^{10}, B_4C_2 and stainless steel in pressurized water reactors. 16 ref. (R4, Q23, P11h, P10a, T11g; SS, Zr)

314-R. Cast Iron and Corrosion in the Gas Industry. H. H. Collins. Chemistry & Industry, Jan. 14, 1961, p. 32-38.

Influence of environment, temperature and galvanic current on graphitic corrosion of flake and nodular irons of both pearlitic and ferritic composition. Influence of composition on growth rate caused by cyclic heating. (R2p, 2-60; CI)

315-R. (Japanese.) Stress-Corrosion Cracking of Austenitic Stainless Steels. Pt. 1. Effect of Shot-Peening on Stress-Corrosion Cracking of Austenitic Stainless Steels. Hideo Togano and Kazuo Osato. Japan Institute of Metals, Journal, v. 24, Dec. 1960, p. 786-790.

The effectiveness of compressive stress left by shot-peening in cancelling out harmful tensile stresses on metallic surfaces is tested for reducing stress corrosion susceptibility in stainless. Specimens immersed in boiling MgCl, H_2SO_4 and HNO_3 are bend tested with measurement of residual stress and metallographic analysis of cracking. 9 ref. (R2d, G23n, Q25h; SS-e)

316-R. (Japanese.) Effect of Gamma Rays on the Corrosion of 347 Stainless Steel in 5% Sulphuric Acid. Takashi Mukaiho, Keichi Oshima, Hisashi Mori and Taiji Nagatari. Japan Institute of Metals, Journal, v. 24, Dec. 1960, p. 829-833.

Corrosion rate and activation energy of specimens in 5% H_2O_4 solution, with or without H_2O_4 addition, at 70-97° C. after irradiation with CO-60 gamma rays. The acceleration of corrosion is believed to be caused by the reducing molecules which have a higher diffusion coefficient and a higher reactivity than the oxidizing one. 7 ref. (R6g, 2-67; SS)

317-R. (French.) Relation Between the Oxygen Content Dissolved in Salt Solutions and the Current Requirement for the Cathodic Protection of Steel. Arne Windfeldt. Corrosion et Anticorrosion, v. 9, Jan. 1961, p. 15-23.

Inhibition of cathodic polarization of steel by the oxygen dissolved in NaCl solution and in sea water. Linear relation between the aggressiveness of the salt solutions and the oxygen content. Formula for protection of steel by electric current in this type of environment. 11 ref. (R10d)

318-R. Aluminum in Marine Environments. R. I. Lindberg. American Society of Naval Engineers, Inc., Journal, v. 73, Feb. 1961, p. 133-138.

Corrosion testing of painted and unprotected marine assemblies composed of various Al alloys in sea water. Comparison with Cu, Pb, Zn and steel. (R4b, R10, T22; Al-b, 17-57)

319-R. How to Prevent Stress-Corrosion Cracking of Copper Alloys. David H. Thompson. Chemical Engineering, v. 68, Feb. 6, 1961, p. 130, 132, 134.

Annealing, relief annealing, protective coating and alloying techniques for preventing corrosion in Cu alloys. (R10, R1d; Cu-b)

320-R. (German.) Corrosion Protection by Pigments. J. D'Ans and V. Groope. Deutsche Farbenzeitschrift, v. 15, Feb. 1961, p. 51-55.

Corrosion of deep drawn iron sheets in solutions of chromates of varying solubility in water (Pb, Ba, Zn, Cr, Cd and Ca chromate) is investigated by weighing and potential and resistance measurements. Protective effect of chromates; influence of anions. (R6k; Fe, 4-53)

321-R. (German.) Sub-Surface Rusting of Lacquered Steel. J. A. W. van Laar. Deutsche Farbenzeitschrift, v. 15, Feb. 1961, p. 56-67.

Method and apparatus for testing of cold rolled lacquered steel sheet by scratching of lacquer and exposure to corrosive media. Corrosion tests in normal climate, sea climate, fresh water submersion test, salt water spray test. Standardization of measurement; reaction mechanism; means of prevention. (R11j, R3, R4a; ST, 8-70)

322-R. (German.) Paint With Lead Powder. Bernd Schwegmann. Deutsche Farbenzeitschrift, v. 15, Feb. 1961, p. 72-73.

Corrosion protection by fine Pb powder pigment dispersed in binders such as linseed oil, resin and caoutchouc. Use in shipbuilding and for Fe constructions. Economics. (R10, T22)

323-R. (French.) High Alloyed Stainless Steels and Alloys. J. Bourrat. Metallurgie et la Construction Mecanique, v. 92, Nov. 1960, p. 867-878.

Steels containing Cr, Ni, Mo and Cu are corrosion tested in 0-50% H_2SO_4 at 20-100° C. Corrosion resistance of these steels, Ni base alloys and Hastalloy B, C, D and F in hydrochloric acid. (R6g; SS, Ni-b)

324-R. (French.) Low-Alloy Corrosion Resistant Steels. E. Herzog. Metallurgie et la Construction Mecanique, v. 92, Nov. 1960, p. 915-929, 959.

Effect of small additions of Cu, Al and Ni on the corrosion behavior of a steel containing 3.5% Cr in industrial and sea atmospheres, sea water, NaCl solution. Stress corrosion in various salts and concentrated alkalis at 20-200° C. (R3, R4b, R11j, 2-60; AY)

325-R. (French.) Heat Resistant Steels and Alloys. R. Neyret. Metallurgie et la Construction Mecanique, v. 92, Nov. 1960, p. 931.

Ferritic steels, austenitic-ferritic steels, austenitic steels and superalloys are mechanically and creep tested at 600-1200° C., or exposed to the action of air, argon-nitrogen, carburizing, CO, combustion atmospheres and furnace atmospheres containing vanadium. (R3, Q3; SS, SGA-h)

326-R. (German.) Intercrystalline Decomposition of Aluminum Materials. E. Nachtigall. Radex Rundschau, Dec. 1960, p. 373-388.

Corrosion testing at up to 300° C. temperature and high pressure (up to 30 atm.) of annealed and recrystallized or worked high-purity Al and Al alloy specimens in distilled water, water vapor or salt solutions. Influence of alloy additions, anodic coating, annealing and pH of corroding solution on intercrystalline decomposition of Al. (R11, R2h; Al-b)

327-R. A Technique for Investigating Reactions Between E. P. Additives and Metal Surfaces at High Temperatures. F. T. Barcroft. Wear, v. 3, Nov-Dec. 1960, p. 440-453.

Thin mild steel, Fe, Ag and Cu wires are heated electrically to 600° C. while immersed in an extreme pressure oil. Rate and extent of reaction deduced from change of resistance of wire with time. 10 ref. (R7e; Ag, CN, Cu, Fe, 4-61)

328-R. (French.) Electrochemical Study of the Cathodic Corrosion Reaction. J. M. Defranoux. Societe Francaise des Electriciens, Bulletin, v. 1, Oct. 1960, p. 672-677.

Separate study of the cathodic reaction during metal corrosion by the polarization curve on a noncorroding electrode (Pt). Corrosion resistance of 18-8 Mo stainless steel in nitric acid and passivity of stainless steel. 17 ref. (R10d, R-general; SS)

329-R. Study of the Corrosion of Metals in an Aqueous Medium by Tracing the Polarization Curves With a Potentiostat. Ph. Berge. Association Technique, Bulletin, 1960, p. 487-504.

Polarization curves obtained by a potentiostat of stainless steel in sulphuric acid, of AG7 alloy under stress, of metal couples in an electrolyte and of the resulting electrochemical corrosion. 17 ref. (R11m, R1, R6; Mg-b, SS)

330-R. Comparative Stress-Corrosion Behavior of Some High Alloy Steels. P. P. Snowden. Iron and Steel Institute, Journal, v. 197, Feb. 1961, p. 136-141.

Testing of austenitic, ferritic and martensitic corrosion-resisting steels in solutions of $MgCl_2$, NaCl, NaOH and KOH superheated up to 650° C. and under a stress of 13 tons per in^2. Microscopic examination to determine effect of composition on stress-corrosion cracking resistance. (R11s, 2-60; SS)

331-R. Special Coating Solves Corrosion Problem. R. E. Gackenbach. Southern Power & Industry, v. 79, Mar. 1961, p. 52.

Corrosion of carbon steel by a polymer solvent used in the manufacture of spin dope is prevented by application of Kolmetal, a mixture of finely pulverized Al in a plastic base, to all the structural members and process tanks exposed to the solvent or its vapors. (R10g, R7, T29; CN)

332-R. Bimetallic Heat Exchanger Tubes. Southern Power & Industry, v. 79, Mar. 1961, p. 64-65.

Stress corrosion testing of bimetallic tubes with 304 stainless on the inside and deoxidized tubes on the outside. Outside environment is brackish river water and inside hot corrosive gases. (R11s, R4f, R6, W13b; Cu, SS, 4-60)

333-R. (French.) Oxidation and Carburization of Thin Aluminum and Beryllium Films. Jean-Jacques Trillat, Lea Tertian and Monique Bonnet-Gros. Memoires Scientifiques de la Revue de Metallurgie, v. 57, Nov. 1960, p. 845-851.

Oxidation of thin Al and Be films heated under different residual air pressures and observed by diffraction and electronic microscope. Formation of the carbides C_3Al_4 and Be_2C by reciprocal diffusion between a carbon film and a thin layer of metal deposited on it. 8 ref. (R1h, N-general; Al, Be, 14-62)

334-R. (French.) Enrichment in Impurities Occurring During Oxidation of Steels Studied by Radioactive Tracers. Ch. de Beaulieu, M. Cagnet and J. Moreau. Memoires Scientifiques de la Revue de Metallurgie, v. 57, Nov. 1960, p. 863-875.

The accumulation at the metal-oxide interface of Cu, Co, Cr, W, As, P and S impurities during the oxidation of steel or a binary ferrous alloy at elevated temperatures and the kinetics of the oxidation process are studied by irradiating the etched surface and preparing autoradiographs or by using S^{35} as a tracer. 14 ref. (R1h, 1-59, 3-69; ST)

335-R. (Italian.) Corrosion Resistance of SG Cast Iron. Lelio Orsini. Macchine, v. 15, Nov. 1960, p. 1065-1077.

Application of pearlitic, pearlitic-ferritic, ferritic, martensitic-sorbitic and austenitic irons in the oil and chemical industries. Corrosion behavior. (R6, R7, T29; CI-r, 17-57)

336-R. (Translation-Brutcher no. 4449.) Season Cracking of Brass in Ammonia. A. N. Kondrat'ev. Metallovedenie i Obrabotka Metallov, Dec. 1958, p. 45-52.

Nature of season cracking of brass specimens held for long periods under various stresses and propagation of cracks in them. Intergranular corrosion in cylindrical brass specimens; effect of Cu concentration in cupriammonium solution on solubility of brass. (R1d; Cu-n)

337-R. Marine Fouling and Corrosion. Inco Corrosion Reporter, v. 7, Jan. 1961, 14 p.

Effects of macro and micro-organisms in seawater on the corrosion resistance of Cu-Ni alloys, admiralty brass and Al brass. Methods of preventing fouling and corrosion. (R4b; Cu-b)

338-R. Food Manufacture Raises Severe Corrosion Problems. J. W. Selby. Corrosion Prevention & Control, v. 8, Jan. 1961, p. 29-31, 34.

Corrosion of food containers, building walls and equipment such as metal trolleys used in food storage and food preparation. Corrosion tests of standard 18/8 Cr-Ni and of 18/8/3 Ni-Cr-Mo stainless steel partially immersed in lemon squash at 37° C. Corrosion problems in jam boiling and in manufacture of pickles. (R7n, T29p; SS)

339-R. Corrosion in Breweries. R. H. Chandler. Corrosion Prevention & Control, v. 8, Jan. 1961, p. 32-34.

Corrosion in brewery equipment, normally of Cu, caused by steam, condensation, organic compounds and alkaline cleaning agents. Prevention and control by replacing Cu with corrosion resistant materials, including stainless and other steels, inert inorganic materials and Al; by cathodic protection and by coating with epoxy resins and rubber and metallic paints. (R-general, R10, L26, T29p; Cu, ST, Al, 17-57)

340-R. Aluminum and Corrosion. A Review of Progress in 1960. F. C. Porter. Corrosion Prevention & Control, v. 8, Jan. 1961, p. 37-43.

Review of 1960 publications on research and technology covering corrosion mechanisms such as fretting, stress corrosion and pitting; atmospheric and aqueous corrosion; acid and alkali attack; and corrosion by contact with other materials. Survey of protection and control, including cathodic protection, anodizing, chemical conversion coatings, painting and vitreous enamelling. Application of Al coatings in corrosion protection systems. (R-general, L-general; Al)

341-R. Corrosion Resistance of Electropolished Surfaces. H. E. Zentler Gordon

and S. C. Boyle. Corrosion Technology, v. 8, Feb. 1961, p. 35-39.

Corrosion testing of Al, Cu, brass, Zn, carbon steel, stainless steel, stainless iron and Fe-Cr alloy samples after mechanical or electropolishing to determine effect of thin, passive oxide films on inorganic chemical corrosion resistance. 33 ref. (R6, L10, L13p; Al, Cu-b, CN, Fe-b, SS, Zn)

342-R. Stainless Steel--Corrosion Resistance in Chemical Plant. E. Ineson. Corrosion Technology, v. 8, Feb. 1961, p. 45-49.

Density, specific heat, thermal expansion and conductivity, electrical resistance and acid corrosion resistance of 18/8 austenitic steel, 13% Cr iron, 13% Cr martensitic stainless and 18/10 + Mo steel. (R6g, P-general; SS)

343-R. New Cast Stainless Alloy Adopted in Nuclear Sub. Inco Nickel Topics, v. 14, Feb. 1961, p. 1, 4.

Galvanic, crevice and stress corrosion resistance and mechanical strength of a precipitation-hardening cast nickel containing stainless alloy, CD4MCU (25-27% Cr, 4.75-6% Ni, 2.75-3.25% Cu, 1.75-2.25% Mo). Application in torpedo breech doors where strength and corrosion resistance are essential. (R1, Q-general, T22; SS, Ni, SGA-g, 17-57)

344-R. (English.) Oxidation of Germanium. Tadashi Yanagihara, Goro Shimaska and Hiroko Suzuki. National Research Institute for Metals, Transactions (Japan), v. 2, Feb. 1960, p. 126.

Powder specimens of Ge are oxidized at 450-930° C., with measurement of oxide film formation and growth by thermobalance and X-ray and electron diffraction methods. Reactive kinetics are determined as a function of temperature, particle size and the protective nature of the films formed. (R1h, M-general, 2-61; Ge, 6-68)

345-R. Corrosion in Alkaline Environments. Paul J. Gegner. Paper from "Short Course on Process Industry Corrosion, Proceedings". National Assoc. of Corrosion Engineers, Houston 2, Tex., 1960, p. 1-30.

Corrosion resistance of Al alloys, cast iron, steel and other metals in soda ash, caustic soda, caustic potash, ammonia, alkaline sulphides and amines as it affects their application in chemical processing equipment. (R6j, T29; Al, CI, ST, 17-57)

346-R. The Use of Iron, Carbon Steel and Alloy Steel in the Chemical Industry. R. J. Schmitt. Paper from "Short Course on Process Industry Corrosion, Proceedings". National Assoc. of Corrosion Engineers, Houston 2, Tex., 1960, p. 31-59.

Study of the corrosion resistance of iron and steel used in the chemical industry as affected by composition, heat treatment, corrosive environments and use of corrosion prevention techniques such as inhibition, protective coating and cathodic protection. (R6, R7, R10, T29; CN, Fe, ST)

347-R. Corrosion by Sulphuric Acid. Walter A. Luce. Paper from "Short Course on Process Industry Corrosion, Proceedings". National Assoc. of Corrosion Engineers, Houston 2, Tex., 1960, p. 63-81.

Corrosion resistance of steel, cast iron, Pb, stainless steels, stainless alloys, chlorimets, Hastelloys, noble metals, Ni alloys and Cu alloys in H_2SO_4 at various compositions and temperatures. (R6g; CI, Cu-b, Ni-b, ST)

348-R. Copper and Its Alloys, Classes and Types, Corrosion Characteristics and Applications. A. W. Tracy. Paper from "Short Course on Process Industry Corrosion, Proceedings". National Assoc. of Corrosion Engineers, Houston 2, Tex., 1960, p. 83-97.

Discussion of types of corrosive attack on Cu alloys, including dezincification, pitting, stress-corrosion cracking, corrosion fatigue and galvanic corrosion. Data are given for composition, mechanical properties and corrosion resistance in various chemical environments. (R1, R6, R7; Cu-b)

349-R. Nickel and High-Nickel Alloys. W. Z. Friend. Paper from "Short Course on Process Industry Corrosion, Proceedings". National Assoc. of Corrosion Engineers, Houston 2, Tex., 1960, p. 99-117.

Corrosion resistance of Ni and Ni-Cu, Ni-Cr, Ni-Mo, Ni-Mo-Cr, Ni-Cr-Mo-Cu, Ni-Fe-Cr-Mo and Ni-Si alloys in various chemical media. Applications in chemical processing equipment. (R6, R7, T29; Ni-b, 17-57)

350-R. Corrosion From Chlorine--Its Major Compounds and Their Homologs. L.

W. Glukman. Paper from "Short Course on Process Inudstry Corrosion, Proceedings". National Assoc. of Corrosion Engineers, Houston 2, Tex., 1960, p. 119-142.

Corrosion resistance of Ni, Mg, Al and their alloys, Ti, stainless steel, Au and other metals in Cl, F, Br, I and their acids and salts. (R6, R7h, T29; Al-b, Au, Mg-b, Ni-b, SS, Ti)

351-R. Corrosion by Acetic Acid. J. A. Manning. Paper from "Short Course on Process Industry Corrosion, Proceedings". National Assoc. of Corrosion Engineers, Houston 2, Tex., 1960, p. 143-151.

Corrosion rates of Al and Al alloys, Cu and Cu alloys, stainless steels, Ni alloys and various nonmetallic materials in acetic acid. Comparison of materials as to applicability for tanks, heating coils, piping, valves and pumps in contact with acetic acid. (R7b, T29; Al-b, Cu-b, Ni-b, SS)

352-R. Solving Refinery Corrosion Problems With Aluminum. Ellis D. Verink, Jr., and Frank B. Murphy. Paper from "Short Course on Process Industry Corrosion, Proceedings". National Assoc. of Corrosion Engineers, Houston 2, Tex., 1960, p. 155-159.

Corrosion resistance of Al and its alloys as it affects applications in refinery heat exchangers, tankage, piping and cryogenic equipment. 15 ref. (R7a, T29; Al-b)

353-R. Resistance of Aluminum Alloys to Underground Corrosion. Paper from "Short Course on Process Industry Corrosion, Proceedings". National Assoc. of Corrosion Engineers, Houston 2, Tex., 1960, p. 161-177.

Pitting, galvanic and stray current corrosion resistance of unprotected or coated Al sheet or pipe buried for various times. 10 ref. (R1, R8; Al, 4-53, 4-60)

354-R. Corrosion Studies of Aluminum in Chemical Process Operations. E. H. Cook, Jr., R. L. Horst, Jr., and W. W. Binger. Paper from "Short Course on Process Industry Corrosion, Proceedings". National Assoc. of Corrosion Engineers, Houston 2, Tex., 1960, p. 179-191.

Corrosion resistance of Al alloys exposed to ammonium nitrate, aliphatic acids and anhydrides, alcohols, sour crude oils, amines, ammonia, acrylonitrite, propellants and water. 25 ref. (R4, R6, T29; Al-b)

355-R. Use of Tantalum, Columbium, Titanium and Zirconium in Chemical Environments. W. K. Boyd, J. D. Jackson and F. W. Fink. Paper from "Short Course on Process Industry Corrosion, Proceedings". National Assoc. of Corrosion Engineers, Houston 2, Tex., 1960, p. 193-213.

Data are given for corrosion resistance in acids, alkalies, salts, organic materials, gases and liquid metals. 28 ref. (R6, R7; Cb, Ta, Ti, Zr)

356-R. Materials for Handling Hydrofluoric, Nitric and Phosphoric Acids. L. R. Honnaker. Paper from "Short Course on Process Industry Corrosion, Proceedings". National Assoc. of Corrosion Engineers, Houston 2, Tex., 1960, p. 215-234.

Corrosion rates of various Ni and Al alloys, Ti, stainless steels and other metallic and nonmetallic materials are given as functions of temperature and acid concentration. 21 ref. (R6g, 2-61, T29; Al-b, Ni-b, SS, Ti, 17-57)

357-R. Designing Corrosion Out of Process Equipment. W. H. Burton. Paper from "Short Course on Process Industry Corrosion, Proceedings". National Assoc. of Corrosion Engineers, Houston 2, Tex., 1960, p. 259-272.

Design suggestions for steel pressure vessels, pipelines, heat exchangers and storage tanks which provide maximum corrosion resistance. (R10g, 17-51, T29; ST, 17-57)

358-R. Corrosion Testing. Mars G. Fontana. Paper from "Short Course on Process Industry Corrosion, Proceedings". National Assoc. of Corrosion Engineers, Houston 2, Tex., 1960, p. 319-352.

Surface preparation, cleaning and stress, crevice, galvanic and other corrosion testing techniques for Al, Mg, Ni, steels, brasses and other metals and alloys. (R11; Al, Cu-n, Mg, Ni, ST)

359-R. Notes on Measurement and Evaluation of Various Modes of Corrosion Damage. F. Prange. Paper from "Short Course

on Process Industry Corrosion, Proceedings". National Assoc. of Corrosion Engineers, Houston 2, Tex., 1960, p. 407-419.

Comparison of modes of corrosion damage, including pitting, liquid level line damage, vapor space damage, weld seam corrosion, corrosion-erosion, blistering, amalgamation, dezincification, hydrogen embrittlement and stress corrosion cracking. (R-general)

360-R. Waterside Corrosion in Steam Plants. Charles J. Schafer. Paper from "Short Course on Process Industry Corrosion, Proceedings". National Assoc. of Corrosion Engineers, Houston 2, Tex., 1960, p. 421-428.

Methods of preventing corrosion of boilers by dissolved oxygen, acids and alkalies contained in the feedwater. (R4c)

361-R. Selection and Proper Use of Stainless Steel for Process Industries. W. G. Renshaw. Paper from "Short Course on Process Industry Corrosion, Proceedings". National Assoc. of Corrosion Engineers, Houston 2, Tex., 1960, p. 429-448.

Mechanisms of intergranular corrosion, pitting and stress corrosion cracking in various stainless steels. Use of inhibition and passivation to prevent corrosion. (R1, R10; SS)

362-R. (German.) Investigation of Corrosion of Reinforcing Steel in Mortar and Concrete of Varying Calcium Chloride Content. Siegfried Reinsdorf. Silikat Technik, v. 11, Oct. 1960, p. 478-483.

Corrosion of 15-10 mm. diameter reinforcing steel rods (ST 37 steel) in mortar or concrete test plates of varying $CaCl_2$ content after storing in wet sand or dry air for 180 days to 5 yr. Influence of CaCl content on corrosion. (R6k; ST)

363-R. (German.) Oxidation of Zirconium at Elevated Temperatures and Structure of Primary Oxide Films. E. S. Sarkisov, N. T. Cebotarev, A. A. Nevzorova and A. I. Zverkov. Kernenergie, v. 2, Oct-Nov. 1960, p. 928-931.

Oxidation of hot rolled, annealed and chemically polished Zr disks in oxygen and water vapor at 150-800° C. at atmospheric pressure and various oxidation times. X-ray diffraction investigation and X-ray analysis to evaluate structure and composition of formed oxides. Oxidation mechanism. (R1h, M22g; Zr)

364-R. (French.) Steels and Refractory Alloys Applied in the Construction of Case Hardening Furnaces. Gilles Pomey. Revue du Nickel, v. 26, Nov-Dec. 1960, p. 147-156.

Composition and structures of Fe-Ni-Cr, Ni-Cr, Cr-Ni-W-Fe, Cr-Ni-Co-Fe, Cr-Fe and Cr-Al-Fe alloys. Corrosion behavior in air, CO_2, CO, H, steam, N, CH_4, C_3H_8 and NH_3 and corrosion structures. 8 ref. (R-general, M27, W27; Fe-b, Co, Cr, Ni, W, ST, 17-57)

365-R. (Russian.) Device for Study of Scale Formation on Molten Steel Surface. L. E. Plotinskiy. Zavodskaya Laboratoriya, Dec. 1960, p. 1422-1424.

Method for determination of scale formation based on principle of increased heat radiation caused by addition of oxidants on the surface of melted steel. Registration of the changes in radiation by apparatus comprising a telescope, thermoelements and a potentiometer. (R1h, 1-54, X9; ST)

366-R. The Corrosion Resistance of Titanium Metal. Atlas Steel News, v. 15, Feb. 1961, p. 7-8.

Oxide film formation and maintenance on Ti as it affects corrosion resistance in oxidizing, neutral and reducing atmosphere. Production of electrically generated films on Ti by anodic treatment. (R-general, L19; Ti)

367-R. Corrosion Problems and Their Treatment. Pt. 6. Corrosion Prevention & Control, v. 3, Feb. 1961, p. 4-8.

Problems of soil corrosion of varied steel structures. Corrosion in new and existing structures. Use of coating and cathodic protection in corrosion control. (R8, R10; ST, 4-57)

368-R. Corrosion Causes Trouble in Instantaneous Water Heaters. Corrosion Prevention & Control, v. 8, Feb. 1961, p. 37-38, 42.

Condensation of sulphuric acid produced by combustion of gas on heat exchanger fins causes corrosion problems. (R6g, W13b)

369-R. Water Supply Causes Attack on Equipment. Corrosion Prevention & Control, v. 8, Feb. 1961, p. 38-39, 42.

Corrosion of iron boilers, galvanized tanks, Cu and Al equipment by supply water. (R4c, T26; Al, Cu, Fe, 17-57)

370-R. Packaging Requires Special Protective Techniques. Corrosion Prevention & Control, v. 8, Feb. 1961, p. 46-47.

Use of grease, oil and other organic films, strippable coatings and vapor phase inhibitors to give temporary corrosion protection. (R10)

371-R. (Translation-ConBur.) Anodic Process Accompanying the Corrosion Cracking of Metals. N. D. Tomashov and N. I. Isaev. Academy of Sciences of the USSR, Proceedings, Physical Chemistry Section, v. 132, May-June 1960, p. 433-436.

Study of corrosion cracking of MA 2-1 Mg alloy in a NaOH solution as affected by electrochemical factors such as anodic polarizability and concentration of anodic zone at the apex of the corrosion crack. (R6j, 9-72; Mg-b)

372-R. (Translation-ConBur.) The Anodic Passivation of Zinc in Alkaline Solutions. T. I. Popova, V. S. Bagotskii and B. N. Kabanov. Academy of Sciences of the USSR, Proceedings, Physical Chemistry Section, v. 132, May-June 1960, p. 445-447.

Effects of polarization, cathodic current density, stirring rate and composition of the solution layer next to the electrode on the passivation of Zn electrodes in KOH solution. (R10c; Zn)

373-R. (Translation-ConBur.) Mechanisms in Protection of Magnesium From Oxidation. M. S. Beletskii and M. I. Erusalimskii. Academy of Sciences of the USSR, Proceedings, Physical Chemistry Section, v. 132, May-June 1960, p. 477-479.

Electron diffraction studies of Mg, Cb and Mg-Cb alloys following pulverization in a vacuum and oxidation by air. Effect of electron shell structure, temperature and exposure time on oxidation rate and film thickness. (R1h; Mg)

374-R. Low-Temperature Reaction in Copper-Oxygen System. U. S. Dept. of Commerce, STR-2556, Feb. 1961, 4 p.

Reaction between Cu surface and oxygen is shown by deposition of a solid film on Cu at 4-40° K. during treatment with partially dissociated oxygen that had been passed through a high-frequency microwave discharge. Measurement of film thickness with ellipsometer. (R1h; Cu)

375-R. Contamination of Titanium by Water Vapour. P. C. Hughes and I. R. Lamborn. Institute of Metals, Journal, v. 89, Jan. 1961, p. 165-168.

Hydrogen contamination of Ti at temperatures to 900° C. and the influence of concurrent oxidation under particular conditions are studied as a function of humidity, temperature and time. Hydrogen contamination in moist, but otherwise inert, atmospheres is negligible below 590° C. The results suggest that in moist oxidizing atmospheres this threshold temperature will be raised. The competing effects of hydrogen and oxygen diffusion on microstructure are examined as a function of surface oxygen concentration, hydrogen partial pressure and temperature. 5 ref. (R1h, Q26s; Ti)

376-R. Atmospheric Corrosion--Fatigue of Age-Hardened Aluminum Alloys. Trevor Broom and Anthony Nicholson. Institute of Metals, Journal, v. 89, Feb. 1961, p. 183-190.

Specimens of Al-4% Cu alloy, a Duralumin-type alloy to B.S. L65 and DTD 683 alloy are fatigued in air, in vacuum and in various gaseous environments at -196 to 20° C. after aging and solution treatment at 135-530° C. and after various surface treatments, including anodizing, chemical oxidizing and coating with Zn chromate and butyl rubber. Accelerated fatigue in the presence of water vapor is observed with crack initiation and growth. The mechanism involves the production of hydrogen ions at clean surfaces exposed by slip and the diffusion of the ions into the metal. 22 ref. (R1e, R3, 2-64; Al-b)

377-R. (English.) Anodic Oxide Films on Titanium. Hiroshi Chiba. Electrochemical Society of Japan, Journal, v. 28, Jan-Mar. 1960, p. E3-E5.

Investigation of relationship between current density during anodization and surface state of resulting oxide film on Ti. Analysis of formed films indicates that higher density effects more rapid changes in microstructure and surface characteristics of formed film. 3 ref. (R1h, L19; Ti)

378-R. Design Considerations for the Reduction of Corrosion of Works Structures

and Equipment. A. J. P. Tucker. South African Mechanical Engineer, v. 10, Jan. 1961, p. 156-164.

Painting, weld sealing and cladding as methods of preventing corrosion of steel foundations, floors and equipment in industrial plants. (R10, L22, L26, K-general; ST, 4-57)

379-R. Corrosion of Copper and Its Alloys in Sea Bittern. A. N. Kappanna and A. Visvesevara Rao. Indian Journal of Applied Chemistry, v. 23, Mar. 1960, p. 117-121.

Corrosion resistance of brass, bronze, phosphor bronze, Monel metal and Cu in aerated sea bittern. 7 ref. (R4b; Cu-b)

380-R. Analytical Procedures for Evaluating High Temperature Failures. W. R. Foley. Metals Engineering Quarterly (American Society for Metals), v. 1, Feb. 1961, p. 90-101.

Use of analytical procedures and the interpretation of results in evaluating elevated temperature failures in power boilers. The procedures are those commonly used in metallurgical laboratories and include visual and macroscopic examination; metallographic examination; analysis of scale and deposit utilizing spectrographic, X-ray and wet chemical techniques and mechanical tests. (R-general, 2-62, T26q)

381-R. (Russian.) Prospective Metals for the Manufacture of Apparatus Used in Intensified Production of Alumina. M. N. Rozov. Tsvetnye Metally, Dec. 1960, p. 28-32.

Review of conditions affecting steel subjected to high temperature corrosion in alkaline alumina baths. Relationship of corrosion rate to alloy composition, bath agitation rate and concentration of Na_2O and NaO. 9 ref. (R6j, R6m, T29; ST, 17-57)

382-R. Timken's Process for Phosphatizing Bearings. Products Finishing, v. 25, Mar. 1961, p. 64-70.

Roll-neck bearings are phosphatized to prevent corrosion while they are being stored prior to use. Phosphatization of the bores of cones on roll-neck bearings reduces scuffing and scoring of roll-necks. (R10g, L14b, T7d)

383-R. Can We Stop Autobody Corrosion. American Machinist/Metalworking Manufacturing, v. 105, Feb. 20, 1961, p. 103-104.

Comparison of 1010 steel, coated stainless steels and Al alloys as to formability and corrosion resistance in automobile body applications. (R-general, Q23q, T21a; Al-b, ST)

384-R. Kinetics and Mechanism of Zinc Dissolution in Acid. R. S. Kapner and H. E. Hoelscher. I/EC (Industrial and Engineering Chemistry), v. 53, Mar. 1961, p. 239-244.

Reaction between dilute acids and packed beds of metal spheres is used to simulate small particle catalytic reactions. (R6g; Zn)

385-R. (Translation-ConBur.) Rate of Solution of Copper in Dilute Solutions of Sulphuric Acid Containing Oxygen and Copper and Iron Sulphates. A. I. Kinevskii. Journal of Applied Chemistry of the USSR, v. 33, Mar. 1960, p. 608-612.

Effectiveness of ferric ion as a cathodic depolarizer during the dissolution of Cu in H_2SO_4 containing O, Cu and ferrous and ferric sulphates. Reaction mechanisms. 10 ref. (R6g; Cu)

386-R. Generalized Rules for Controlling Chemical Process Equipment Corrosion. W. W. Shepard. Corrosion, v. 17, Mar. 1961, p. 18-20.

Methods of controlling liquid-vapor interface corrosion, high or low temperature corrosion, pitting, stress corrosion cracking and hydrogen embrittlement in processing equipment. Use of a punch card system for keeping corrosion data. (R10, T29)

387-R. Influence of Acid and Chloride Concentrations on Corrosion in a Nitric Acid Concentrator. J. B. Lowe. Corrosion, v. 17, Mar. 1961, p. 26-28.

Prevention of corrosion in a concentrator made of 347 stainless steel by use of ozone and electrolytic cells for chloride removal. Rate of corrosion of Hastelloy, Carpenter 20, Ni-O-Nel, Inconel and various stainless steels is compared in liquid and vapor phases of 20-40% nitric acid containing 550-900 ppm. chlorides to determine tolerable chloride concentrations. (R6, R10, T29; Ni-b, SS, 17-57)

388-R. Aluminum Satisfactory to Resist Ammonium Nitrate Corrosion. Corrosion, v. 17, Mar. 1961, p. 28.

Applications of Al, stainless steel and concrete in ammonium nitrate production. Corrosion prevention techniques. (R6j, R10, T29; Al, SS, 17-57)

389-R. Effects of Alternating Currents in Causing Corrosion. F. E. Kulman. Corrosion, v. 17, Mar. 1960, p. 34-35.

Review of investigations on alternating current, electrolytic corrosion of Fe, Pb, Cu, Al and other metals. Effect of electrolyte composition, current density and size and arrangement of electrodes on corrosion rate. Current rectification. (R1a; Al, Cu, Fe, Pb)

390-R. Tin Plated Cans Sprayed With Soluble Oil Formulation Show Increased Rust Resistance. Raymond K. Cohen. Corrosion, v. 17, Mar. 1961, p. 103t.

Emulsion of a soluble oil in water containing a sodium nitrate inhibitor and surface-active agent reduces external corrosion of tin plated cans. (R10; Sn)

391-R. Corrosion of Reinforcing Steel in Concrete in Marine Atmospheres. Howard F. Finley. Corrosion, v. 17, Mar. 1960, p. 104t-108t.

Relation of concrete porosity, permeability, strength, water saturation and electrical resistivity to corrosion rate of reinforcing steel in concrete structures exposed to sea water action. Existence of natural galvanic cells in concrete structures explained in terms of differential oxygen concentration in pour space water. Recommendations for preventing corrosion in new structures and correcting problems in existing structures. 23 ref. (R4b; ST, 4-57)

392-R. Hydrogen Pickup During Aqueous Corrosion of Zirconium Alloys. Warren E. Berry, Dale A. Vaughan and Earl L. White. Corrosion, v. 17, Mar. 1961, p. 109t-117t.

Hydrogen absorption during corrosion of binary Zr alloys containing Ni, Sn, Fe, Cu or Sb and Zircaloy-2 with Sb, As, Bi or Te additions. Effect of alloying elements on hydrogen absorption and corrosion rate. 14 ref. (R4; Zr-b)

393-R. Anodic Polarization of Lead-Platinum Bielectrodes in Chloride Solutions. L. L. Shreir. Corrosion, v. 17, Mar. 1961, p. 118t-124t.

Report on potential-time studies which show the effect of a Pt microelectrode on the behavior of Pb in chloride solutions. Possible applications of Pb-Pt bielectrodes as anodes for cathodic protection purposes. (R6, R10d; Pb)

394-R. Resistance of Aluminum Alloys to Underground Corrosion. D. O. Sprowls and M. E. Carlisle, Jr. Corrosion, v. 17, Mar. 1961, p. 125t-132t.

Summary of field test data and service experience with Al alloys underground showing effect of soil variation on corrosion of pipelines and other structures. Cathodic protection and protective coatings for Al structures. Stray current and galvanic effects. (R8, R10, T26r; Al-b, 17-57)

395-R. Chloride Corrosion and Fouling in Catalytic Reformers With Naphtha Pretreaters. E. B. Backensto and A. N. Yrick. Corrosion, v. 17, Mar. 1961, p. 133t-136t.

Summary of laboratory studies simulating corrosion of carbon steel test specimens in the $HCl-H_2S-NH_3$ system established in catalytic reformers. Effect of pH, air atmosphere and addition of ammonia neutralizers and amine inhibitors on corrosion rate. (R6, R7d, R11; CN)

396-R. Massive De-Aluminization of Aluminum Bronze by Chloride Crevice Attack. L. W. Gleekman and R. K. Swandby. Corrosion, v. 17, Mar. 1961, p. 144t-148t.

Corrosion of Al bronze drying drum by calcium carbonate paste containing 0.2% NaCl and sodium sulphate as minor impurities. Nature of attack. Corrosion testing of 90-10 cupro nickel as material for drying drum. (R1b, R6j; Cu-b, Al, Ni)

397-R. Cathodic Protection and Zinc Grounding in Industrial Plant Construction. J. D. Ghesquiere. Corrosion, v. 17, Mar. 1961, p. 149t-153t.

Design of cathodic protection system. Effect of Cu electrical grounding rods on protection current requirement. Use of Zn rods for grounding purposes. 9 ref. (R-general, 18-71)

398-R. Corrosion of Superalloys by Selected Fused Salts. A. Moskowitz and L. Redmerski. Crucible Steel Co. of America (Wright Air Development Division). U. S.

Office of Technical Services, PB 161848, Mar. 1960, 84 p. $2.25.

Test program involves the application of salts (potassium chloride and lithium fluoride) to thin sheet materials followed by exposure to high temperatures at various stress levels is carried out to determine the severity of corrosive attack on four types of nickel-base alloys and a cobalt-base alloy. Thin coatings of the salts cause severe corrosion of the alloys in air, resulting in accelerated failures of specimens in creep-rupture testing. Only very little corrosion occurs without the presence of oxygen. (R6j; Ni-b, Co-b)

399-R. High-Temperature Oxidation of Iron-Chromium Binary Alloys in Water Vapor. Pt. 1. Preliminary Study of the Mechanism of Iron-Chromium Binary Alloys in Water Vapor. C. T. Fujii and R. A. Meussner. U. S. Naval Research Laboratory. U. S. Office of Technical Services, PB 161696, Sept. 1960, 24 p. $.75.

Correlations between chromium concentration of the alloy, temperature oxidation, weight gain, oxide composition and the microstructure of the oxide layers; and a possible mechanism for the oxidation process. (R1h; Fe-b, Cr)

400-R. Corrosion of Metals in Tropical Environments. Pt. 5. Stainless Steels. B. W. Forgeson. U. S. Naval Research Laboratory. U. S. Office of Technical Services, PB 161749, Sept. 1960, 19 p. $.75.

Over an eight year period, specimens of six stainless steels were exposed to underwater and atmospheric environments. In the underwater phase of the study, the steels were severely pitted during sea water immersion. Mean tide immersion produced 1/4-1/10 the pitting of continuous immersion. After submersion in fresh water, the metals show practically no pitting attack. It is suggested that greater pitting attack in tropical than in temperate seas may be the result of heavy marine fouling. (R3s, R4b; SS)

401-R. Corrosion Inspection Methods in Practice. Herbert C. Van Nouhuys. American Gas Journal, v. 188, Mar. 1961, p. 29-33.

Review of corrosion detection methods for underground pipelines. Description of equipment and techniques used to measure soil resistivity, pipe to soil potentials, pipe current density and soil oxidation-reduction potentials. Prevention of corrosion by cathodic protection and pipeline coatings. 29 ref. (R8, R10, T26r)

402-R. (German.) Combustion of Iron Wire in Oxygen at High Pressures. Leonhard Kirschfeld. Archiv fur das Eisenhuttenwesen, v. 32, Jan. 1961, p. 57-62.

Combustion of Fe wire (1 and 2 mm. diameter) in a pressure bomb under static oxygen atmosphere of 1-100 atm. pressure. Measurement of combustion rate as influenced by wire diameter and oxygen pressure. Reaction mechanisms. (R1h; Fe, 4-61)

403-R. The Prevention of Silver Tarnishing. Heinz W. Dettner. Plating, v. 48, Mar. 1961, p. 285-287.

Tarnishing is prevented by electrolytic treatment, using either cataphoretic deposition of an oxide layer or electrolytic chromating. 11 ref. (R10; Ag)

404-R. (French.) Aqueous Corrosion of Stainless Steel. Pt. 1. L. Colombier. Metallurgie et la Construction Mecanique, v. 93, Jan. 1961, p. 29-39.

Intergranular pitting and strain corrosion caused by action of aqueous solutions containing hypochlorous acid or the chlorides of Hg, Fe, Cu, Sn, Mn or Cr on martensitic, ferritic and austenitic stainless steels. (R2j, R4, R6; SS)

405-R. (French.) Corrosion by Uranium Hexafluoride. Pt. 1. Methods for Studying Corrosion. J. Dixmier, R. Hasson, S. Maraval and L. M. Vincent. Journal of Nuclear Materials, v. 3, Jan. 1961, p. 41-59.

Review of continuous and discontinuous methods for measuring corrosion reactions and the nature of the base metal and corrosion product, including electrochemical, mechanical and chemical assessment, radioactive tracer study; micro and macrosurface examination, electrical resistance measurements and thermo and microbalance, manometric and gravimetric techniques. Application of gravimetry to the study of the gas-metal corrosion reaction of steel and alloy specimens with UF_6. 23 ref. (R6p, S11, 1-54, 10-54; ST, U, 14-68)

406-R. Atmospheric Corrosion of Metals. Pt. 3. Corrosion of Metals in Calcutta. B. Sanyal, B. K. Das Gupta, P. V. S. Krishnamurthy and G. K. Singhania. Journal of

Scientific & Industrial Research (India), v. 20D, Jan. 1961, p. 27-30.

The rates of corrosion of mild steel and Zn under outdoor and indoor conditions in industrial atmospheres. 3 ref. (R3n; CN, Zn)

407-R. Cathodic Protection for Old Pipe Line Systems. O. E. Moore. Pipe Line News, v. 33, Mar. 1961, p. 18-19, 22, 70.

Survey of corrosion mechanisms, galvanic cells and electrolytic action. Application of cathodic protection to coated and/or uncoated steel pipe lines. (R10d, R-general, T26p; ST)

408-R. Pipe Line News Annual Symposium on Pipe Line Corrosion Problems. George B. McComb. Pipe Line News, v. 33, Mar. 1961, p. 24-26.

Performance requirements of coating systems such as bond, electrical insulation, moisture penetration, resistance to attack by soil micro-organisms, insolubility, soil stress and hot line enamels. (R-general, T26q)

409-R. (Italian.) Theoretical Interpretation of Action of Organic Corrosion Inhibitors. Sergio Ferrari. Rivista di Ingegneria, Oct. 1960, p. 1112-1116.

Mechanism of corrosion inhibition by amines, by compounds containing sulphur and by aldehydes and ketones. Role of supertension, anodic or cathodic action of inhibitors, adsorption capacity, the ortho-effect and the effect of the double bond. 11 ref. (R10b, R10d)

410-R. (German.) Wear Abatement by Corrosion Protection. Bergbautechnik, v. 11, Jan. 1961, p. 20-26.

Review of corrosion in terms of uniform and bi-metal corrosion; corrosion by vagabond currents, by local elements and by simultaneous chemical and mechanical effects; and corrosion protection by proper material selection, coating, derusting and descaling operations, such as mechanical and flame derusting, and chemical reactions. Composition and structure of protective lacquers and plastic and electrolytic coatings. (R-general, 10-54)

411-R. The Effect of Metallic Cations on the Corrosion of Iron and Tin in Boiling Acids. W. Roger Buck, III, and Henry Seidheiser, Jr. Electrochemical Society, Journal, v. 108, Mar. 1961, p. 203-208.

In the presence of metallic cations in both boiling citric acid and hydrochloric acid the corrosion rate of Sn is apparently determined solely by the cathodic hydrogen evolution reaction. The corrosion rate of Fe in boiling citric acid depends upon the cation present. External coupling also influences the corrosion rates. 12 ref. (R1a, R6g, R7b; Fe, Sn)

412-R. Oxidation of Iron-Nickel Alloys. Pt. 4. Further Electron Diffraction Studies at Elevated Temperatures. R. T. Foley. Electrochemical Society, Journal, v. 108, Mar. 1961, p. 216-221.

The oxide films formed on Fe-Ni alloys containing 30, 41, 78 (3.8% Mo) and 80% Ni are studied at formation temperature to 1000° C. with reflection electron diffraction. Structures, lattice spacings, transformations and oxidation kinetics are observed as a function of temperature, presence of moisture at the oxide metal interface and composition, with consideration of possible temperature distortion of the diffraction pattern. 24 ref. (R1h, M22h, 2-60, 2-62; Fe-b, Ni-b)

413-R. Anodic Behavior of Austenitic Stainless Steels and Susceptibility to Stress Corrosion Cracking. S. Barnartt and D. van Rooyen. Electrochemical Society, Journal, v. 108, Mar. 1961, p. 222-229.

Anodic behavior of 16Cr-20Ni stainless steel, unsusceptible to stress corrosion cracking, is compared with that of a susceptible 18Cr-8Ni stainless in 42% $MgCl_2$ at 146° C. Potential-time behavior of pure Fe, Cr and Ni is also determined, with potentiostatic corrosion found to provide an accelerated test for susceptibility to cracking. 29 ref. (R-general, R1d, Q26s, 2-60; SS-e)

414-R. Effect of Dissolved Gases on Oxide Film Formation. J. J. Polling. Electrochemical Society, Journal, v. 108, Mar. 1961, p. 294-296.

Effects of oxygen and nitrogen in Zr on the color, thickness and potential barrier of the oxide film formed by anodization. 5 ref. (R1h, N15; Zr, O, N)

415-R. Corrosion Protection of Magnesium in Electronic Equipment. Harold Shapiro. Metal Finishing, v. 59, Mar. 1961, p. 40-45, 48.

Corrosion problems in assemblies of dissimilar metals. Immersion and electrochemical methods of protecting Mg against electrolytic corrosion. Electroplating of Mg; and limitations of plating as a protection against corrosion. Application of organic coatings for corrosion prevention. (R-general, R10, L-general, L17; Mg)

416-R. Material Study Relative to Corrosion. Paul F. Marx. Gas, v. 37, Mar. 1961, p. 83-86.

Galvanic action between alloy steels and carbon steel or malleable iron. Design of couplings to balance cathodic effect of materials against relative areas of various parts, so that materials having smallest area are cathodically protected by parts having large areas subjected to corrosion. (R1a, R10d; AY, CI-s, CN)

417-R. (Japanese.) 17-7 PH Stainless Steel. Pt. 5. Corrosion Resistance of Heat Treated 17-7 PH Stainless Steel Containing About 1% Al. To-oru Furukawa and Tomo-o Sato. Japan Institute of Metals, Journal, v. 25, Jan. 1961, p. 23-26.

Specimens of 17% Cr-7% Ni stainless containing 0.93% Al are corrosion tested in 10% H_2SO_4 (30° C.) and 40% HNO_3 (boiling) solutions after solution treatment at 1050°, cooling from 750-800° C. in water and air and aging at 400-500° C. for 0.5-500 hr. Corrosion resistance and passivity are compared favorably to 18-8 stainless as a result of heat treatments. 16 ref. (R-general, R6g, 2-60, 2-64; SS-e, Al)

418-R. (Japanese.) The Surface States of Tungsten Powder. Pt. 4. Oxidation Rate in O_2 Gas and X-Ray Line Broadening of Tungsten Powder. Shigetoshi Takayanagi. Japan Institute of Metals, Journal, v. 25, Jan. 1961, p. 44-48.

Effect of crystallite size and lattice distortion and imperfections on the line broadening phenomena as a function of oxidation rate, compacting pressure and heating time at 400-700° C. in H_2 and O_2 atmospheres. 14 ref. (R1h, M22, 3-73; W, 6)

419-R. (Japanese.) Corrosion of Aluminum in Deionized Water at Elevated Temperatures. Factors Affecting Intergranular Corrosion of Pure Aluminum. Pt. 1. Masayuki Kawasaki, Sueo Nomura and Tatsuo Kondo. Japan Institute of Metals, Journal, v. 25, Jan. 1961, p. 76-79.

Annealed and cold worked 99-99.99% pure specimens are examined in static autoclave tests in O, H and Ar atmospheres at 200° C. for 10-60 hr. Effect of specimen purity and grain size, pH of water and interaction of atmosphere and plastic deformation induced slip defects on weight gain and corrosion attack mechanism. 11 ref. (R4e, R2h, 2-60, 2-62, 3-68; Al-a)

420-R. (Japanese.) Corrosion of Aluminum in Deionized Water at Elevated Temperatures. Effect of Alloy Additions. Pt. 2. Masayuki Kawasaki, Tatsuo Kondo and Sueo Nomura. Japan Institute of Metals, Journal, v. 25, Jan. 1961, p. 80-83.

Binary Al alloys, containing 6.5-2% Fe or Ni, 1-2% Cu or 1% Zn, Mg or Mn, in ingot and sheet form, are examined by autoclave tests at 200-300° C. for 5 min. to 290 hr., with X-ray diffraction and metallographic examination of corroded surfaces. Weight gain and intergranular corrosion mechanisms are determined as a function of composition. 13 ref. (R4e, R2h, M-general, 2-60, 2-62; Al-b, Fe, Ni, Cu, Zn, Mg, Mn)

421-R. Stop Galvanic Corrosion. Federico Strasser. Product Engineering, v. 32, Feb. 20, 1961, p. 87, 89.

Survey of five methods for reduction of galvanic corrosion including use of metals near each other in the galvanic series, waterproofing, insulating, dividing potential difference and protection with sacrificial anodes. (R1a, R10)

422-R. Stress Corrosion of Steels for Aircraft and Missiles. E. H. Phelps and A. W. Loginow. Paper from "High-Strength Steels for the Missile Industry". American Society for Metals, Novelty, Ohio, 1961, p. 40-78.

Very high strength alloys hardened by heat treatment, like many nonferrous alloys used in conventional aircraft, are under certain conditions susceptible to atmospheric stress-corrosion cracking. Tempering at temperatures of 1100° F. or above confers resistance to stress corrosion. Austenitic stainless steels hardened to very high strength levels by cold working are not susceptible. Protective coatings that are anodic to steel appear to be very effective in preventing stress corrosion. (R1d, T24e; SS-e)

423-R. Scale on Wire Rod and Its Removal by Mechanical Means. Pt. 1. The Formation and Structure of Scale on Wire Rod. S. Garber and G. M. Sturgeon. Wire Industry, v. 28, Mar. 1961, p. 257-259, 295.

The oxide scale formed on carbon steel rod after heating is found to be composed of three layers, wustite, magnetite and hematite. The kinetics of oxidation are influenced by the finishing temperature and subsequent cooling rate. 23 ref. (R1h, 2-64, 9-52; CN, 4-53)

424-R. Corrosion Problems in the Railway Industry. T. Henry Turner. Corrosion Prevention & Control, v. 8, Mar. 1961, p. 37-45.

Corrosion of steel and Fe (containing small amounts of Zn, Cu, Pb, Sn, Ni, Cr and Al) railway equipment is caused by air pollution, atmospheric conditions, rainfall, chemicals and other factors. Suggested corrosion prevention treatments included painting, enameling, galvanizing, tinning and varnishing. 21 ref. (R-general, L-general, T23; ST, Fe-b, 17-57)

425-R. (Translation-ConBur.) Kinetics of Oxidation of Fine Magnesium Powders at Elevated Temperatures. I. A. Makolkin, I. I. Vernidub, Yu. N. Zhvanko, V. T. Karpov, G. S. Razumovskaya and A. A. Vol'khovskaya. Journal of Applied Chemistry of the USSR, v. 33, Apr. 1960, p. 826-832.

Kinetics study of the reactions between Mg powders and air, oxygen and nitrogen at 350-500° C. shows that up to 450° C. the surface film of MgO and Mg_3N_2 has protective properties. 11 ref. (R1h; Mg, 6)

426-R. (Translation-ConBur.) Transition From Uniform to Pitting Corrosion in High-Temperature Oxidation of a Metal Under Cyclic Stress. E. L. Kazimirovskaya and A. V. Ryabchenkov. Journal of Applied Chemistry of the USSR, v. 33, Apr. 1960, p. 843-846.

Study of corrosion in heat resistant austenitic steels under cyclic stress at 750° C. in dry and moist air containing SO_2. 3 ref. (R1h, R3n; SS-e)

427-R. Investigations Carried Out on the Corrosion of Lead Vats. Martin Buch. Wire World International, v. 2, Dec. 1960, p. 289-292.

Steel sheet specimens are annealed in Pb baths at 932 and 1328° F. for 3-16 hr. to determine corrosion losses and the influence of the annealing time and temperature on the useful life of Pb containing steel vats used in the annealing of drawn wire. (R-general, R6m, T28n, 2-61; ST, Pb, 17-57)

428-R. Corrosion of Austenitic Stainless Steel in CO_2. Metal Industry, v. 98, Mar. 10, 1961, p. 187.

X-ray diffraction examination of the oxide coating formed on vapor blasted and etched 18-8 Ti stainless steel exposed to CO_2 to determine the extent of oxidation of stainless steel cladding materials in nuclear reactors using CO_2 as coolant. Prior surface condition of the specimen is found to influence the nature and composition of the oxide and the rate of corrosion. (R1h, M22g, T11g; SS, 17-57)

429-R. Easy-to-Apply Resin Coatings Block Corrosive Attacks. Iron Age, v. 187, Apr. 13, 1961, p. 92-93.

Use of resin coatings which harden by chemical action to protect metal, concrete and wood surfaces from corrosion. (R10g)

430-R. Gases in Steel (Corrosion of an Iron Alloy Containing 25% Chromium and 3% Aluminum by a Melt Containing Oxides of Vanadium and Sodium). A. J. Pollard and A. J. Edwards. Report of NRL (Naval Research Laboratory) Progress, Mar. 1961, p. 26-27. (Available as PB 171316 from U. S. Office of Technical Services, Washington 25, D. C.) $1.25.

Corrosion rates measured by weight and diameter changes of cylindrical specimens suspended in molten 90% vanadium pentoxide-10% sodium sulphate solution at 1500-1850° F. for various times. (R6j, R6m, 2-62; Fe-b, Cr, Al)

431-R. Gases in Steel (High-Temperature Oxidation of Iron-Nickel Binary Alloys in Water Vapor). C. T. Fujii and R. A. Meussner. Report of NRL (Naval Research Laboratory) Progress, Mar. 1961, p. 28-29. (Available as PB 171316 from U. S. Office of Technical Services, Washington 25, D. C.) $1.25.

Oxidation rates for 10-25% Ni-Fe specimen exposed 9 hr. at 1100° C. in

an atmosphere containing 10% H_2O, with X-ray diffraction and metallographic data for wustite, magnetite and spinel structure of the oxide layers. Comparison with Fe and a Fe-Cr alloy. (R1h, M-general, 2-62; Fe-b, Ni, Cr)

432-R. Physical Metallurgy of Refractory Metals (Oxidation of Niobium-Titanium Alloys). J. Stoop. Report of NRL (Naval Research Laboratory) Progress, Mar. 1961, p. 32-33. (Available as PB 171316 from U. S. Office of Technical Services, Washington 25, D. C.) $1.25.

Cb-Ti alloys, containing 65-100% Ti, are produced by vacuum consumable electrodes arc melting, forged, hot and cold worked and oxidized in air at 1985° C. for various times. Oxidation rate is measured by weight gain as a function of Ti concentration and temperature. (R1h, 2-60, 2-61; Cb-b, Ti-b)

433-R. (Pamphlet.) The Role of Copper and Physico-Chemical Factors in Steam Generator Tube Failures. J. P. Engle and C. E. Fox. Dow Industrial Service. Div. of Dow Chemical Co., Cleveland, Ohio, 8 p.

Paper presented Apr. 22, 1958, at meeting of the Production Committee, Southeastern Electric Exchange. Influence of the presence of Cu, suspended solids, interior tube projections, surface imperfections and differential thermal cells on localized deposition in boiler tubes causing overheating. Methods for prevention of Cu plating onto the steel tubes from acid solutions by using an additive. 3 ref. (R-general, 9-73, T26q)

434-R. Solving Corrosion Problems in HF Alkylation Units. G. W. G. McDonald and D. J. Bergman. Corrosion, v. 17, Apr. 1961, p. 9-10, 12-13.

Evaluation of Monel, various steels, Ag, Duranickel and other metals used in valves, bolts and exchangers for HF alkylation units. (R6g, T29; Ag, Ni-b, ST, 17-57)

435-R. Evaluation of Some Materials and Coatings for Utility Pole Line Hardware. John S. Melvin. Corrosion, v. 17, Apr. 1961, p. 14-15, 18-19.

Evaluation of Al, stainless steel and high-strength low-alloy steels for use as corrosion resistant coatings on utility pole hardware. Factors considered include corrosion resistance, adaptability and compatibility. (R3; Al, AY, SS)

436-R. Composition of Corrosion Products Formed on Metals in Steam Condensate. C. E. Imhoff, R. D. Eberhardt and E. W. Arneson. Corrosion, v. 17, Apr. 1961, p. 95.

Study of corrosion products formed in steam condensates of pH 5.1-9.6 on carbon steel, cast iron, Admiralty metal, Muntz metal, Al 3S and Zn at 100 and 212° F. 7 ref. (R4d; Al-b, CN, Cu-b, Fe, Zn)

437-R. Corrosion of Metals by Weak Acids Under Heat Transfer Conditions. L. R. Scharfstein, N. D. Groves and C. M. Eisenbrown. Corrosion, v. 17, Apr. 1961, p. 97-100.

Weight-loss measurements are made on 304 L and 316 stainless steels, Carpenter 20-Cb, Hastelloy B, Inconel and Monel in solutions of 10%, 50% and concentrated acetic acid, formic acid and phosphoric acid. (R6g; Cb-b, Ni-b, SS)

438-R. Aluminum Aluminized Steel and Galvanized Steel in Seven Coastal Environments. Thomas A. Lowe. Corrosion, v. 17, Apr. 1961, p. 101-104.

Al, aluminized steel and galvanized steel pole line hardware are exposed in a severe marine environment for three years. Variables include aluminizing process and type of base steel. (R3p; Al, ST, 8-65)

439-R. Corrosion Product Films Formed on Aluminum in High Temperature Water. D. F. MacLennan. Corrosion, v. 17, Apr. 1961, p. 105-108.

Corrosion products formed on Al alloys following exposure to 300° C. high-purity water for short periods of time are examined by optical and electron microscopy. 5 ref. (R4, M21; Al)

440-R. Elevated Temperature Corrosion of Type 310 Stainless Steel by Vanadium Compounds. Hugh L. Logan. Corrosion, v. 17, Apr. 1961, p. 109-111.

Seamless 310 stainless steel tubes are used as containers for synthetic ash mixtures to determine corrosion rate in wet and dry air or He atmospheres at 1700-2000° F. for 6-200 hr. (R6, R7d; SS, 4-60)

441-R. Investigation of Mild Steel Corrosion Rate in San Diego Harbor. M. H. Peterson and L. N. Waldron. Corrosion, v. 17, Apr. 1961, p. 112-114.

Mild steel panels are immersed for 6-8 month periods to determine the basic corrosion rate from measurements of weight loss and degree of pitting. Tables compare corrosion rate for unprotected panels and for those protected cathodically. (R4b; CN)

442-R. Behavior of Stainless Steels and Other Engineering Alloys in Hot Ammonia Atmospheres. J. K. Mihalisin, E. N. Skinner and J. J. Moran. Corrosion, v. 17, Apr. 1961, p. 115-119.

Monel, Inconel, 37Ni/20Cr, 60Ni/15Cr, 80Ni/20Cr, 11 steels and a 99.49% pure Ni are tested in an ammonia converter and in a chemical plant ammonia line to determine corrosion resistance. 12 ref. (R6j; Ni-b, ST)

443-R. Intergranular Corrosion of Commercially Pure Zirconium. R. S. Payne and D. K. Priest. Corrosion, v. 17, Apr. 1961, p. 120-124.

Selective corrosion during service in hot HCl has been noted in the heat affected zone of a fabricated Zr weldment. The attack is found to be intergranular in nature and associated with a precipitated phase in the grain boundaries. Methods of prevention include using high-purity Zr and heating the weldment to 1800° F. and water quenching. 11 ref. (R2h, R6g; Zr, 7-51)

444-R. (German.) Development of Alloys Resistant to Fluoride Melts. Chemische Rundschau, v. 14, Feb. 1, 1961, p. 45-46.

Review of corrosion mechanism acting on Cr in fluoride melts (NaF-LiF-KF-UF_4; NaF-ZrF_4-UF_4) and corrosion behavior of NiMo and CrNiMo alloys at temperatures to 980° C. Development of a corrosion resistant INOR-8 alloy (15-18% Mo, 6-8% Ni, maximum 5% Fe) as material for fluoride melt containers. Mechanical properties, weldability and solderability of the alloy. (R6k, 2-62, A-general, Q-general; Fe-b, Ni-b, Mo, Cr)

445-R. (German.) Nonmetallic, Organic Materials as Corrosion Resistant Coatings. Hubert Salmen. Praktische Chemie, v. 11, Dec. 1960, p. 503-506.

Review of properties of corrosion resistant plastic coatings (low melting plastics and heat resistant hardenable plastics) used to protect unalloyed steel from external corrosion, alloyed steel from intercrystalline corrosion, brass parts from fresh and sea water corrosion and steel parts in atomic reactors from radiation defects. Correlation between water vapor diffusion through plastic coating and thermal conductivity. (R10g; AY, Cu-b, ST, 8-70)

446-R. Corrosion Protection With Nickel-Base Hardsurfacing Alloys. G. R. Bell. Corrosion Technology, v. 8, Mar. 1961, p. 65-70, 76.

Application of Ni-Cr alloys to steel parts to increase operating efficiency and protect parts against corrosion and atmospheric and high-temperature oxidation. Coatings are applied by spraying and fusing. (R10, L24; ST, Cr-b, Ni-b)

447-R. Corrosion at Carbon-Metal Contacts. T. K. Ross and A. H. Morseshedian. Institution of Chemical Engineers, Transactions, v. 38, 1960, p. 43-45.

Corrosion tests on carbon surfaces in aerated systems show that the surfaces adopt a cathodic role towards the test materials which include Fe, Ni and Cu alloys. The effect of the aeration rate on the corrosion is determined from weight loss measurements. 11 ref. (R6q; Cu-b, Fe-b, Ni-b)

448-R. (French.) Method for Improving the Resistance of Combined Ni-Cr Deposits to Atmospheric Corrosion. H. Brown and D. R. Millage. Galvano, v. 30, Jan. 1961, p. 23.

Resistance of Ni-Cr, Ni-Cu-Cr, Ni-Cu-Cr-Cr and Cr-Ni-Cr electroplating deposits to corrosion examined by exposure to SO_2, Cu chloride and by salt spray and Corrodkote tests. Determination of ductility. (R-general, R11; Ni-b, Cr-b, Cu)

449-R. (French.) Resistance to Corrosion of Ornamental Coatings on Zinc Alloy Castings. O. J. Jones, V. E. Carter and J. Edwards. Galvano, v. 30, Jan. 1961, p. 24.

Effect of casting defects, of increased thickness of the Cr coat and replacement of the Cu subcoat by a Ni deposit on the corrosion resistance of Zn alloys. (R-general, L17c; Zn, 5, Cu, Cr, Ni, 8-62)

450-R. (Czech.) Scale Formation in the Heating of Steel. V. Hasek. Strojirenstvi, v. 10, Dec. 1960, p. 916-919.

The carbon steels 12050 W6H and 12061 W5H and the low-alloy steels 14220 CE2 and 15260 CV4 are held at 1100-1290° C. for 0-60 min. to determine the weight increase by oxidation as a function of time. Microhardness and microstructure of the scale formed. 9 ref. (R1h; ST)

451-R. (French.) Oxidation of Zinc at High Temperatures. Oxidation Kinetics of Zinc in an Atmosphere of Oxygen and of Carbon Dioxide. I. G. Murgulescu and D. Cismaru. Journal de Chimie Physique et de Physico-Chimie Biologique, v. 58, Feb. 1961, p. 181-185.

Oxidation of Zn at 370-400° C. in an atmosphere of oxygen or of CO_2 at normal pressure. Effect of partial oxygen pressure on oxidation rate. 12 ref. (R1h; Zn)

452-R. (French.) Corrosion Control. F. Criqui. Atomes, no. 174, 1960, p. 51-55.

Application of antibiotics, anodic and cathodic inhibitors and fatty amines in corrosion control. (R10)

453-R. Resistance of Tinplate to Rust and Corrosion. Australasian Manufacturer, v. 45, Mar. 11, 1961, p. 84-89.

Discussion of corrosion processes inside tin plated steel cans with plain or lacquered surfaces. (R1h, R7n; ST, Sn, 8-62)

454-R. Oxidation Studies on Ni-Al Alloys. Kazuo Fueki and Hirotsusu Ishibashi. Electrochemical Society, Journal, v. 108, Apr. 1961, p. 306-311.

Air oxidation rates of Ni, 1-12% Al alloys at 700-1000° C. follow the parabolic rate law. Oxidation rate, crystal structure of the oxide film and alloy surface and chemical composition of the oxide film vary with temperature and alloy composition. These data are compared with those obtained from the oxidation of an Fe-15% Al alloy. 13 ref. (R1h; Ni-b, Al)

455-R. The Permeability of Aluminum to Hydrogen. C. N. Cochran. Electrochemical Society, Journal, v. 108, Apr. 1961, p. 317-321.

Permeability constant for hydrogen in Al and in Al-1% Ni is sensitive to temperature, surface films formed by water, chemical and metal additions and to the degree of ionization of the hydrogen. 13 ref. (R4; Al-b, Ni)

456-R. Oxidation of High-Purity Aluminum and 5052 Aluminum-Magnesium Alloy at Elevated Temperatures. C. N. Cochran and W. C. Sleppy. Electrochemical Society, Journal, v. 108, Apr. 1961, p. 322-327.

Oxidation of chemically polished high-purity Al in dry oxygen, water vapor and moist air at 450-640° C. is nearly linear to a weight gain of 3 micrograms per sq. cm., then decreases rapidly. Oxidation of the Mg alloy is much faster. Surface roughness and the presence of water affect the rate. The Al oxidized to eta-alumina and the alloy to MgO. 13 ref. (R1h; Al-b, Mg)

457-R. Critical pH and Critical Current Density for Passivity in Metals. Herbert H. Uhlig. Electrochemical Society, Journal, v. 108, Apr. 1961, p. 327-330.

An equation is derived relating pH to the critical current density necessary to passivate metals. Conditions under which passivation occurs are discussed and related to results predicted by the equation. 15 ref. (R10c)

458-R. Electrochemical Measurements of Corrosion Rates on Zirconium and Zircaloy-2 at Elevated Temperatures. A. L. Bacarella. Electrochemical Society, Journal, v. 108, Apr. 1961, p. 331-336.

Electrochemical measurements on Zr and Zircaloy-2 in highly oxygenated, dilute sulphuric acid at 167 and 208° C. provide data which are used to calculate corrosion rates. 14 ref. (R6g; Zr-b)

459-R. Anodic Polarization Behavior of Iron-Nickel Alloys in Sulphuric Acid Solutions. George Economy, Rudolph Speiser, F. H. Beck and M. G. Fontana. Electrochemical Society, Journal, v. 108, Apr. 1961, p. 337-343.

The anodic behavior of Fe-Ni alloys containing 0-100% Ni in H_2SO_4 under constant current and constant potential is correlated with metallurgical structure and electrochemical environment. In general, the behavior of the alloys is intermediate to that of pure Fe and Ni. 18 ref. (R6g; Fe-b, Ni-b)

460-R. An Investigation of Columbium as an Electrolytic Capacitor Metal. A. Shtasel

and H. T. Knight. Electrochemical Society, Journal, v. 108, Apr. 1961, p. 343-347.

Anodic oxidation characteristics of Cb metal are determined. Both wet and solid capacitors of Cb are similar to those of Ta except that working voltages of Cb capacitors are about 1/3 and d-c. leakage about double those of Ta and are less affected by severe radiation. 6 ref. (R1h, P15; Cb, Ta)

461-R. Mechanism of the Oxidation of Nickel and Chromium Alloys. D. V. Ignatov and R. D. Shamgunova. NASA Technical Translation F-59, Mar. 1961, 104 p. (Available from National Aeronautics and Space Administration, Washington, D. C.) $2.50.

Gravimetric analysis, electron diffraction analysis, X-ray diffraction and metallographic analysis using an electron microscope of Cr, Ni, NiCr alloy and NiCrTi alloy at 400-1050° C. to determine the mechanism of oxide formation, oxidation kinetics and the effect of temperature and heating time on the structure and composition of oxide films. 117 ref. (R1h, M22, S11b; Cr-b, Ni-b, Al, Ti)

462-R. The Corrosion Resistance of Some Sprayed Metallic Coatings. T. K. Ross and E. L. Smith. British Chemical Engineering, v. 6, Mar. 1961, p. 172-175.

Sprayed coatings of Zn, Mg or Al on mild steel reduce the corrosion of the steel by two mechanisms--cathodic protection and pore blocking. 10 ref. (R-general; CN, Al, Mg, Zn, 8-67)

463-R. (Swedish.) Effect of Acidity on Stress Corrosion of Brass. Einar Mattson. Teknilisen Kemian Aikakauslehti, v. 17, Dec. 31, 1960, p. 848-849.

Alpha brass containing 37.2% Zn is exposed to a bending load while immersed in an ammoniacal $CuSO_4$ solution the acidity of which is varied from 2-11.2 pH by addition of $(NH_4)_2SO_4$ or NH_3, respectively. Time elapsed until failure as a function of acidity. (R1d; Cu-n)

464-R. Stress Corrosion in Brass Considered Against the Background of Potential/pH Diagrams. E. Mattisson. Electrochimica Acta, v. 3, Jan. 1961, p. 279-291.

Study of stress corrosion in brass (62.8% Cu, 37.2% Zn) in ammoniacal $CuSO_4$ solution. Corrosion behavior and corrosive medium composition are related with reference to potential pH diagrams for the corroding system. Time to cracking is found to be dependent on pH and Cu $(NH_3)_2$ + ion formation is an important factor in reduction reaction. 10 ref. (R1d; Cu-n)

465-R. How Temperature, Velocity of Potable Water Affect Corrosion of Copper and Its Alloys. Laurence L. Quill and Malvern F. Obrecht. Heating, Piping and Air Conditioning, v. 33, Apr. 1961, p. 129-133.

Testing the erosive-corrosive effects of water in Cu and Cu alloy distribution systems. Findings are focused on the influence of temperature and velocity factors, chemical action and character of corrosion. (R4; Cu-b)

466-R. Battle Corrosive SO_2 at 2280° F. Chemical Processing, v. 24, Apr. 1961, p. 86-88.

Application of stainless steel castings in pipe lines carrying hot, corrosive SO_2 from a sulphur burner to a cooling pond at 2280° F. Data are given for short and long time tensile and creep properties and corrosion resistance of the alloy. (R6, Q27, Q3, T26r; SS, 5, 17-57)

467-R. Some Studies of Corrosion in Liquid Metal. H. M. Finniston. Paper from "Australian Atomic Energy Symposium". Melbourne University Press, Melbourne, Australia, 1958, p. 189-196.

Investigation of liquid metal corrosion processes including solution (atom transfer), isothermal and thermal gradient mass transfer and the kinetics of crystallization. Metals included are Cu alloys, liquid Bi, Pb and CrMo steel. (R-general; Bi, Cu-b, Pb, ST)

468-R. Current Status of Alkaline Digester Corrosion as Reported by Regional Digester Group. Jacob B. Morrison, H. M. Canavan and Zane S. Blanchard. Tappi (Technical Assoc. of the Pulp and Paper Industry), v. 44, Mar. 1961, p. 169A-171A.

Summary and evaluation of corrosion data from 22 pulp and paper mills for digesters using 206 carbon steel, stainless steel and Inconel as construction materials, including reports on use of stainless steel. Overlay welding in critical areas of the equipment. (R6j, L24, T29r; CN, SS, Ni-b, 17-57)

469-R. (French.) Oxidation of Uranium in Carbon Dioxide at High Temperature. J. Paidassi, M. L. Pointud, R. Caillat and R. Darras. Journal of Nuclear Materials, v. 3, Feb. 1961, p. 162-174.

Specimens of mechanically polished reactor grade uranium ore treated at 100-700° C. in CO_2 with oxidation being followed simultaneously by gravimetry (using an Eyraud thermobalance) and by micrography. Oxide nuclei growth, blistering and cracking of the thin films formed and plastic deformation of the specimen are determined as a function of temperature and purity of the CO_2. 18 ref. (R1h, 2-62, 2-66; U-a)

470-R. The High Temperature Oxidation of Beryllium. Pt. 3. In Carbon Dioxide, Carbon Monoxide and Carbon Monoxide-Carbon Dioxide Mixtures. S. J. Gregg, R. J. Hussey and W. B. Jepson. Journal of Nuclear Materials, v. 3, Feb. 1961, p. 175-189.

The kinetics of the oxidation reaction of electrolytic flake specimens are measured at 500-750° C. by gravimetry and metallographic methods. 8 ref. (R1h, M-general, 2-62, 2-66; Be)

471-R. The High Temperature Oxidation of Beryllium. Pt. 4. In Water Vapor and in Moist Oxygen. D. W. Aylmore, S. J. Gregg and W. B. Jepson. Journal of Nuclear Materials, v. 3, Feb. 1961, p. 190-200.

The kinetics of the oxidation of electrolytic flake specimens are investigated at 500-750° C. by gravimetric and metallographic methods. 21 ref. (R1h, M-general, 2-62, 2-66; Be)

472-R. Atmospheric Corrosion Tests of Several Delta-Phase Alloys of Plutonium. J. T. Waber, W. M. Olson and R. B. Roof, Jr. Journal of Nuclear Materials, v. 3, Feb. 1961, p. 201-215.

Oxidation of delta-phase, binary Pu alloys containing small additions of Al, Ce, Hf, Zn and Zr is at 75° C. in moist air. Thermochemical and thermodynamics data are given for oxide phase formation. 37 ref. (R1h, R3, P12, P13, 2-60; Pu-b)

473-R. The Compatibility of Beryllium and Uranium Dioxide. A. G. Knapton and K. B. C. West. Journal of Nuclear Materials, v. 3, Feb. 1961, p. 239-240.

Metallographic examination and microhardness measurement of the reaction products of specimen couples of Be with UO_2, U, Fe, Ni or stainless steel heated at 500-1000° C. for times to 224 days. (R-general, M-general; Be, U, Fe, Ni, SS, 14-68)

474-R. (French.) Behavior, Resistance and Hardness of Stainless Steel in Corrosive Atmospheres. Frank. L. LaQue. Revue du Nickel, v. 27, Jan-Feb. 1961, p. 1-9.

Applications of 12% Cr and of 18-8 Cr-Ni steel in architecture. Data for corrosion resistance of openhearth and stainless steel in atmospheres at various geographic locations. 14 ref. (R3, T26n; SS, 17-57)

475-R. (French.) Corrosion Test for Electrolytic Deposits: Corrodkote Test. Revue du Nickel, v. 27, Jan-Feb. 1961, p. 18-19.

Preparation of a corrosive paste composed of $Cu(NO_3)_2$, $FeCl_3$, NH_4Cl and kaolin. Application of the test to Zn alloys and steel. (R11a; ST, Zn-b)

476-R. (Dutch.) Corrosion Tests With Al Alloys. E. M. J. Mulders, W. G. R. de Jager and J. W. Boon. Metaalinstituut T.N.O., v. 5, Dec. 1960, p. 73-84.

Individual samples, weldments and mechanical assemblies of the alloys 2S-H, 3S-H, 57S-H, A56S-H, 23S-T, 51S-T, 75S-T and 50S-T are exposed to the weather of various places for up to 6 1/4 yr. using bolts and nails of an Al alloy, steel, galvanized or Cd plated steel. Effect of corrosion on tensile strength. (R3, Q27a; Al-b)

477-R. (Russian.) Corrosion of Iron in Hardening Salt Baths Containing Nitrides of Sodium, Potassium, Lithium and Barium. V. P. Kochergin, V. N. Savel'ev and E. P. Asanova. Izvestiya Vuz Chernaya Metallurgiya, Oct. 1960, p. 132-138.

Thermal decomposition of nitrides and corrosion rate of Armco iron studied at 450-550° C. in melts containing $NaNO_3$-KNO_3-$LiNO_3$ and their equimolecular mixtures--$NaNO_3$-$Ba(NO_3)_2$, $NaNO_3$-KNO_3 and $NaNO_3$-$LiNO_3$. 18 ref. (R7j, J28k, 2-66; Fe-a)

478-R. Motion Picture Studies of Columbium Oxidation. W. T. Hicks. Metallurgical Society of AIME, Transactions, v. 221, Apr. 1961, p. 218-220.

Visual observation of the oxidation of Cb showing that the protective behavior in the early stages of the reaction below

600° C. and throughout the reaction at 640° C. is associated with an adherent oxide. The oxide moves outward from the metal at 550-935° C. implying that the reaction takes place at the oxide-metal interface. 3 ref. (R1h, P13b, 2-61; Cb, O)

479-R. Effect of Copper on the Corrosion of High-Purity Aluminum in Hydrochloric Acid. M. Metzger, G. R. Ramagopal and O. P. Arora. Metallurgical Society of AIME, Transactions, v. 221, Apr. 1961, p. 250-256.

Single-phase Al containing 0.0001-0.06% Cu is studied in strong acid mainly through observations of hydrogen evolution. The strong influence of Cu on corrosion acceleration is exerted almost entirely through the imposition after a delay time of an autocatalytic localized-corrosion reaction. 18 ref. (R6g, 3-69; Al-a, Cu)

480-R. The Rates of Formation and Structure of Oxide Films Formed on a Single Crystal of Iron. J. Bruce Wagner, Jr., Kenneth R. Lawless and Allan T. Gwathmey. Metallurgical Society of AIME, Transactions, v. 221, Apr. 1961, p. 257-261.

X-ray diffraction and optical microscopy study of spherical specimens between 250-550° C. in oxygen pressure of 10-760 mm. Hg. The relative oxide thicknesses formed per unit time and their composition, orientation and surface topography are determined as a function of substrate structure. 17 ref. (R1h, M-general, 3-71; Fe-a, 14-61)

481-R. Oxidation of Niobium (Columbium) in the Temperature Range 500 to 1200° C. Per Kofstad and Hallstein Kjollesdal. Metallurgical Society of AIME, Transactions, v. 221, Apr. 1961, p. 285-294.

Kinetic studies of the oxidation and structural investigations of the oxidized specimens by X-ray and electron diffraction, electron microscopy and metallographic techniques at 500-1200° C. and 0.1-760 mm. of Hg. The oxidation reaction has a highly irregular temperature dependence and is unusually sensitive to changes in the oxygen pressure. 12 ref. (R1h, M-general, P13b, 2-61, 3-74; Cb, O)

482-R. Oxidation of Columbium Monoxide. W. T. Hicks. Metallurgical Society of AIME, Transactions, v. 221, Apr. 1961, p. 352-356.

The oxidation of CbO is studied by a gravimetric technique at 400-1200° C. in oxygen. The oxidation is characterized by an inductive period of low oxidation rate, which becomes shorter as the temperature increases, followed by a rapid parabolic oxidation. 6 ref. (R1h; Cb, 14-68)

483-R. Ford Experience With Coated Body Steels. Robert J. Saxon. SAE Preprint 323A, 1961, 10 p.

Corrosion resistance of stainless steel coated with Zn and exposed to salt and water. (R4, R6k; SS, Zn, 8)

484-R. (Swedish.) Anodic Protection. Teknisk Tidskrift, v. 91, Mar. 3, 1961, p. 195-200.

Passivation and protection currents and potentials for stainless steel, mild steel, Ti, Hastelloy B and Carpenter 20 in 1 M to 93% H_2SO_4, fuming sulphuric acid, 80% HNO_3, 75-115% H_3PO_4, 20-50% NaOH, saturated $Al_2(SO_4)_3$, 15% Na_2CO_3 and saturated NH_4NO_3 solutions measured at 24-82° C. 6 ref. (R10c; CN, Ni-b, SS, Ti)

485-R. (English.) Diffusion as a Rate-Determining Factor in the Reaction of Copper With Ferric and Cupric Chloride in Aqueous Solution. Eino Uusitalo. Teknillisen Kemian Aikakauslehti, v. 18, Feb. 1, 1961, p. 73-79.

Cu samples are exposed to the action of $FeCl_3$ or $CuCl_2$ solution. Effect of temperature, agitating the Cu sample, addition of $K_2Cr_2O_7$ and acidity on the rate of reaction that is thought to be diffusion-controlled. 9 ref. (R6k; Cu)

486-R. (French.) Corrosion of Cupro-Aluminum Alloys by Desaluminization. I. P. Colnenne. Revue de l'Institut Francais du Petrole, v. 16, Jan. 1961, p. 71-97.

Corrosion resistance of ASTM B111 and B111 bronzes, aluminum bronze, Inoxyda 3 and Inoxyda 90 used as tubing in refrigerating units. (R6k; Cu-b, Al)

487-R. Significant Improvement in Corrosion Testing. Products Finishing, v. 25, Apr. 1961, p. 70, 72, 74.

A new development in accelerated corrosion testing of plated metals by the CASS test is the G-8 "Uni-fog" Dispersion Tower testing unit which provides

uniform collection rates in any geographic location. (R11; 8-62)

488-R. (German.) Influence of Steam Corrosion on Properties of Reactor Material Zircaloy-2. E. Bodmer. Schweizer-Archiv, v. 27, Mar. 1961, p. 114-120.

Long-time corrosion tests of cold worked and 750-1000° C. annealed Zircaloy-2 and ZrNbPd (2% Nb, 0.2% Pd) alloy in steam at a constant temperature of 430° C. at 60 atm. pressure and at temperature cycling from 260-360° C. at 30 atm. pressure. (R4d, R11; Zr-b)

489-R. Aluminum Alloys in the Process Industries. E. D. Verink. I/EC (Industrial and Engineering Chemistry), v. 53, May 1961, p. 66A-69A.

Corrosion resistance, formability, weldability, strength and cost of Cu-bearing and non Cu-bearing Al alloys. Fabrication to produce heat exchangers, piping, conduit, storage tanks, fasteners, fences, screens and architectural structures. (R-general, G-general, K9s; Al-b, Cu)

490-R. Scale on Wire Rod and Its Removal by Mechanical Means. Pt. 2. S. Garber and G. M. Sturgeon. Wire Industry, v. 28, Apr. 1961, p. 369, 371-373, 375-376.

Simulation of scale formation on steel rod during rolling by heating and cooling with metallographic examination of the scale microstructure, thickness, hardness and formation. Kinetics as a function of temperature. Study of influence of surface finish and oxide phase hardness and adherence on susceptibility to mechanical and cathodic descaling. (R1h, F23, L-general, 2-61; ST, 4-55)

491-R. (German.) The Usefulness of Aluminum and Aluminum Alloys in Construction of Water Cooled Atomic Reactors. G. Saur, W. Reinsch and H. Borchers. Atomkern Energie, v. 6, Jan. 1961, p. 30-36.

Review of Al alloys resistant to water and steam corrosion at 200° C. Values for strength and absorption index of Al as influenced by alloying elements, radiation and pH value, pressure and flow rate of cooling water. Evaluation of absorption index of metals including Al, Zr and steel by a graphical method. (R4c, P13d, T11; Al-b, 17-57)

492-R. Adherence and Thermal Performance of Aluminum Enamels and Coatings. G. L. Geltman. Ceramic Age, v. 77, Apr. 1961, p. 73-76.

Flame testing at 2500° F. of uncoated and porcelain enameled Al and Al alloys to determine corrosion and heat resistance. Comparisons with glass, Al oxide and Zr oxide. (R-general, P11; Al-b, 8-71)

493-R. Columbium, Vanadium and Tantalum Base Alloys. Mining Magazine, v. 104, Apr. 1961, p. 215-216.

Oxidation resistance, tensile strength, stress rupture properties and strain rate sensitivity at 2000-3500° F. of Cb, V and Ta base alloys containing Zr, Mo, Al, Ti and W. (R1h, Q27a, Q3m; Cb-b, Ta-b, V-b)

494-R. (Italian.) Anodic Behavior of Platinum in the System H_2O-H_2O_2-O_2. G. Bianchi, G. Caprioglio, G. Davolio, F. Mazza and T. Mussini. Chimica e l'Industria, v. 43, Feb. 1961, p. 146-153.

Anodic development of oxygen on Pt at various current densities. Comparison with the behavior of Au. Reaction between adsorbed oxygen and H_2O_2. 18 ref. (R1h; Pt)

495-R. Low-Temperature Reactions in Copper-Oxygen Systems. National Bureau of Standards, Technical News Bulletin, v. 45, Apr. 1961, p. 61. (Available from U. S. Government Printing Office, Washington 25, D. C.)

No reaction occurs when oxygen is deposited at 40° K. on a Cu specimen, but as oxygen is partially dissociated a thin film forms that remains solid at room temperature. (R1h; Cu)

496-R. Organic and Metallic Finishes. R. J. Brown. Metal Industry, v. 98, Mar. 17, 1961, p. 207-209.

Description of weathering resistance tests on organic finishes involving heat, humidity and ultraviolet light in various overseas locations. Evaluation of metal finishes applied to Fe castings and steel pressings to determine resistance to the effects of oils, fuels and fluids used during manufacture. (R-general; Fe, ST, 8)

497-R. Environmental and Metallurgical Factors of Stress Corrosion Cracking in

High-Strength Steels. Defense Metals Information Center, Battelle Memorial Institute, DMIC Rept. 151, Apr. 14, 1961, 21 p.

Discussion of stress corrosion cracking as the complex interplay of tensile strength and corrosion which leads to cracking. Time to failure and the effect of internal structure and composition. Theories of stress-corrosion cracking. 25 ref. (R1d; ST, SGB-a)

498-R. (German.) Influence of Copper on Corrosion Behavior and Mechanical Properties of Chromium-Nickel Steels. Thonnangamath Ramchandran, Karl Roesch and Hans Jurgen Engell. Archiv fur das Eisenhuttenwesen, v. 32, Mar. 1961, p. 173-185.

Corrosion testing in 10-75% H_2SO_4 at 20-80° C., measurement of current density-potential in 2N H_2SO_4 at 80° C., investigation of intercrystalline corrosion in boiling $CuSO_4$-H_2SO_4 solution, age hardening tests at 400-600° C., tensile and notch impact testing and test welding of alloy steel (8-28% Cr, 4-8% Ni) containing 0-6% Cu. Properties as influenced by Cu. (R6g, R2h, Q27, Q6, 2-60; ST, Cu)

499-R. Reaction of Copper and Fluorine From 800-1200° F. Patricia M. O'Donnell and Adolph E. Spakowski. NASA Technical Note D-768, Apr. 1961, 15 p. (Available from National Aeronautics and Space Administration, Washington, D. C.) $.50.

Effect of preheat conditions, time and temperature on the fluorination of Cu foil. 14 ref. (R6q, 2-61; Cu, 4-56)

500-R. Review of Recent Developments on Oxidation-Resistant Coatings for Refractory Metals. W. D. Klopp. Defense Metals Information Center, Battelle Memorial Institute, DMIC Memo. 102, Apr. 26, 1961, 3 p. (Available from U. S. Office of Technical Services, Washington, D. C.)

Properties given for corrosion resistant coatings formed by vacuum distillation, electrodeposition, hot dipping on Cb, Mo and Ta. Coatings include Zn, aluminide, beryllide, silicide and Cr alloy. 7 ref. (R1h; Cb, Mo, Ta, 8)

501-R. Field Corrosion Tests. Southern Power & Industry, v. 79, May 1961, p. 66, 68.

Insulation by teflon washers and sleeves of pipeline valves composed of Hastelloy C, 304 and 316 stainless steel, Aloyco 210 and 25-12S prevents corrosion of the valves. (R10c, T26r; Ni-b, SS)

502-R. (Russian.) Penetration of Silver Into Tungsten. V. I. Rakhovsky, A. P. Lubimov and V. M. Garmash. Academy of Science of the USSR, Reports, v. 135, Apr. 1960, p. 906-908.

A tungsten laminate is immersed in radioactive liquid Ag a number of times at up to 1000-1080° C. Increase of speed of penetration is observed with rising temperature. Diffusion does not occur and the process is explained as intercrystalline erosion. (R1c, R6m, 2-62; W, Ag)

503-R. Corrosion in Cryogenic Liquids. James D. Jackson. Chemical Engineering Progress, v. 57, Apr. 1961, p. 61-64.

Corrosion behavior and mechanical properties of highly stressed Ti, Al, Ni and other metals for missile systems in liquid oxygen and fluorine. (R6q, 3-66, T24e; Al, Ni, Ti)

504-R. New Alloys for Extreme Conditions. E. G. Holmberg. Chemical Engineering Progress, v. 57, Apr. 1961, p. 74-78.

Various Ni base alloys, stainless steels, Ti, Zr and Mo are tested for corrosion resistance to liquified gases for low-temperature application as fuel containers. Tensile properties, Charpy impact and stress corrosion cracking determined. Cr content effects corrosion resistance to HNO_3. 13 ref. (R7d, Q27, Q6; Mo, Ni-b, SS, Ti, Zr)

505-R. The Determination of the Effects of Elevated Temperatures on the Stress Corrosion Behavior of Structural Materials. Armour Research Foundation of Illinois Institute of Technology (Wright Air Development Division). U. S. Office of Technical Services, PB 161962, May 1960, 53 p. $1.50.

Dissolution rates of anodized oxide films on a Ti-Al-V alloy determined from 800-1000° F. Tests show conclusively that oxide film protection is lost by direct reaction with chloride salt. (R1d, 2-61; Ti-b, Al, V)

506-R. Nitrogen Tetroxide Corrosion Studies. C. W. Alley. Allied Chemical Corp. (Wright Air Development Division). U. S. Office of Technical Services, PB 171301, July 1960, 40 p. $1.75.

Corrosive effects of nitrogen tetroxide on mild steel, Al, stainless steels and Ti under static conditions at six water concentrations up to 3.2 wt. % and four temperatures up to 74° C. (R6; Al, CN, SS, Ti)

507-R. Compatibility Between Solid and Liquid Metals. F. L. Bett. Paper from "Australian Atomic Energy Symposium". Melbourne University Press, Melbourne, Australia, 1958, p. 201-205.

Definition, reduction and assessment of compatibility between solid and liquid metals illustrated by investigation into compatibility of Cb with liquid Na. 7 ref. (R6m; Cb)

508-R. Influence of the Silicon in Cast Iron on Corrosive Wear. R. Graham, O. S. Prado, M. H. Collins, E. A. Brandes and H. K. Farmery. Institution of Mechanical Engineers, Proceedings, v. 174, no. 19, 1960, p. 617-634.

Samples of diesel engine liners containing 0.59-2.96% Si are tested by simulated wear conditions, acid immersion and exposure to acid condensation to determine the corrosive effect of Si. 5 ref. (R-general, Q9, T21b; CI, Si, 17-57)

509-R. (French.) Aqueous Corrosion of Stainless Steel. L. Colombier. Metallurgie et la Construction Mecanique, v. 93, Feb. 1961, p. 131-133.

Action of accelerators and inhibitors on corrosion resistance. Mechanism of inhibition. 43 ref. (R10b; SS)

510-R. (German.) Corrosion of Steel in Concrete by Calcium Chloride. J. Tomek and F. Vavrin. Zement Kalk Gips, Mar. 1961, p. 108-112.

Corrosion testing of reinforcing steel (0.2% C, 0.04% Si, 0.33% Mn), aged in concrete of various porosity and $CaCl_2$ content, by optical assessment and electrical resistance and potential measurements. Structure investigation of rust by X-ray examination. (R1h, R6, R11m; ST)

511-R. (German.) Passivation and Corrosion Resistance of Technical Iron Alloys. Anton Koniger. Forschungsberichte des Landes Nordrhein-Westfalen, no. 968, 1961, 4 p.

Measurement of corrosion potentials of commercial Fe alloys and of a binary Fe-Pd (0.05% Pd) alloy in HNO_3 of varying concentration. Influence of alloying elements and heat treating on potential. (R6b, R10c, R11m, 2-60, 2-64; Fe-b, Pd)

512-R. Stress Corrosion of Notched and Unnotched AM-350 Alloy. Wright Air Development Division. U. S. Office of Technical Services, PB 161998, May 1960, 14 p. $.50.

A 3 1/2% sodium chloride solution is used. With the specimen stressed to 60% of the 0.2% offset yield strength, all of the unnotched specimens failed within 150 hr. and none of the notched specimens failed after 800 hr. Stress raisers such as mechanically induced notches do not have an appreciable effect on the susceptibility of an alloy to stress corrosion cracking. (R1d, R11s; SS)

513-R. Oxidation of Metals. W. W. Smeltzer and J. M. Perrow. I/EC (Industrial and Engineering Chemistry), v. 53, Apr. 1961, p. 319-324.

Review of current studies on the theory of oxidation, metal and alloy oxidation processes and metal oxides. (R1h)

514-R. Dynamic Corrosion Testing With Water and Steam. F. Muller. Nuclear Power, v. 6, May 1961, p. 68-70.

A steam and H_2O circuit is designed and constructed to study susceptibility to corrosion of reactor materials. Zr and Zircaloy-2 are tested for embrittlement after H_2 absorption at 300-500° C. under 1422.3 lb. per in.^{2} of steam pressure. (R11, T11; Zr-b)

515-R. International Corrosion Congress. Corrosion Prevention and Control, v. 8, Apr. 1961, p. 37-53.

Summaries of papers presented at the First International Congress on Metallic Corrosion, Imperial College, London, Apr. 10-15. Topics include corrosion mechanisms, corrosive effects, protective methods, effects of coatings and environments, structural and mechanical property effects, and metallographic study and measurement of corrosion of metals and alloys such as Al, Ti, Ni, Zn, Zr, Cu, brass, alloy and stainless steels, Fe and Mg. (R-general, 10-54; Al-b, Cu-b, Ni-b, Fe-b, Zr-b, Zn-b, Mg-b, ST)

516-R. Corrosion Problems and Their Treatment. Corrosion Prevention and Control, v. 8, Apr. 1961, p. i-v.

Corrosion protection of steel ship hulls by painting, coating and cathodic protection. (R10, L-general, T22g; ST)

517-R. Factors in the Choice of Corrosion-Resisting Materials of Construction. C. M. Schillmoller and F. L. LaQue. Paper from "Extractive Metallurgy of Copper, Nickel and Cobalt". Interscience Publishers, Inc., New York 1, 1961, p. 85-129.

Characteristics of Cu, Ni and Co refining electrolyte solutions and effects of process variables on corrosion mechanisms and resistances of the refined metals. Comparative behavior of metals, alloys and nonmetals in acid solutions with emphasis on special alloys such as Si bronze, Monel, Ni-o-nel, Illium 6, Duriron, Corrosiron, Labour R55, stainless steel and Hastelloy and Chlorimet types. Applications of materials in corrosive environments. 8 ref. (R-general, C23p, 10-54; SGA-g, Cu-b, Co-b, Ni-b, SS, Fe-b, 17-57)

518-R. (French.) Predetermination of Corrosion Conditions for Metals and Alloys. M. Pourbaix. Corrosion et Anticorrosion, v. 9, Feb. 1961, p. 47-62.

Electrochemical thermodynamics including plotting and interpretation of equilibrium diagrams of stress and pH and predetermination of theoretical corrosion conditions for immunity and passivation of metals. Electrochemical kinetics with experimental determination of curves of stress and current in electrolysis. Application of results. (R1)

519-R. (Italian.) Influence of Triethanolamine and Glycerine on the Corrosion of Aluminum in an Alkaline Environment. Natale Genova. Pitture & Vernici, v. 36, Dec. 1960, p. 1077-1083.

Effect of variations in time and concentration of corrosive agent on Al corrosion. Protection afforded by varying concentrations of glycerine. 10 ref. (R6j, R10b; Al)

520-R. Corrosion Mechanisms. M. Krulfeld and M. C. Bloom. Report of NRL (Naval Research Laboratory) Progress, Apr. 1961, p. 41-44.

Protective Fe_3O_4 and gamma-Fe_2O_3 films formed on mild steel specimens by exposure to LiOH stabilizing solutions and to distilled water at 600° F. for various time are examined metallographically and by flame spectrophotometry after exposure to air saturated water at room temperature. Effect of Li stabilization on film breakdown and corrosion of the specimen. (R1h; CN)

521-R. Cathodic Protection Studies. L. J. Waldron and M. H. Peterson. Report of NRL (Naval Research Laboratory) Progress, Apr. 1961, p. 44-45.

Influence of Al, Cd and Si alloy additions and of Fe impurities on the effectiveness of Zn sacrificial anodes in cathodic protection of ships. (R10d, 2-60, 3-69; Zn, Al, Cd, Si, Fe)

522-R. The Pitting of Lubricated Gear Teeth and Rollers. Pt. 2. P. H. Dawson. Power Transmission, v. 30, May 1961, p. 286-290.

Growth of a pitting crack propagated by cyclic stressing is shown to be dependent on the magnitude of the stress and on the oil pressure. 13 ref. (R2j, T7a)

523-R. (German.) Corrosion Protection by Pigments. J. D'Ans and V. Groope. Deutsche Farben-Zeitschrift, v. 15, Mar. 1961, p. 99-104.

Corrosion potential measurement of chromated steel sheets in chromic acid solutions of various concentration. Potential curves as influenced by acid concentration, chloride, fluoride and sulphate ions are compared with curves of lacquered and caoutchouc-coated steel sheet. (R-general, L14, L26, 1-54; ST, 4-53)

524-R. (German.) Subsurface Corrosion of Lacquered Steel. Formation-Detection-Control. J. A. W. van Laar. Deutsche Farben-Zeitschrift, v. 15, Mar. 1961, p. 104-117.

Corrosion tests on cold rolled steel sheet having various paint, lacquer, wash-primer, pigment and plastic protective coatings in laboratory climate chambers at varying humidity and temperature, by salt water spray and by weathering in open air. (R11; ST, 8-70)

525-R. (English.) Mechanism of Grain Boundary Corrosion of Aluminium in High-Temperature Water. Sueo Nomura. Review of Physical Chemistry of Japan, v. 30, Dec. 1960, p. 100-108.

Metallographic and electrochemical study of grain boundary corrosion of Al in high-temperature water. Governing factors include diffusion of hydrogen atoms, over-voltage of hydrogen from Al water reaction and surface film properties on Al. 11 ref. (R4; Al)

526-R. (Japanese.) Method of Evaluation of Corrosion Test Results in Grid Alloys. Toshio Ishikawa, Hiroshi Tagawa and Akira Ishikawa. Japan Institute of Metals, Journal, v. 25, Feb. 1961, p. 147-151.

Corrosion tests on Pb and Pb-1.8% Sb alloy storage battery grid plate specimens in H_2SO_4. A method is suggested for measuring corrosion resistance and consequently battery life, in terms of weight loss after the corrosion process has become stabilized, rather than from beginning to end, as a function of time. 12 ref. (R1; Pb-b)

527-R. Mechanism of the Iron-Hydrogen Sulphide Reaction at Elevated Temperatures. Hans Arm, Paul Delahay, Charles Hudgins, Fritz Hugli, Lester Hulett and Mohsin Qureshi. Paper from "Proceedings--American Petroleum Institute". Section 3. v. 40. American Petroleum Institute, New York 20, 1960, p. 117.

Reaction is studied at 500-760° C. for a total gas pressure of 1 atm. Rate of attack is essentially constant and the corrosion scale is composed of two layers, a thin dense layer adjacent to the metal and a porous layer with a coarse crystalline structure. (R6r; Fe)

528-R. Corrosion Inhibitors in Refinery Process Streams. D. L. Burns, R. L. Hildebrand and Paul D. Thomas. Paper from "Proceedings--American Petroleum Institute". Section 3. v. 40. American Petroleum Institute, New York 20, 1960, p. 155-162.

Information on the mechanism of corrosion inhibition, temperature limitations, detergent action and chemical composition of the high-molecular-weight organic inhibitors commonly used in the refining industry. 19 ref. (R10b, T29n)

529-R. Oxidation of Niobium. Tor Hurlen. Institute of Metals, Journal, v. 89, Apr. 1961, p. 273-280.

The reaction of Cb with oxygen at 10^{-2} to 760 mm. Hg pressure and 150-1000° C. is studied by gravimetric and volumetric rate measurements and by X-ray diffraction, electron diffraction, electron microscopy and metallographic techniques. Data are given for oxidation rate kinetics as influenced by time, temperature, pressure and solution of oxygen in the Cb lattice. 34 ref. (R1h, M-general, S11, 2-61, 3-67, 3-74; Cb)

530-R. Further Observations on the Uniform Corrosion of Aluminium Alloys in High-Pressure Steam. J. N. Wanklyn and N. J. M. Wilkins. Institute of Metals, Journal, v. 89, Apr. 1961, p. 289-291.

Corrosion tests on Aereal 1 (2.5% Ni) and Fe-Ni-SAP Al alloys in steam at 1000 lb. sq. in. pressure at 325° C. for various times and flow rates to investigate the pressure dependence of the corrosion rate. Dryness of the steam is postulated as being possibly more rate-controlling than pressure. (R4d, 3-74; Al-b, Ni, Fe)

531-R. (French.) Corrosion-Resistant Alloys in the Chemical Industry. L. Colombier. Corrosion et Anticorrosion, v. 9, Mar. 1961, p. 87-92.

Behavior of steels and stainless alloys (17, 18-10, 18-10 Mo, 20-8 Mo Cu, 20-25 Mo Cu, Hastelloy B and C) toward mineral or organic acids and aggressive salt solutions. (R6g, R7b; Ni-b, SS)

532-R. The Silver-Silver Oxide Electrode. Pt. 1. Anodic Oxidation in Alkaline Solutions. Charles P. Wales. Electrochemical Society, Journal, v. 108, May 1961, p. 395-400.

Ag electrodes are anodized at 25° C. in 35 or 50% KOH at constant current. The discharge capacity is higher in 35% KOH than in 50% KOH except at low charging rates. During charging at the Ag_2O/AgO plateau, Ag_2O oxidizes to AgO, then the prevailing reaction is Ag oxidizing to AgO with same AgO reacting with Hg to give Ag_2O. Under same discharge conditions AgO may reduce directly to Ag with same formation of Ag_2O. 18 ref. (R1h; Ag)

533-R. Inhibition by Ferric Sulphate of the Dissolution of Iron and Stainless Steel. A. C. Makrides. Electrochemical Society, Journal, v. 108, May 1961, p. 412-416.

$Fe_2(SO_4)_3$ concentration required to produce passivity in 410 stainless steel and other metals is determined by the critical current density of the metal and exceeds the concentration required to maintain activity by about two orders of magnitude. Pure iron has a very large critical current density and is not protected by ferric ion in acid solution unless first made passive with impressed anodic current. 6 ref. (R10b; Fe, SS)

534-R. The Equivalent Series Resistance of Anodically Formed Oxide Films on Aluminum. Walter J. Bernard. Electrochemical Society, Journal, v. 108, May 1961, p. 446-449.

A cell is constructed for measuring the resistance of anodic oxide films on Al. The resistance is directly proportional to film thickness; other factors affecting resistance are studied. 5 ref. (R1h, P15g; Al)

535-R. An Ultrastructure Study of the Corrosion of Aluminum in the Presence of Mercury. A. N. J. Heyn. Electrochemical Society, Journal, v. 108, May 1961, p. 482-483.

The discontinuous arrangement of whiskers and fibrils of oxide formed on Al by reaction with Hg or Hg containing Pb or Tl in the presence of moist air is studied by electron microscopy. (R-general, N12n, M21e; Al)

536-R. Specialists Against Corrosion. Adrian Seligman. Australian Machinery and Production Engineering, v. 14, Apr. 1961, p. 63, 65-67.

Corrosion protection is provided for steel ships, tankers, pipeline, aircraft and machinery by covering with a tannin solution which combines with the oxides on already-corroded metals to form a hard and insoluble tannate film which halts further corrosion. Tannins are nonacid, nontoxic and provide protection for ferrous and nonferrous metals. (R10g; ST)

537-R. (German.) Anodic Oxidation of Oxalic Acid on Platinum. Pt. 1. Passivation of a Bright Platinum Electrode. J. Giner. Electrochimica Acta, v. 4, May 1961, p. 42-54.

Anodic passivation of Pt electrode in 1 N H_2SO_4 occurs by means of a separation of oxygen from water at the Pt anode with formation of a layer of chemisorbed oxygen which retards oxalic acid oxidation. Removal of chemisorbed oxygen by cathodic reduction or by slow reduction by the oxalic acid itself (self-activation). 11 ref. (R10c, L19; Pt)

538-R. Corrosion Research in India. Corrosion Prevention & Control, v. 8, May 1961, p. 40.

Review of research on atmospheric and aqueous corrosion, inhibition and cathodic protection of brass, phosphor, bronze, mild steel, Cu, admiralty brass and zinc. (R10b, R10d; CN, Cu-b, Zn)

539-R. Corrosion Problems and Their Treatment. Pt. 9. Corrosion Prevention & Control, v. 8, May 1961, p. iv-vii.

Comparison of cathodic protection, plastic coating and painting for protecting surfaces of steel jetties and piers under and above water. (R10, T26; ST)

540-R. Oxidation of Columbium. Digest of "Oxidation of Binary Niobium Alloys". NASA Technical Note D-283, Lewis Research Center, Cleveland, Nov. 1960, 27 p. C. H. Barrett and J. L. Corey. Metal Progress, v. 79, June 1961, p. 176-177.

Oxidation characteristics of Cb-base alloys containing up to 25% of alloying elements. Data are given on the effect of an oxidation rate of V, Al, Ti, Fe, Cr, Re, Si, Zr, Ta, Mo, Co, Cu and Ir. (R1h, 2-60; Cb)

541-R. Surface Reconditioning of the Key West Water Pipeline. Kurt A. Gruber. Corrosion, v. 17, May 1961, p. 20.

Processes used in reconditioning include sandblasting, patching, priming, coating with hot and cold bituminous enamel and installation of cathodic protection system. (R10, T26r)

542-R. High Temperature Sulphur Corrosion of Intermediate Range Chromium Steels. R. E. Hannum. Corrosion, v. 17, May 1961, p. 201t-202t.

Corrosion rates of steels containing up to 9% Cr and of types 316 and 405 stainless steels in the sulphur environment of a thermal desulphurization unit. (R6q; SS)

543-R. Corrosion of Nickel-Based Alloys in High Temperature Nitrogen Environments.

J. S. Brunhouse and G. W. Titus. Corrosion, v. 17, May 1961, p. 203t-207t.

Corrosion rates and mechanical properties of Inconel, Inconel X, Inconel 702, Hastelloy X, Hastelloy R-235 and Inor 8 after prolonged exposure from 1750° F. to N_2 + 0.5% O_2 are determined in a program to select fuel element claddings for a gas-cooled reactor. (R6q, Q-general; Ni-b)

544-R. Effect of Acid Volume and Inhibitor Quantity on Corrosion of Steel Oil Field Tubing. William E. Billings and David Morris. Corrosion, v. 17, May 1961, p. 208t-211t.

Efficiency of ethoxylated rosin amine, arsenic, hexynol and dibutylthiourea as corrosion inhibitors in 15% HCl and the influence of acid volume-steel surface area ratio on the corrosion rate of SAE 1051 steel. (R10b; ST, 4-60)

545-R. New Methods of Simulating Corrosive Plant Conditions in the Laboratory. A. Orman Fisher. Corrosion, v. 17, May 1961, p. 215t-221t.

Apparatus for high temperature, high pressure measurements of corrosion under heat transfer conditions. Corrosion data for various stainless steels, Inconel, Multimet, Hastelloy C, Haynes Alloy 25, Ti, Zr, A285 steel. (R-general, 1-54; Ni-b, SS, ST, Ti)

546-R. Cathodic Polarization of Steel in Salt Water. A. R. Erben. Corrosion, v. 17, May 1961, p. 222t-226t.

Effect of temperature, organic acid and corrosive gases on the current required for cathodic polarization of 1020 steel. (R10d; ST)

547-R. Welded Stainless Steels for Hot Hydrogen Sulfide Service. Frank J. Bruns. Corrosion, v. 17, May 1961, p. 227t-231t.

Effects of welding and various heat treatments on the corrosion by hot H_2S in a hydrodesulphurizer effluent of 201, 202, 304L, 347, 304, 430, 316L, 321, 410 stainless steels and Tenelon. Aqueous corrosion tests on seam welded tubing of 304 and 304L stainless steels. (R6p, R4, 2-64; SS, 7-51)

548-R. Development of a Mineral Scale Inhibitor. L. W. Jones. Corrosion, v. 17, May 1961, p. 232t-236t.

Efficiency of various sequestrants, surface active agents, colloids and mixed compounds for the inhibition of deposition of sulphate and carbonate scales on brass tubing in heated aqueous solutions. (R10b; Cu-n, 4-60)

549-R. Corrosion of Aluminum Alloys in High Purity Water in the Range 150C-340C. D. F. MacLennan. Corrosion, v. 17, May 1961, p. 239t-242t.

Examination of the cross section of the film on Al, while attached to the metal, shows that the second-phase particles play an important part in the corrosion pattern. Corrosion rates are illustrated by 25 and 157 Al alloys. (R4e, 2-61; Al-b)

550-R. Laboratory and Service Evaluation of Aluminized Steel Wire. Jane H. Rigo. Corrosion, v. 17, May 1961, p. 245t-250t.

Corrosion resistance of aluminized as compared with galvanized steel wire in marine, industrial and semirural atmospheres. Specification tests for uniformity and porosity of the Al coating. (R3, L16; ST)

551-R. A Discussion of the Possible Role of Autoreduction in the Passivation of Iron. E. E. Nelson. American Society of Naval Engineers, Journal, v. 73, May 1961, p. 327-330.

Effect of inhibitors, solution acidity and impressed current on corrosion and pitting action is studied to show the role of autoreduction and reduction in solution of a film of ferric oxide by Fe acting as an anode. (R10c; Fe)

552-R. The Corrosive Behavior of Non-Ferrous Metals in Sea Water. T. Howard Rogers. American Society of Naval Engineers, Journal, v. 73, May 1961, p. 387-393.

Corrosion resistance of Al, brass, bronze, Cu alloys containing Ni, Sn and Pb alloys, gunmetals and Zn in marine applications. (R4b; Al, Cu-b, Ni-b, Pb-b, Sn-b, Zn)

553-R. (English.) Surface Energy Mechanism for Stress-Corrosion Cracking. E. G. Coleman, D. Weinstein and W. Rostoker. Acta Metallurgica, v. 9, May 1961, p. 491-496.

Stress-corrosion cracking is proposed as a process in brittle fracture whereby the surface energy associated with crack formation is reduced by the adsorption

of atom or ion species in the stress-corrosion medium. The grain size dependence of stress-corrosion cracking stress in tensile loading is studied in two stress-corrosion systems, 304 stainless steel in $MgCl_2$ and Mg-5.56 Al alloy in NaCl-K_2CrO_4-H_2O solution. 7 ref. (R1d, R6, P13h, 2-59; SS, Al-b)

554-R. (French.) Oxidation of Uranium in Carboxylic Anhydride at High Temperatures. J. Paidassi, M. L. Pointud, R. Caillat and R. Darras. Acta Metallurgica, v. 9, May 1961, p. 515-518.

Specimens of 99.94% uranium are reacted in gaseous carboxylic anhydride at 300-700° C. with subsequent gravimetric and metallographic analysis of oxide scale formation mechanisms and composition, surface cracking and distortion phenomena, and pellicle and film formation. 9 ref. (R1h, 2-62; U)

555-R. (Translation-ConBur.) Thin Oxide Films on Titanium, Zirconium, Molybdenum and Titanium Alloys. V. V. Andreeva and E. A. Alekseeva. Academy of Sciences of the USSR, Proceedings, Physical Chemistry Section, v. 134, Sept-Oct. 1960, p. 793-797.

Kinetics of oxidation of Ti, Zr, Mo and alloys of Ti with Al, Cr and Mo from 50-400° C. Results indicate that appreciable oxidation occurs at 50° C. with Zr, at 100° C. with Ti and Ti-Mo alloy and at 150° C. with Mo and Ti-Cr and Ti-Al alloys. 12 ref. (R1h; Mo, Ti-b, Zr)

556-R. New Data Predict Corrosion Rates in Sour Crude Units. G. R. Port. Petroleum Refiner, v. 40, May 1961, p. 154-158.

Furnace tubes of 5% chromium steel are replaced by 7-12% chromium steel with corrosion rates being measured for various times from 600-670° F. for the effect of velocity, charge rate and temperature on corrosion rate. 4 ref. (R7a, T29n; SS, 17-57)

557-R. Accelerated Cavitation Erosion and Sand Erosion. W. C. Leith and W. S. McIlquham. ASTM Preprint no. 93a, 1961, 16 p.

Comparative scales for metals selection based on cavitation erosion tests and sand erosion tests. Cavitation erosion in diesel engines, hydraulic pumps and water turbines discussed. Additives for diesel cooling water evaluated. 11 ref. (R2m)

558-R. Salt Water Ingestion by Gas Turbine Engines. Ted F. Stirgwolt. American Helicopter Society, Inc. Seventeenth Annual National Forum, Proceedings, May 1961, p. 64-70.

Methods for controlling salt deposition and corrosion in gas turbine engines of helicopters. Formation of salt water droplets. Measurement of salt water content and drop size. Maintenance of engine performance by deposit removal. Effect of wash procedure on corrosion and blade fatigue life. 4 ref. (R4b, W11m)

559-R. (German.) Problems in Rust Control. Bruno Waeser. Deutsche Farben-Zeitschrift, v. 15, Apr. 1961, p. 151-160.

Theory of rusting mechanism including composition and structure of various rust types. Rust protection by coating, use of wash primers, painting of wet iron surfaces and application of inhibitors in Fe, protective paint or corrosive agent. 61 ref. (R1h; Fe)

560-R. (French.) Protection of Steel by Combined Methods. Outline of the Work at Gaz de France and I. R. S. I. D. A. Hache. Corrosion et Anticorrosion, v. 9, Apr. 1961, p. 111-118.

Corrosion by sulphate-reducing bacteria, H2S and sea water. Use of inhibitors, paints, pigments and plastics for surface protection of gas pipes. 9 ref. (R4b, R10, T26r)

561-R. (French.) Statistical Study of Intercrystalline Corrosion of 18-8 Stainless Steel. F. Gobin. Corrosion et Anticorrosion, v. 9, Apr. 1961, p. 119-131.

Intergranular corrosion of 18-8 austenitic steel as affected by carbon content, size of grains and presence of Ti or Cb as stabilizing elements. A formula is derived calculating safe minimum carbon content. (R2h, 2-60; SS-e)

562-R. New Oils Lick Rust Problem. W. N. Redstreake. Iron Age, v. 187, June 8, 1961, p. 92-93.

Development of a volatile corrosion-inhibitor oil consisting of lubricating vehicle, contact inhibitor and vapor producing component which produces

rust-inhibiting vapors when used as a lubricant for ferrous parts. (R10g; Fe)

563-R. (French.) High-Temperature Corrosion by Gas With High Concentration of Hydrogen Sulphide and Sulphur. Ph. Marchessaux. Institut Francais de Petrole, Revue, v. 16, Feb. 1961, p. 184-193.

Study of corrosion in a sulphur-producing furnace as a function of design, temperature and refractory materials. Chemical and X-ray analysis of sulphide produced by corrosion. (R7k)

564-R. Galvanic Corrosion. F. L. LaQue. Chapter 9 from "Handbook of Mechanical Wear". University of Michigan Press, Ann Arbor, Mich. 1961, p. 175-198.

Nature of galvanic corrosion including galvanic action as related to corrosion in and around crevices and to pitting. Conditions necessary for corrosive attacks and methods for control. Galvanic corrosion of Mg alloy, Zn, Al and Al alloy, Cd, wrought and cast iron, mild low alloy and stainless steel, Pb, Sn, Cu, brass, bronze, Ni and Ni alloy. Couples and solders in sea water. 13 ref. (R1a)

565-R. Accelerated Cavitation Research. William J. Rheingans. Chapter 10 "Handbook of Mechanical Wear". University of Michigan Press, Ann Arbor, Mich., 1961, p. 199-235.

Vibratory method of accelerated cavitation testing. Effects of amplitude of vibration, depth of submergence and different test liquids on rate of pitting. Cavitation resistance of cast rolled welded or sprayed stainless steels, cast steels, cast rolled or welded Ampco bronzes, welded or sprayed Colmonoy, Thiokol, rubber overlay, Stellite, toolsteels and brasses. 43 ref. (R11r, R2m; SS, ST, Cu-s, Ni-b, TS, Cu-n)

566-R. Fretting and Fretting Corrosion. J. R. McDowell. Chapter 11 from "Handbook of Mechanical Wear". University of Michigan Press, Ann Arbor, Mich., 1961, p. 236-251.

Nature and theory of the mechanism of fretting corrosion. Effects of motion, pressure, frequency, humidity, lubrication, hardness, temperature, coefficient of friction and atmosphere. Identification and prevention of fretting corrosion. 36 ref. (R1f, 2-61, 3-74, R10)

567-R. Corrosion at High Temperatures. M. J. Tauschek. Chapter 12 from "Handbook of Mechanical Wear". University of Michigan Press, Ann Arbor, Mich., 1961, p. 252-273.

Theory of high-temperature oxidation of metals. Corrosion resulting from metal oxides in combustion gases as in gasoline engine exhaust valves. Accelerated corrosion tests and relation to service experience. Effects of Cr, Ni and Si content on the resistance of Fe-Cr-Ni alloys to metal-oxide attack. 7 ref. (R-general, R1h, 2-62, 2-60; Fe-b, Cr-b, Ni-b, SGA-g)

568-R. Abrasive Wear of Metals. T. E. Norman. Chapter 13 from "Handbook of Mechanical Wear". University of Michigan Press, Ann Arbor, Mich., 1961, p. 277-314.

Occurrence in mining, earth moving, mineral benefication and other industrial operations of gaging, high-stress grinding and low-stress erosion and abrasive wear. Wear rate of abrasion-resistant materials for each type. Influence of mechanical properties and relative toughness of high Cr irons, Ni-Cr martensitic white irons, pearlitic and chilled irons, martensitic steels, pearlitic low-alloy steels and austinitic steels. 16 ref. (R1c, Q9n, 3-66, Q-general; Fe-b, Cr, CI, ST, SGA-m)

569-R. (German.) Oxidation of Ni-Cr Heating Conductor Alloys. Volker Schumacher. Zeitschrift fur Metallkunde, v. 52, Apr. 1961, p. 280-284.

Measurement of oxidation of NiCr (80% Ni) heating conductor alloy with and without additions of Ce and Ca and their oxides during continuous and discontinuous heating in air from 1000-1200° C. Lifetime as influenced by scaling modulus. (R1h; Ni-b, Cr)

570-R. Corrosion Mechanisms (The Effect of Phosphate on the Corrosion of Steel in Aqueous Media at 316° C). W. A. Frazer and M. C. Bloom. Report of NRL (Naval Research Laboratory) Progress, May 1961, p. 28-29. (Available as PB 171318 from U. S. Office of Technical Services, Washington 25, D. C.) $1.25.

Mild steel capsules filled with disodium phosphate dodecahydrate are tested for various times to 30 days with comparison of corrosion rate to data for capsules filled with distilled

water and sodium hydroxide. Catastrophic pitting is a function of concentration of solutions and of protective film formation. (R6j; CN)

571-R. Alloy Stops Corrosion in Fluid Coker. Kenneth L. Moore. Petroleum Refiner, v. 40, May 1961, p. 149-153.

Severe high-temperature sulphide corrosion in a fluid coke burner is controlled by altering the burner atmosphere and by using corrosion-resistant 12% Cr Steel in internal parts. (R7k, W16a; SS, 17-57)

572-R. The Cathodic Protection of Buried Steel Pipelines. L. A. Woodworth and F. P. A. Robinson. South African Mechanical Engineer, v. 10, Apr. 1961, p. 231-257.

External corrosion of buried steel pipelines can be prevented by cathodic protection procedures involving polarizing the structure to the open circuit anode potential or building of films resulting from alkaline conditions produced. Soil resistivity and corrosion measurements are important criteria of the protective system. 29 ref. (R10d, T26r; ST, 17-57)

573-R. (German.) Corrosion Testing in Laboratories. Wilhelm Wiederholt. Materialprufung, v. 3, Apr. 20, 1961, p. 137-146.

Review of laboratory methods for various atmospheric tests, short-time tests in liquid solutions and tests at high pressures and flow rates. 22 ref. (R11)

574-R. (German.) Relations Between Annealing and Corrosion Behavior of Hardenable Stainless Chromium Steels. Anton Baumel and Carl Carius. Archiv fur das Eisenhuttenwesen, v. 32, Apr. 1961, p. 237-249.

Corrosion resistance (measured in terms of weight loss in boiling acetic acid and by measuring passivation) and hardness as influenced by annealing (up to 700° C.), for hardened knife steel with 0.4-1.1% C, 14-18% Cr and 0-1% Mo. X-ray investigation of precipitated carbides. (R-general, Q29n, 2-64; SS)

575-R. (German.) Oxygen Absorption of Reactor Grade Zirconium on Annealing in Air. G. Saur, H. J. Laue and H. Borchers. Metall, v. 15, May 1961, p. 409.

Measurement of oxygen absorption by hardness measurements on polished cylindrical reactor grade Zr specimens (15 mm. diameter, 15 mm. high) after 5 hr. annealing in air at 600-900° C. Thickness of scale layer. (R1h, J23, Q29n; Zr)

576-R. Design for Corrosion Prevention. Australian Mechanical Engineering, v. 48, Apr. 5, 1961, p. 51-54.

Comparative corrosion resistance of a number of metals; factors influencing material selection in corrosive environments. (R-general, 17-51)

577-R. (Translation-ConBur.) Mechanism of Oxidation of Copper by Liquid Sulfur Using the S^{35} Isotope. I. I. Pokrovskii and M. M. Pavlyuchenko. Academy of Sciences of the USSR, Proceedings, Physical Chemistry Section, v. 134, May 12, 1960, p. 391-393.

Relation of sulphide layer formation and grain growth to grain boundary diffusion of Cu and sulphur in specimens oxidized from 400-444° C. for various times. 4 ref. (R1h, N1; Cu)

578-R. High Temperature Oxidation of Fe-Cr Base Alloys With Particular Reference to Fe-Cr-Y Alloys. Edward J. Felten. Electrochemical Society, Journal, v. 108, June 1961, p. 490-495.

Fe-Cr alloys containing 25-37.5% Cr and small amounts of Y, Al, Ga, La, Gd, Dy or Er are oxidized between 700-1200° C. Agreement with the parabolic rate law is generally found. Fe-Cr alloys have good resistance but lose their protective oxide film by spalling above 1000° C. Alloys with the rare earth metals have both good resistance and film retention. 14 ref. (R1h; Fe-b, Cr, Y)

579-R. Kinetics of the Oxidation of Platinum. George C. Fryburg and Helen M. Petrus. Electrochemical Society, Journal, v. 108, June 1961, p. 496-503.

Electrically heated Pt ribbons are oxidized from 900-1500° C. and at pressures from 15 microns to 1 atm. Oxidation rate is affected by temperature, pressure, and orientation of surface crystals. Energy of activation is calculated at 42.5 kcal. per mole. 23 ref. (R1h; Pt)

580-R. The Oxide Films Formed on Copper Single Crystal Surfaces in Water. Pt. 2. Rate of Growth at Room Temperature.

Jerome Kruger. Electrochemical Society, Journal, v. 108, June 1961, p. 503-509.

Cu single crystals are immersed in water in equilibrium with O_2 or O_2-He mixtures and oxidation rate is measured from increase in film thickness with time. Film thickness is measured by polarized light. O_2 concentration, crystal surface orientation and stirring affect the rate. 16 ref. (R1h; Cu, 14-61)

581-R. Anodic Polarization and Passivity of Ni and Ni-Cu Alloys in Sulfuric Acid. J. Osterwald and H. H. Uhlig. Electrochemical Society, Journal, v. 108, June 1961, p. 515-519.

Potentiostatic data for Ni from 25-40° C. and Ni-Cu alloys at 25° C. in deaerated IN H_2SO_4. Data for critical current density for passivity and minimum current density to maintain passivity. 23 ref. (R10c; Cu-b, Ni-b)

582-R. Inhibiting Corrosive Wear in Lubrication With Halogenated Gases at 1500° F. by Use of Competitive Reactions and Other Methods. Donald H. Buckley and Robert L. Johnson. ASLE (American Society of Lubrication Engineers) Transactions, v. 4, Apr. 1961, p. 33-38.

Various gases are tested as corrosion inhibitors for Ni and Co-base alloys in halogen-containing gas lubrication systems. Experiments with $CF2Cl2$ and various mixtures of gas with inhibitors indicate that oxygen (air) is a satisfactory inhibitor reacting at the metal surface in competition with the chlorine of CF_2Cl_2. A CF_2Cl_2-air mixture lubricating Al_2O_3 sliding on cobalt base alloy shows low wear and low friction from 75-1500° F. (R7e, R10b; Co-b, Ni-b, EG-k, 14-68)

583-R. Mechanism of the Oxidation of Iron Films at Temperatures From -195° C. to 120° C. M. Wyn Roberts. Faraday Society, Transactions, v. 57, Jan. 1961, p. 99-109.

Activation energy as a function of temperature, pressure and oxide layer thickness. Surface diffusion and chemisorption of molecularly adsorbed oxygen. 32 ref. (R1h, P13a, 2-61, 3-74; Fe)

584-R. Use of Ductile Iron in the Pulp and Paper Industry. E. G. Holmberg. Tappi (Technical Assoc. of the Pulp and Paper Industry), v. 44, May 1961, p. 217A-222A.

Effect of structure and the electrochemical reactions in the corrosion of gray cast iron, ductile iron and mild steel. Corrosion data are given comparing the resistance of these materials to various paper mill environments. Other topics include mechanical properties, machinability, weldability, wear and heat resistance and foundry practice. 6 ref. (R-general, T29r; CI, CN, 17-57)

585-R. (Translation-ConBur.) The Passivating Properties of Chromate Pigments. I. L. Rozenfel'd, F. I. Rubinshtein and V. V. Zhebrovskii. Journal of Applied Chemistry of the USSR, v. 33, June 1960, p. 1280-1286.

Data on the electrochemical behavior of Al and Mg in the presence of Zn, Sr, Ba and K chromate pigments. Influence of pigments on the kinetics of electrode reactions determining the corrosion process. (R10c; Al, Mg)

586-R. (Translation-ConBur.) Effects of Corrosion Inhibitors on Corrosion Embrittlement of 1Kh18N9 Steel in $MgCl_2$ Solution Boiling at 153°. S. A. Balezin and N. I. Podobaev. Journal of Applied Chemistry of the USSR, v. 33, June 1960, p. 1287-1296.

Efficiency of PB-5, PB-8, BA-12 and K-I as stress corrosion cracking inhibitors. Mechanisms of their inhibiting action. 7 ref. (R10b; ST)

587-R. (Translation-ConBur.) Influence of Certain Inhibitors and Inhibited Lubricants on the Resistance of Brass to Stress Corrosion Cracking. N. I. Podobaev, S. A. Balezin and V. V. Romanov. Journal of Applied Chemistry of the USSR, v. 33, June 1960, p. 1297-1299.

Efficiency of petrolatum, lanolin, paraffin, ceresin, sodium benzoate, dibutyl phthalate and succinic acid as stress corrosion cracking inhibitors for brass exposed to NH_3 vapor. (R10b; Cu-n)

588-R. (Translation-ConBur.) Joint Action of Inhibitors on Corrosion of Iron in Acids. I. P. Anoshchenko. Journal of Applied Chemistry of the USSR, v. 33, June 1960, p. 1305-1309.

A more pronounced inhibiting effect on the corrosion of Fe in HCl and H_2SO_4 is achieved with a mixture of urotropine, acridine, KBr and $SnCl_2$ or $Al_2(SO_4)3$ than with the individual components. 15 ref. (R10b; Fe)

589-R. (Translation-ConBur.) Influence of Anodic Polarization on Intergranular Corrosion of Stainless Chromium-Nickel

Steels. N. D. Tomashov, G. P. Chernova and O. N. Markova. Journal of Applied Chemistry of the USSR, v. 33, June 1960, p. 1310-1317.

Annealed and quenched 2Kh18N9 steels are tested for resistance to intergranular corrosion as influenced by anodic polarization in H_2SO_4 solution. 10 ref. (R2h; SS)

590-R. (Translation-ConBur.) Corrosion of Steels Under Atmospheric Conditions. A. A. Babakov and D. G. Tufanov. Journal of Applied Chemistry of the USSR, v. 33, June 1960, p. 1318-1323.

Influence of C, Cr, Ni and other alloying elements on the atmospheric corrosion rate of various carbon, low-alloy, Cr and Cr-Ni stainless steels. (R3, 2-60; AY, CN, SS)

591-R. (Translation-ConBur.) Cathodic Polarization of Lead and Structure of Lead Deposits. O. A. Khan. Journal of Applied Chemistry of the USSR, v. 33, June 1960, p. 1330-1336.

Influence of temperature, Pb^{++} and HNO_3 concentration and various additives on the cathodic polarization of Pb in $PbNO_3$ electrolyte. The effect of glue, resorcinol, alpha-naphthol, beta-naphthol and alpha-nitroso-beta-naphthol in promoting satisfactory structure of the cathodic deposit. 19 ref. (R10c, R10d; Pb)

592-R. (Translation-ConBur.) Corrosion of Cadmium-Antimony Alloys in Hydrochloric and Nitric Acids. I. M. Bokhovkin. Journal of Applied Chemistry of the USSR, v. 33, June 1960, p. 1403-1405.

Influence of composition and Furfural additions on the corrosion rate of Cd-Sb alloys. Mechanism of formation at a 1:1 ratio of a protective surface barrier composed of Cd-Sb. (R6g; Cd-b, Sb-b)

593-R. (Translation-ConBur.) Corrosion of Iron in Acids in the Presence of Oxidizing and Inhibiting Agents. I. P. Anoshchenko. Journal of Applied Chemistry of the USSR, v. 33, June 1960, p. 1406-1407.

Influence of ferric ions on the corrosion rate and polarization of Fe in HCl and HNO_3 with a mixture of KBr, urotropine, acridine and $SnCl_2$ or $FeSO_4$ as inhibitor. 5 ref. (R10b, R6g; Fe)

594-R. (German.) Chemical-Physical Measurements With Pickling Inhibitors. C. Kalauch. Elektrie, v. 15, Mar. 1961, p. 90-92.

Effect of inhibitors on steel erosion during pickling is investigated in tests at 40° C. on steel sheet in HCl and H_2SO_4 by measuring weight loss and hydrogen gas development and by potential measurements on steel electrodes. 4 ref. (R6, L12g; ST)

595-R. The Structure of Surface Oxide Films on Molten Alloys. Kichizo Niwa, Goro Shimaoka and Iwao Yamai. Paper from "Physical Chemistry of Process Metallurgy". Pt. 1. v. 7. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1959, p. 293-322.

Electron diffraction studies are used to determine structures of films formed on Sn, Pb, Bi and Cd and Zn and alloys such as Pb-Sn, Pb-Zn, Pb-Cd, Pb-Sb, Pb-Bi, Cd-Zn and Sn-Cd. Structure, orientation and mechanisms of selective oxidation. 29 ref. (R1h, M22g; Bi, Cd-b, Pb-b, Sn-b, Zn-b, 14-60)

596-R. Rates of Solution of Rotating Zinc Cylinders in Liquid Bismuth. J. K. Jackson and R. E. Grace. Paper from "Physical Chemistry of Process Metallurgy". Pt. 1. v. 7. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1959, p. 633-644.

Effects of temperature and speed of rotation from 300-400° C. and rotational speeds of 80-400 rpm. on the rate of solution of Zn cylinders in liquid Bi. A modified Nernst-Brunner equation is used to define the solution rate constants. 19 ref. (R6q; Zn)

597-R. (Japanese.) Corrosion of Stainless Steel in High-Temperature Water. Tatsuo Mackawa, Michio Mizuta and Katsumi Ishihara. Japan Institute of Metals, Journal, v. 25, Mar. 1961, p. 195-197.

The corrosion of 304 and 304 L stainless steel in high-purity water at 300° C., 85 kg. per $cm.^2$ pressure is investigated as a function of chemical composition, heat treatment surface preparation for abraded and pickled specimens after solutioning and sensitizing heat treatments from 675-1050° C. The results are compared with corrosion in boiling 40% and 65% nitric acid. 9 ref. (R4, 2-62, 2-64; SS-e)

598-R. (Russian.) Corrosion of Fe-C Alloys in Acids. N. D. Tomashov and P. V. Strekalov. Chernaya Metallurgiya, Nov. 1960, p. 143-148.

Influence of the carbon content in carbon steel on corrosion rate in various concentrations of nitric, sulphuric and hydrochloric acids. Determination of the critical range of carbon concentration after which the corrosion reaction is inhibited. 4 ref. (R6g, 2-60; CN)

599-R. (French.) Duplex Nickel Plating. A. Dias Santilhano. Revue du Nickel, no. 2, Mar-Apr. 1961, p. 27-38.

Parts protected by various Ni plating processes are corrosion tested by the Corrodkote or Cass methods to study the protective power of one or two bright Ni platings with or without sulphur. 24 ref. (R11; Ni, 8-62)

600-R. (French.) High Temperature Corrosion by H_2S and Sulphur. Ph. Marchessaux. Corrosion et Anticorrosion, v. 9, May 1961, p. 160-168.

Corrosion of a reactor manufactured from Schneider AM 8/9 S steel, where sulphur is prepared by the combustion of H_2S in pure oxygen at approximately 1200° C. as a function of wall temperature. Protective power of BMA concrete used as a refractory. (R6q, T29; ST, 17-57)

601-R. Factors in Deterioration of Metals by Acid Slurries. F. L. Laque. Canadian Mining and Metallurgical Bulletin, v. 54, May 1961, p. 361-366.

Corrosion of equipment made of steel, Fe, Pb, Monel, Ni-Cu alloys, stainless steels and Ti in H_2SO_4 from 20-500° F. is determined as a function of acid concentration, air velocity and temperature. (R6g; Cu-b, Fe, Ni-b, Pb, ST, Ti)

602-R. Corrosion Experiences in the Acid Leaching of Cobalt-Nickel Sulphides. R. B. McIntosh and S. Romanchuk. Canadian Mining and Metallurgical Bulletin, v. 54, May 1961, p. 383-388.

Evaluation of corrosion test results for various stainless steels (304, 316, 317, 347), Nionel, Ti and other acid resistant materials used in part of the process involving H_2S04 leaching of Ni-Co sulphide slurry under air pressure. (R6g, T29; Ni-b, SS, Ti)

603-R. Materials of Construction for Slurries Containing Dilute Hydrofluoric Acid. H. G. Burbidge. Canadian Mining and Metallurgical Bulletin, v. 54, May 1961, p. 392-394.

Corrosion rates are determined for Fe-Cu-Ni alloy, Cu, red brass, polyvinyl chloride and other materials used in pot gas scrubbers from 180-200° F. Scrubbers are used in the removal of gases (HF and SO_2) formed in the electrolytic reduction of Al_2O_3 to metallic Al from molten cryolite. (R6g, T29; Cr-b, Cu-b, Fe-b, Ni-b, 17-57)

604-R. Corrosion Survey of Steel Sheet Piling. Naval Civil Engineering Laboratory. U. S. Office of Technical Services, PB 171501, Dec. 1960, 59 p. $1.75.

Corrosion occurring on sheet piling at eight naval harbors. The maximum rate of corrosion occurs in the splash zone about 2 ft. above mean low water and a secondary high corrosion rate of slightly less magnitude occurs in the anodic area about 2 ft. below mean low water. (R4b; ST, 4-53)

605-R. (Pamphlet-Translation.) The Resistance of Gas Turbine Metals to Vanadium Corrosion. R. A. Lipshtein, S. E. Khaikina and E. S. Ginzburg. Aug. 1960. 8 p. INFOSERV, 967 Farmington Ave., West Hartford 7, Conn. $12.

Vanadium corrosion of various steel alloys containing Cr, Ni and Fe and a Nimonic alloy is investigated as a function of temperature composition. Alloy with the highest Ni percentage showed greatest corrosion resistance while alloy containing Mo showed the least. Pt, porcelain and quartz were also subject to vanadium corrosion at high temperatures. 8 ref. (R6, 2-60, 2-61, W11m; Ni-b, ST)

606-R. The Influence of the Physical Metallurgy and Mechanical Processing of the Basis Metal on Electroplating. Pt. 7. The Effect of Chemical Treatment of a Steel Base on the Corrosion Performance of a Watts Nickel Deposit. M. H. Jones and J. Saiddington. Plating, v. 48, June 1961, p. 625-636.

Influence of ferrous base variables such as the nature and composition of steels, effect of mechanical polishing and influence of stretching due to forming or drawing on the corrosion performance of Ni deposits. Corrosion effects attributable to the base metal are concerned with the surface layer and can be reduced or eliminated by chemical treatments prior to plating. 8 ref. (R-general; ST, Ni, 8-62)

607-R. Evaluation of Structural Materials for Corrosion Resistance. R. J. Landrum. Materials Engineering Quarterly, v. 1, May 1961, p. 45-57.

Dynamic corrosion testing using various acids, stress corrosion testing, crevice corrosion testing and galvanic corrosion testing of No. 20 alloy steel, 316 stainless steel, 304 stainless steel, SAE 1020 steel, low-carbon steel, 70-30 brass, Hastelloy, 1100 Al alloy, Ti and gray cast iron. (R11; Al-b, AY, Cu-n, CI-n, Ni-b, SS, Ti)

608-R. Copper Oxide Film Formation at a Sliding Carbon-Copper Interface. W. J. Spry and P. M. Scherer. Wear, v. 4, Mar-Apr. 1961, p. 137-149.

Surface chemistry of a Cu_2O film is studied at a sliding C-Cu interface during passage of electric current. The effective temperature at which oxidation occurs is found to be the bulk temperature of the Cu. Various electrographitic bushes cause changes in the steady state thickness of the film. 18 ref. (R1h; Cu)

609-R. Oxidation-Resistant Coatings for Refractory Metals. C. A. Krier. Battelle Technical Review, v. 10, June 1961, p. 11-15.

Evaluation of metallic, intermetallic, ceramic and cermet coatings applied to W, Ta, Cb, Mo and other refractory metals to prevent oxidation at high temperatures. Comparison of melting point, crystal structure and other physical properties of the refractory metals. (R1h; EG-d37, 8)

610-R. Getting to Grips With Dry Corrosion. Engineering, v. 191, May 5, 1961, p. 646-647.

Report on causes and effects in industrial and nuclear reactor installations of "dry corrosion" or the destruction of metal by a chemical process without the presence of a liquid electrolyte. Research on new Ti, Zr, Hf and Cb alloys to determine their resistance to such corrosion. (R6, T11; Cb-b, Hf-b, Ti-b, Zr-b)

611-R. Some Comments on the Tarnishing of Silver Contacts. H. L. Halstrom. Teleteknik, v. 4, Feb. 1960, p. 29-39.

Determination of tendency of Ag alloys to tarnish when used as relay contact material. Results indicate Ag-Si and Ag-Cu alloys, when properly surface treated, have high resistance to sulphur-induced corrosion. (R1h, T1n; Ag-b, Cu, Si, 17-57)

612-R. Inspection Discloses Severe Corrosion and Scale Deposits in Cast Iron Steam Boiler. Condenser, v. 14, June 1961, p. 11.

Report on inspection of cast iron sectional steam boiler discloses leakage of steel pipe nipples resulting from severe corrosion. Analysis of corrosion deposits. (R4c, T26q; CI)

613-R. Review of Some Data on Corrosion of Stainless Steel and Higher Alloys in Pulp Mill Equipment. Harold C. Templeton. Corrosion, v. 17, June 1961, p. 9-13.

Allowable corrosion rates for equipment with low-corrosion tolerance are discussed with review corrosion case histories in sulphite, alkaline, kraft and groundwood pulping processes. Survey of application of materials including use of stainless 316 for heater and liquor piping, use of Hastelloy C for the highly corrosive chlorine and hypochlorite bleaching solutions and use of Ti in some cases when chlorine dioxide solutions are present. 7 ref. (R-general, T29r; SS, SGA-g, 17-57)

614-R. Corrosion of Stainless Steel Pulp Digesters. W. M. Scott. Corrosion, v. 17, June 1961, p. 14-16, 18.

Insoluble calcium sulphate scale deposited in a spot welded stainless steel or Hastelloy F digester lining is suggested as the cause of pitting from a concentration cell effect, stress corrosion cracking and intergranular precipitation and cracking. Theories are outlined for the corrosion damage observed in the digester, with description of repair procedure. 6 ref. (R1, R2h, L24, T29n; SS, Ni-b, 17-57)

615-R. Corrosion Resistance of Stainless Steel Overlays in Kraft Digesters. C. L. Carns. Corrosion, v. 17, June 1961, p. 20-24.

Failure in weld overlays of 310 stainless steel deposited by automatic arc welding in repairing complete digester shells of firebox plate. Failure of the weld deposit is attributed to dilution of the stainless steel by the base metal and to nonuniformity of deposit resulting in corrosion cells causing pitting. (R2j, L24, T29r; SS)

616-R. Cathodic Protection Proposed for Vapor Area in Pulp Digesters. L. C. Wasson. Corrosion, v. 17, June 1961, p. 26-28.

A proposed system of cathodic protection for pulp digester tanks in areas covered by both liquor and vapors. An inner lining of steel sheet serves as an anode, separated from the tank wall by a porous filler layer of Portland cement and plaster of paris that permits electrical conductance paths of moisture vapor through the filler. (R10d, T29n; ST, NM, 17-57)

617-R. Effect of Sunlight on the Corrosion of Steel. Leonard C. Rowe. Corrosion, v. 17, June 1961, p. 267t-268t.

Investigation of the surface activation of steel covered by a thin film of water by ultraviolet rays in sunlight. Effect of surface activation and of the water level on the corrosion rate of steel. (R2b; ST)

618-R. Corrosion of Carbon and Low-Alloy Steels in Out-of-Pile Boiling-Water-Reactor Environment. D. C. Vreeland, G. G. Gaul and W. L. Pearl. Corrosion, v. 17, June 1961, p. 269t-276t.

Extensive corrosion testing of structural carbon steels, high-strength low-alloy steels, alloy and stainless steels in a dynamic test loop simulating the various environments found in a nuclear boiling-water-reactor system. Effect of pH, oxygen and hydrogen content and metal composition on the total corrosion, corrosion rate and iron-to-system rate. 18 ref. (R4c, T11, 2-62; ST, 17-57)

619-R. Corrosion Characteristics of Iron-Aluminum and Iron-Chromium-Aluminum Alloys in High Temperature Petroleum Applications. R. B. Setterlund and G. R. Prescott. Corrosion, v. 17, June 1961, p. 277t-282t.

Review of the basic metallurgy of the Fe-Al system and of the status of alloy development programs. Data are given for elevated temperature, mechanical properties, oxidation resistance, corrosion by oil ash containing Na_2SO_4 and V_2O_5 and resistance to sulphidization at high temperatures by H_2S formed during the desulphurization of petroleum oils. 19 ref. (R-general, R7a, M24b, T29n, 2-62; Fe-b, Al-b)

620-R. Acid Corrosion Inhibition With Secondary Acetylenic Alcohols. John G. Funkhouser. Corrosion, v. 17, June 1961, p. 283t-287t.

Evaluation of secondary acetylenic alcohols functioning as corrosion inhibitors in aqueous mineral acids. Factors affecting corrosion and corrosion control including type and concentration of corrosive medium and inhibitors, type of metal to be protected, temperature, amount of oxygen and impurities present and testing methods. 8 ref. (R10b)

621-R. Unity of Anaerobic and Aerobic Iron Corrosion Process in the Soil. C. A. H. von Wolzogen Kuhr. Corrosion, v. 17, June 1961, p. 293t-299t.

Review of soil corrosion mechanisms on Fe including electrochemical, sulphate, nitrate and carbonic acid reduction, effects of chemical substances, and, in particular, aerobic and anaerobic corrosion processes. The hydrogen acceptor, as invariably present in all forms of Fe corrosion considered, is proposed as the unity in the aerobic and anaerobic processes. 29 ref. (R8, R1g, 10-54; Fe)

622-R. Devices Used in Corrosion Control of Power Cables. J. J. Pokorny. Corrosion, v. 17, June 1961, p. 300t-304t.

Description of improvements in electrical devices such as silicon diode electrolysis switches, the test current interrupters, cathodic protection and forced drainage rectifiers used in the corrosion control of underground power cables. A method is outlined for grounding and corrosion protection of a steel pipe cable system. (R10d, T1b, 1-52; ST, 17-57)

623-R. Corrosion of Superalloys at High Temperatures in the Presence of Contaminating Salts. A. Moskowitz and L. Redmerski. Corrosion, v. 17, June 1961, p. 350t-312t.

Corrosion of Inconel X, Inconel 702 Haynes 25, Rene 41 and M-252 Ni alloy sheets by potassium chloride and lithium fluoride from 1600-1900° F. Severe surface attack, intergranular penetration and internal void formation accelerate the failures of thin sheet specimens during creep-rupture testing. X-ray diffraction examinations show a difference between normal oxidation products and oxide corrosion products, indicating that the presence of the salt prevents the normal formation of a protective oxide film. 9 ref. (R-general, R1d, R6, Q3, 2-62; Ni-b, SGA-h, SGA-g, 4-53)

624-R. Atmospheric Corrosion Testing of Metals in Canada. E. V. Gibbons. Corrosion, v. 17, June 1961, p. 318t-320t.

Evaluation of corrosion resistance of Al and Mg alloys, Cu, Zn, Muntz metal, and low-carbon stainless and alloy steels exposed to rural, marine-industrial, industrial, marine, far northern and semi-industrial atmospheres. 6 ref. (R3; ST, Al-b, Cu-b, Mg-b, Zn-b)

625-R. Aluminium Sprayed Steel in Marine Conditions. F. C. Porter. Engineer, v. 211, June 2, 1961, p. 906-907.

Comparison of Al coatings on steel with Zn coatings as to corrosion resistance in sea water and sulphur polluted industrial atmospheres. 22 ref. (R4b; ST, Al, 8)

626-R. (Polish.) Oxidation of Liquid Bi-Sn and Bi-Mg Alloys. S. Balicki. Archiwum Hutnictwa, v. 6, Jan. 1961, p. 9-21.

Determination of the oxidation rates of liquid Bi-Sn and Bi-Mg alloys at 500° C. Variation in the two rates is considered as a function of the compactness of the respective surface oxides, rather than of the free energy of oxide formation or of the value of the ionic radii of alloying elements. Comparison with oxidation of Bi-Al alloys. 16 ref. (R1h, 2-62; Bi-b, Sn, Mg, Al, 14-60)

627-R. (Polish.) Mechanism of Metal Oxidation at High Temperatures. S. Mrowel. Archiwum Hutnictwa, v. 6, Jan. 1961, p. 61-82.

Investigation of the oxidation mechanism of Cu and Ag and the diffusion mechanism of individual reagents using a double layer scale from 444-842° C. Sulphurization of Cu and Ag using radioactive isotope of S^{35}. 56 ref. (R1h, Cu, Ag)

628-R. (Spanish.) Rubbing Corrosion. Enrique J. Garcia Sardinero. Tecnica Metalurgica, v. 17, Jan-Feb. 1961, p. 1-16.

Rubbing corrosion and seizing observed with the metal pairs Cu/Cu and Cu/steel in air, CO_2 and humid air. Effects of friction coefficient, mechanical load, amplitude, frequency and number of cycles, temperature, surface elasticity, hardness, liquid, half-liquid and solid lubricants. 45 ref. (R1f; Cu, ST)

629-R. Failure of a Thick-Walled Pressure Vessel. Edward Saibel. I/EC (Industrial and Engineering Chemistry), v. 53, July 1961, p. 56A-57A.

Study of mechanical properties of 4340 alloy steel pressure vessels which failed because of stress corrosion after operation at 20° C. and maximum wall stress of 58,500 psi. (R1d, Q-general, T26q; AY)

630-R. Stainless Steels and Other Ferrous Alloys. W. A. Luce and J. H. Peacock. I/EC (Industrial and Engineering Chemistry), v. 53, July 1961, p. 586-589.

Stress and intergranular corrosion of ferrous alloys and AISI 200, 202, 301, 304, 310, 314, 316, 319 L and 347 stainless steels. Effect of high temperature (100-2600° F.) on mechanical properties. Welding, manufacturing, metalworking and surface treatments. 66 ref. (R1d, R2h, Q-general, 2-62; SS)

631-R. Stress-Corrosion Cracking Susceptibility of Zirconium in Ferric Chloride Solution. J. T. Dunham and H. Kato. U. S. Bureau of Mines, Report of Investigations 5784, 1961, 29 p.

Determination of cracking susceptibility of Zr in $FeCl_3$ solution with applied tensile stress from 12,000-35,000 psi. at room temperature. Effect of stress, solution concentration and aeration of the solution. 18 ref. (R11s, R1d, 2-66, 3-66; Zr)

632-R. Corrosion of Stainless Steels. K. L. Sanborn. Digest of "Comparative Data on the Corrosion Resistance of Selected Types of 18-8 Chromium-Nickel Stainless Steels". U. S. Atomic Energy Commission Report no. HW-32727. Metal Progress, v. 80, July 1961, p. 140, 142.

347, 347 CbTa, 304 L and 321 stainless steels are subjected to Huey tests, Strauss tests and HNO_3-HF tests to determine comparative data on corrosion resistance. (R11; SS)

633-R. Penetration of Liquid Bismuth Into the Grain Boundaries of a Nickel Alloy. R. F. Cheney, F. G. Hochgraf and C. W. Spencer. Metallurgical Society of AIME, Transactions, v. 221, June 1961, p. 492-498.

Columnar grained specimens of Ni, containing 0.25% Si and 0.22% Mn, are exposed to liquid Bi from 670-105° C. Under isothermal conditions the liquid penetration rate is constant, the activation energy for the process is 22,000 cal. per g-atom and increases with small amounts of plastic deformation. The reaction is attributed to

either transfer of Ni across the liquid-solid interface or diffusion in the grain boundary ahead of the liquid film. 13 ref. (R2h, R6m, N-general, Ni-b, Bi)

634-R. (German.) Mechanical Properties at Elevated Temperatures of Sintered Iron-Aluminum-Molybdenum Alloys. Friedrich Benesovsky. Stahl und Eisen, v. 81, May 25, 1961, p. 712-719.

Investigation of oxidation resistance by annealing from 800-1100° C. in air, measurement of mechanical properties including stress-rupture strength at 500° C. and creep and microstructure examination of sintered and unsintered and subsequently extruded Fe-Al-Mo (10-20% Al, 5% Mo) specimens containing 1-30% TiC/Cr_3C_2 and 2.5% Al_2O_3. (R1h, Q-general, M27; Fe-b, Al, Mo)

635-R. Monel, Inconel Alloys Resist Corrosion by Fluorine Compounds. Inco Nickel Topics, v. 14, Apr. 1960, p. 9.

Ni-Cr and Ni-Cu alloys resist corrosion by hydrofluoric acid, fluorine, UO_2 UF_4 and UF_6 at very high temperatures (1100° F.) during fluorination of uranium oxide ores to produce UF_6. (R6, 2-62; Ni-b, Cr, Cu)

636-R. (English.) Anodic Dissolution of Iron. K. A. Christiansen, H. Hoeg, Kirsten Michelsen, G. Bech Nielsen and H. Nord. Acta Chemica Scandinavica, v. 15, Feb. 1961, p. 300-320.

Kinetics of the anodic dissolution of Fe as governed by a pH dependent and potential dependent dissociation mechanism of chemisorbed water. A system of differential equations for the mechanism is derived and solved for steady state conditions. 17 ref. (R2g, R10c; Fe)

637-R. Zinc Dust Points-- Chemical or Electrochemical Protection? R. H. Chandler. Corrosion Technology, v. 8, June 1961, p. 165-167.

Research into the mechanism of protective action of Zn dust coatings on steel panels. Evidence for the chemical and electrochemical protection theories. 17 ref. (R10, L23; Zn, ST)

638-R. Effects of Fouling and Its Economic Importance. Pt. 1. A. Partington. Corrosion Technology, v. 8, June 1961, p. 176-179.

Association of fouling with corrosion on ship plates due to the action of anti-fouling compositions. Effects of fouling on harbor installations and on the erosion/corrosion of condenser tubes in power stations. (R4b, 2-60; T22)

639-R. Protection for the Forth Road Bridge. Corrosion Technology, v. 8, June 1961, p. 173-175.

Techniques for the corrosion protection of the steelwork and cables of a suspension bridge having a main span of 3300 ft. Cables are protected by coating with a paste and wrapping with a bituminous tape for an expected service life of 100 yr. (R10, T26p)

640-R. Inhibition of Corrosion of Commercial Aluminum in Hydrochloric Acid Solutions. J. Sundararajan. Journal of Scientific and Industrial Research, 20D, Apr. 1961, p. 137-141.

Influence of different inhibitors on corrosion rate. Evaluation of acridine, thiourea, nicotinic acid and dextrin. Polarization studies with thiourea. 27 ref. (R6g, R10b; Al)

641-R. Cavitation Erosion on Screw Propellers. Nils Christian Astrup. Acta Polytechnica Scandinavica (Mechanical Engineering Series no. 7), ME 7, 1960, 16 p.

Hydrodynamics of cavitation, types which give rise to erosion, means of avoding or reducing cavitation damage. 4 ref. (R2m, T22h)

642-R. Protecting Structural Steel Against Corrosion. Pt. 2. Australian Civil Engineering and Construction, v. 2, May 3, 1961, p. 49-52.

Protection of steel structures against air, soil and water corrosion by coating with pitch, bitumens, vitreous enamel and concrete, wrapping with tape, spraying with Zn and Al, painting and galvanizing. Use of chemical inhibitors in water to reduce its corrosiveness by making it softer. 8 ref. (R10, T26; ST, 17-57)

643-R. Eliminating Soldering Flux Corrosion From Stainless Steel Products. Metal Products Manufacturing, v. 18, July 1961, p. 36-37.

Prevention of corrosion by using hot water to wash away soldering fluxes containing hydrochloric acid and zinc chloride. (R10, R6g; SS, 7-52)

644-R. Hot Water Cylinders and Immersion Heaters. Corrosion Prevention and Control, v. 8, June 1961, p. i-v.

Problems of stress and galvanic corrosion in Cu and steel liners of water heating devices. Methods of corrosion prevention and control with emphasis on cathodic protection. (R1, R4, R10d; Cu, ST)

645-R. Corrosion Inhibitors in Pickling Baths. Corrosion Prevention and Control, v. 8, June 1961, p. v-vi.

Acid corrosion tests on cleaned steel sheet specimens to determine whether pickling acid containing inhibitor at various concentrations attacked the samples. Loss of weight is determined for 30-120 min. exposure time. (R6g, R10b, L12g; ST)

646-R. Gases in Steel (Vapor Transport in the Oxidation of Iron-Chromium Alloys). C. T. Fujii and R. A. Meussner. Report of NRL (Naval Research Laboratory) Progress, June 1961, p. 23-25. (Available as PB 1713109 from U. S. Office of Technical Services, Washington 25, D. C.) $1.25.

Specimens of pure Fe and Fe-Cr alloys (10-20% Cr) are heated with wustite from 950-1100° C. to determine whether wustite in the outer scale supplies the oxygen necessary to generate inner scale and subscale formation. Weight gain measurements and photomicrographic measurements are used to determine oxide scale composition (wustite and spinel) and the extent of the transport mechanism in the reaction. (R1h, 9-52; Fe-b, Cr)

647-R. Continuous Corrosion Monitoring. E. S. Troscinski, A. S. Couper and Andrew Dravnieks. Mechanical Engineering, v. 83, July 1961, p. 47-51.

Electrical resistance measurements at temperatures up to 1000° F. and pressures up to 1000 psi. on a probe of proposed structural material (such as 304 and 316 stainless steels, carbon steel and Hastelloy C) predict corrosion behavior as influenced by alloy tested, inhibitors, process under study, time and temperature. 9 ref. (R11a, P15g, 2-61, 3-74; SS, CN, Ni-b)

648-R. Stress Corrosion Cracking. Warren E. Berry. Light Metal Age, v. 19, June 1961, p. 6-10.

Effect of alloy composition, stress, corrosive environment, temperature and time on cracking of Al, Cu, Mg, Au, Ni and Ti alloys, stainless and low-alloy steels, methyl methacrylate and polyvinyl chloride plastics and glass. Pitting, galvanic corrosion, intergranular corrosion, cavitation, fretting and corrosion fatigue. (R1d, R-general, 2-60, 2-61; Al-b, Cu-b, Mg-b, Au-b, Ni-b, SS, AY)

649-R. Pitting Corrosion of Stainless Steel. D. L. Graver. Steel Horizons, v. 23, 1961, 4 p. (Bound In).

Parameters of this type of corrosion, indicating its relationship to the corroding environment and to the length of time of exposure. Comparison of Mo-bearing stainless steels (type 316, 317) with 18-8 types such as 304 stainless for resistance to pitting attack by halide and other ions. (R2j, R7h; SS, Mo)

650-R. Cladding and Structural Materials. Reactor Core Materials, v. 4, May 1961, p. 32-50.

Review of literature on corrosion of Zr, Al and Fe-Ni-Co alloys; carburization of stainless steels; oxidation of Cb and Ta; coating of Mo and radiation effects on Ag, Au, Fe, Cu, Ni, Pd, Al, Pt, Sn, Mo, W, alkali halides, UO_2, ZrO_2, Al_2O_3, SiO_2, TiO_2 and steels. Mechanical properties of Zr alloys, steels, Hastelloy X and Zircaloy. 89 ref. (R-general, J28g, R1h, L-general, Q-general; SGB-s, 2-67)

651-R. (Russian.) Influence of Urotropine on Corrosion of Steel in Acid. A. S. Afanasiev, A. P. Brinza and L. I. Herasiutina. Ukrainskii Khimicheskii Zhurnal, v. 26, June 1960, p. 723-729.

Corrosion of MST-2 steel in H_2SO_4 of various concentrations and in the presence of urotropine. Determination of the inhibitory, neutralizing or stimulating effect of urotropine by the polarization method. 5 ref. (R6g, 2-66; AY)

652-R. Galvanic Corrosion of Couples of Metals in Acids in Absence and Presence of Inhibitors. W. Machu and M. G. Fouad. Journal of Chemistry of the U. A. R., v. 3, Feb. 1960, p. 189-195.

Weight losses and inhibition effects during galvanic corrosion of brass

and cast iron in various acids and mixtures of acids in absence and presence of inorganic and organic inhibitors and their mixtures. (R1a, R6, R10b; Cu-n, CI)

653-R. (Translation-Brutcher no. 5007.) Improving the Corrosion Fatigue Strength of Pump Rods (by Surface Hardening). R. M. Raskin and R. A. Bagramov. Metallovedenie i Termicheskaya Obrabotka Metallov, Dec. 1959, p. 35-38.

Previously abstracted from original. See item 78-R, 1960. (R1e, T28, J28; CN-p)

654-R. (Translation-Brutcher no. 5012.) Oxidation of Steel and Cast Iron at High Temperatures. E. M. Blank. Metallovedenie i Termicheskaya Obrabotka Metallov, Dec. 1959, p. 53-54.

Previously abstracted from original. See item 79-R, 1960. (R1h, 2-62; ST, CI)

655-R. Problems of Predicting Cavitation Erosion From Accelerated Tests. J. M. Hobbs. American Society of Mechanical Engineers, Paper no. 61-HYD-19, 1961, 8 p. $1.

Experimental techniques for measurement of relative rates of erosion in full-scale hydraulic turbomachines under varying conditions. Possible use of models in accelerated laboratory tests. 15 ref. (R2m, R11r, W11n)

656-R. Exothermic Columbium Reaction for Direct Addition to Metals. Harry W. Highriter. Fansteel Metallurgy, June 1961, p. 2-3.

Cb additions to stainless steel prevent intergranular corrosion by immobilizing chromium carbide. Effect on yield and tensile strength of low-carbon steels and on weldability of CuNi-base alloys. Methods of adding Cb to stainless steel melts. (R2h, Q23b, Q27a, K9s, 2-60; SS, CN, Ni-b, Cu, Cb)

657-R. Column Woes Vanish With Titanium Trays. Chemical Processing, v. 24, July 1961, p. 92.

Application of commercially pure 16-gage sheet Ti in sieve-type trays and linings for a crude organic chemical reactor column to resist corrosive environment. (R7j, T29; Ti, 4-53, 17-57)

658-R. Argon-Arc Welded Heat- and Corrosion-Resistant Tubing. P. L. Cotton and Kingsley Davis. Australian Institute of Metals, Journal, v. 6, May 1961, p. 115-123.

Characteristics of welded austenitic stainless steel tubing. Mechanism of intercrystalline corrosion and effect of microstructure, sigma phase precipitation and duplex structures on corrosion resistance. Use of cold work and heat treatment to eliminate metallurgical evidence of the existence of the weld. 7 ref. (R2h, R-general, 3-71; SS, 4-60, 7-51)

659-R. (Translation-ConBur.) Influence of Oxidizing Agents on the Inhibiting Properties of Phosphates. A. Ya. Shatalov, I. K. Marshakov and T. A. Rubtsova. Journal of Applied Chemistry of the USSR, v. 33, May 1960, p. 1025-1029.

Determination of the corrosive behavior of steel-3 by measurement of equilibrium potential in an electrolyte containing 30 mg. NaCl and 70 mg. Na_2SO_4 per liter, representing lake and river water. Influence of $K_2Cr_2O_7$, aeration, O_2 and H_2 on the inhibiting effect of K_2HPO_4, K_3PO_4 and orthophosphate. 5 ref. (R10b, 2-60; ST)

660-R. (Translation-ConBur.) Influence of Metal Cations on Corrosion of Iron in Sulphuric Acid at Elevated Temperatures. I. P. Anoshchenko. Journal of Applied Chemistry of the USSR, v. 33, May 1960, p. 1136-1139.

A study of the influence of K, Ca, Na, Sr, Mg, Al, Zn, Cd, Co, Ni, Sn, Sb and Bi cations on the dissolution of Fe cylindrical specimens in 3N H_2SO_4 and 3N HCl from 20-80° C. Polarization curves are constructed. 11 ref. (R6g, 2-60, 2-61; Fe)

661-R. The Exfoliation Corrosion of Aluminium Alloys. E. A. G. Liddiard, J. A. Whittaker and H. K. Farmery. Institute of Metals, Journal, v. 89, June 1961, p. 377-384.

The layer or exfoliation type of attack occurring on extruded HE15 alloy is studied by a nondestructive method in which the changes with time in the deflection characteristics of specimens under four-point loading are used as a measure of the effective loss in thickness to determine the forms of the corrosion of time curves and the effect of aging time, metal spraying and stressing. 6 ref. (R2n, R1d, 2-64, 3-67, 3-68; Al-b, 4-58)

662-R. (German.) Stress Corrosion of Alpha Brass (as Influenced by Chemical Composition, Deformation and Annealing). Karkala Vasudeva Kamath. Freiberger Forschungshefte, no. B 56, 1961, p. 7-98. (plus 4 p. of illus.)

Stress corrosion testing of bent brass (6.1-35.2% Zn) strip specimens subjected to varying deformation and annealing treatments in 10% ammonia solution containing 5 g. per liter Cu in the form of $CuCO_3$. Influence of additions of Sn, Al, Cr and Si on stress corrosion. Microscopic investigation of corrosion mechanism and crack formation. (R1d, R11s, 2-60, 2-64, 3-68; Cu-n)

663-R. (German.) Standardization in the Field of Corrosion and Corrosion Protection. Herbert Puschmann. Metall-Reinigung + Vorbehandlung, v. 10, May 1961, p. 70-72.

Standardization of corrosion and corrosion protection of materials (metals, nonmetallic inorganic materials, nonmetallic organic materials and supplementary materials, for example, seals or gaskets) with emphasis on metals, is discussed from the viewpoint of physical, chemical and combined physical-chemical stress state of material and means of corrosion protection. (R-general)

664-R. (German.) Physical-Chemical Approach to Waste-Gas Corrosion Problems in Steam Boiler Plants. A. Bukowiecki. Schweizer Archiv, v. 27, May 1961, p. 180-193.

Chemical reactions and physical factors governing high-temperature (over 200° C.) corrosion in superheaters and on boiler walls, low-temperature (below 200° C.) corrosion in economizers and air heaters, both occurring during plant operation and corrosion during stoppage time, caused by reactive components of waste gas (CO_2, H_2O, SO_2 and SO_3). 49 ref. (R-general, R4c, 2-61, 2-66, T26q)

665-R. (German.) Control of Corrosion and Deposit Formation in Steam Boilers Fired by Sulphur-Rich Oils. E. Zehnder. Schweizer Archiv, v. 27, May 1961, p. 193-198.

Means for control of corrosion and deposit formation with emphasis on neutralization of SO_2, SO_3 and H_2SO_4 by an alkali medium, preferably MgO in the form of dolomite or magnesite, which is blown as dust into the furnace chamber. (R10a, T26q)

666-R. (German.) Problems in Corrosion, Deposit Formation and Air Pollution in the Operation of Oil-Fired Steam Boilers. J. Greenwood and G. R. Wade. Schweizer Archiv, v. 27, May 1961, p. 198-211.

Reaction mechanism of high-temperature corrosion (600-900° C.), formation of adherent deposits caused by Na, V and SO_3 contained in waste gas and low-temperature corrosion (150° C.) Survey of air pollution problems and pollution and corrosion control. 49 ref. (R-general, R4c, A8, T26q)

667-R. (German.) Control of Low-Temperature Corrosion in Oil-Fired Steam Boiler Plants by Constructive Means. Gottfried Peter. Schweizer Archiv, v. 27, May 1961, p. 211-217.

Control of corrosion by selection of carbon steel low in nonmetallic inclusions, application of resistant coatings for parts exposed to corrosion and by increase of feed water and air temperature. Block diagrams for plants with feed water preheater and waste heat utilization. (R4c, R10, T26q; CN)

668-R. Investigation of Oxidation Resistant Coatings on Graphite and Molybdenum in Two Arc-Powered Facilities. Roger W. Peters and Thomas A. Rasnick. NASA Technical Note D-838, July 1961, 29 p. (Available from National Aeronautics and Space Administration, Washington, D. C.). $.75.

ATJ graphite and 0.5% Ti-Mo alloy are tested in a 6 in. subsonic low-pressure arc-powered tunnel and a 1500-kw. subsonic arc jet to determine effectiveness of refractory coatings in preventing oxidation of these materials. Results indicate that the siliconized coating for the graphite and the W-2 and Durak MG coatings for the alloy provide adequate protection at temperatures up to 3000° F. (R1h, 2-61, 1-54; Mo-b, Ti, NM-k36, 8, EG-d37)

669-R. (German.) Investigation of Corrosion of Steels Containing 13% Chromium. Walter Peter and Edward G. Gondolf. Archiv fur das Eisenhuttenwesen, v. 32, May 1961, p. 337-343.

Corrosion testing by measurement of weight loss of heat treated steels (0.08-0.45% C, 12.3-15.2% Cr) in boiling

acetic, citric, oxalic and nitric acid of various concentration. Study of corrosion mechanisms and influence of heat treatment on corrosion resistance. (R6g, R7b, R-general, 2-64; SS)

670-R. The Corrosion of Decorative Nickel Plus Chromium Coatings--A Metallographic and Potential Study. G. N. Flint and S. H. Melbourne. Metal Finishing Journal, v. 7, June 1961, p. 218-221, 233.

Comparison of the morphology of pits in coatings resulting from service in an industrial atmosphere with that of pits produced by accelerated corrosion testing. (R2j, R3n, R11; Ni-b, Cr, 8-62)

671-R. (Translation-ConBur.) Effect of the Solution Composition on the Anodic Behavior of Low-Carbon Steel. V. V. Gerasimov and A. I. Gromova. Journal of Applied Chemistry of the USSR, v. 33, July 1960, p. 1547-1550.

Kinetics of electrode processes on 40 steel in 1 N solutions of sodium chloride, sulphate and sulphite. In the first two solutions the rate of the cathodic process is found to be controlled by the rate of oxygen diffusion to the metal surface while in sodium sulphite the rate is controlled by oxygen diffusion and the rate of discharge of hydrogen ions. Corrosion rates and equilibrium potentials are given. 5 ref. (R1j; CN-g)

672-R. (Translation-ConBur.) Mechanism of Gas Corrosion of Magnesium Alloys of the Mg-Al-Zn-Mn Type. I. A. Makolkin. Journal of Applied Chemistry of the USSR, v. 33, July 1960, p. 1556-1562.

Oxidation mechanisms of alloy specimens are determined from electron diffraction studies, spectral and chemical analysis and X-ray structural analysis of the oxide films. Composition of the films is given for temperature from 20° C. to above 400° C. 25 ref. (R1h, M-general; Mg-b)

673-R. (Translation-ConBur.) Corrosion of Iron in Fused Nitrates and Chlorides of Metals of Groups I and II of the Periodic System. V. P. Kochergin, E. P. Druzhinina, G. V. Men'shenina and E. P. Asanova. Journal of Applied Chemistry of the USSR, v. 33, July 1960, p. 1563-1568.

The corrosion resistance of Fe in $NaNO_3$-$MgCl_2$, $NaNO_3$-$ZnCl_2$, $NaNO_3$-LiCl, $NaNO_3$-KCl, $Ca(NO_3)_2$-NaCl, $Sr(NO_3)_2$-NaCl, $Ba(NO_3)_2$-NaCl and KNO_3-NaCl melts is measured at 500° C. and various melt compositions. 17 ref. (R6g, 2-60, 2-62; Fe-b)

674-R. (Translation-ConBur.) Study of the True Corrosiveness of Oils. N. M. Grad and Yu. T. Sudakov. Journal of Applied Chemistry of the USSR, v. 33, July 1960, p. 1569-1572.

Corrosiveness of machine oil containing various organic additives is determined on Pb, Cd and leaded bronze plates in air and oxygen atmospheres. Influence of the oil acid number and of anticorrosion additives is shown. (R7e, 2-60; Pb, Cd, Cu-s)

675-R. (Translation-ConBur.) Influence of Admixtures of Lead on the Corrosion Resistance of Electrolytic Zinc. I. E. Titova and T. Khamogonova. Journal of Applied Chemistry of the USSR, v. 33, July 1960, p. 1573-1575.

Study of the corrosion in acid and alkali media of Zn containing additions of 0.08-1.35% Pb by weight shows that the Pb influences the cathodic liberation of hydrogen and therefore retards corrosion most effectively in acids. 8 ref. (R6g, R6j, 2-60; Zn-b, Pb)

676-R. Climatic Effects on the Rusting of Painted Steel. J. R. Rischbieth and K. R. Bussell. Oil and Colour Chemists' Assoc., Journal, v. 44, June 1961, p. 351-366.

The efficiency of various primers in retarding the rusting of steel exposed to temperate marine semi-industrial and rural, and hot dry, tropical rural and equatorial oceanic climates. (R3, L26; ST, 8-70)

677-R. Properties of Materials at High Temperatures. Pt. 2. Industrial Heating, v. 28, July 1961, p. 1301-1302.

Test program for developing ceramic, ceramic-metal and metal coatings for stainless steels and refractory metals used in missiles and supersonic aircraft. Prevention of high temperature oxidation. Radiation properties of the coatings. (R1h, L-general, P17, T24; SS, EG-d37, 8)

678-R. Control Carbide Precipitation When You Weld Stainless Steel. G. E. Linnert and R. M. Larrimore, Jr. Welding Design & Fabrication, v. 34, July 1961, p. 35-36.

Evaluation of heat treatment, use of stabilized stainless steel, use of stainless with extra-low carbon and rapid weld cooling for avoiding intergranular corrosion caused by welding heat. (R2h, K9, N7, 2-60, 2-64; SS)

679-R. The Mechanism of Cavitation Damage by Nonhemispherical Cavities Collapsing in Contact With a Solid Boundary. Charl F. Naude and Albert T. Ellis. American Society of Mechanical Engineers, Paper no. 61-Hyd-8, 1961, 9 p.

A perfect fluid theory which neglects effect of gravity and which assumes that pressure inside a cavitation bubble remains constant during collapse is given for the case of a nonhemispherical but axially symmetric cavity. High speed motion pictures of cavities generated by spark methods are used to test theory experimentally. 9 ref. (R2m, 10-51)

680-R. A Study on Controlling High Temperature Oxidation of Vanadium Base Alloys. J. S. Klicker and H. B. Bomberger. Crucible Steel Company (Wright Air Development Division). U. S. Office of Technical Services, AD 258378, Jan. 1961, 88 p. $2.25.

Improved oxidation resistance of vanadium-base alloys is possible through alloying and/or oxide coating. Results indicate that vanadium oxide mixtures and, therefore, possibly vanadium alloys can be developed to form refractory oxides at operating temperatures as high as 1800-2100° F. (R1h, 2-60, 2-62; V-b, 14-68)

681-R. Protection of Steel Structures Against Corrosion. Acier-Stahl-Steel, v. 26, June 1961, p. 293-301.

Corrosion testing of 2 mm. thick A.B.E.M. IV type steel sheet specimens to determine inhibitory effect of eight paints in air, sea and river water and natural weather conditions. (R3, R4, R10b; ST, 4-53)

682-R. (Pamphlet.) Stainless Steel for Corrosion and Oxidation Resistance. F. P. A. Robinson. 9 p. (Paper from South African Industrial Chemist, Mar. 1961.)

Composition limits, mechanical properties, corrosion resistance and applications of austenitic, precipitation hardening, martensitic and ferritic stainless steels including those with rare and noble metal additions. Pitting, intercrystalline corrosion, knife-line attack and stress corrosion cracking mechanisms. 10 ref. (R-general; SS)

683-R. Some New Ideas of the Mechanism of Corrosion of Tinplate Cans by Fruit. Denis Dickinson. Corrosion Technology, v. 8, July 1961, p. 201-203.

Corrosive activity of fruits and vegetables on Sn-plated steel cans is discussed in terms of hydrogen evolution, anodic polarization and residual enzyme activity. Effect of pH of fruit juices on corroding potentials of Sn and Fe. Dissolution of Sn is prevented by lacquering. (R7n, R10b, T29p; ST, Sn, 8-62)

684-R. Preserving Water-Sealed Gasholders. R. Nichols. Corrosion Technology, v. 8, July 1961, p. 204-209.

Comparison of various primer, undercoat and finish coat systems used for preserving steel sheeting of water-sealed gasholders. Effect of surface treatment on performance and effective life of coatings. (R10b, T26q; ST)

685-R. 'Pipe-Life-Long' External Protection for Water Main. Corrosion Technology, v. 8, July 1961, p. 210.

Protection of Fe pipe against corrosion and moisture penetration by insulating and wrapping with rubber, adhesive compounds, absorbent cotton fabric (saturated with petroleum hydrocarbon, tannin and siliceous fillers) and bitumenized hessian tape. (R10e, T26r; Fe)

686-R. Effects of Fouling and Its Economical Importance. Pt. 2. A. Partington. Corrosion Technology, v. 8, July 1961, p. 211-214.

Effect of fouling and corrosion including rust blistering, roughening of paint film, slime film formation and the absorption of energy in the formation of waves and eddies on ship hull resistance and fuel consumption. Preventive measures include docking, shot blasting and repainting with antifouling compound. 11 ref. (R4b, R10, T22g)

687-R. (Translation-ConBur.) Effect of Stresses on the Characteristic Form

of the Polarization Curve in Corrosion Cracking of Metals. V. V. Romanov. Journal of Applied Chemistry of the USSR, v. 33, Aug. 1960, p. 1829-1832.

Study of stress variations as they affect cathodic and anodic branches of the polarization curves of D-16 Al alloy in a solution of NaCl plus H_2O_2. Explanation in terms of the electrochemical mechanism of corrosion cracking. (R1d, R1j, 3-66, 9-72; Al-b)

688-R. (Translation-ConBur.) Effect of Temperature on the Nature of Corrosive Destruction of Stainless Steel in Acid Solutions. A. I. Glukhova. Journal of Applied Chemistry of the USSR, v. 33, Aug. 1960, p. 1833-1839.

Corrosion resistance of 2Kh18N9 annealed steel in 0.1 N HCl at 0-110° C., 10 N HNO_3 at 60 and 120° C. and a mixture of HNO_3 and HCl at 20-115° C. 16 ref. (R6g, 2-61; SS)

689-R. (German.) Corrosion Protection in Reactor Construction. M. Stendel. Kerntechnik, v. 3, Apr. 1961, p. 169-170.

Review of corrosion protection of V2A steel by electrolytic passivation, electroplating and plastic coating. Parameters for testing mechanical properties of plastics. (R10, L-general, W11q; ST, NM-g33, 17-57)

690-R. (Russian.) Corrosive Stability of Steels and Zirconium Alloys in Boric Acid Solutions at Varying Temperatures. M. A. Tolsmaya, S. V. Bogamyreva and G. N. Grabusov. Atomnaya Energiya, v. 10, Mar. 1961, p. 222-226.

Carbon steel, alloy steel, nonrusting steel and Zr-Cb alloys are corrosion tested in an autoclave in boric acid solutions at temperatures from 40-335° C. and pressure up to 140 atm. for periods from 150-2000 hr. (R6g, 2-61, 3-67, 3-74; ST, Zr-b, Cb)

691-R. Salt Water Corrosion. R. H. Warring. Machinery Lloyd (Overseas Edition), v. 33, July 1961, p. 41-42.

Analysis of the mechanisms of salt water corrosion; electrochemical corrosion between two dissimilar metals in contact, impingement attack and the formation of concentration cells. Corrosion performances of various metals and alloys and preventive techniques. (R4b, R10)

692-R. (Japanese.) Studies on Corrosion of Aluminum Alloy for Water Cooled Reactor. Dynamic Corrosion Test of Aluminum in High-Purity Water Between 50-80° C. Light Metals, v. 11, Mar. 1961, p. 131-148.

Determination of corrosion rates, oxide film thickness, weight loss and corrosion microstructures for 2S Al and 1% Ni-Al alloys as a function of time, temperature and flow rate for exposure in high-purity water at 3-14 m. per sec. flow for times of 214 hr. to 1 yr. at 50-80° C. (R1h, R4, 1-54, T11; Al-b, 17-57)

693-R. (Russian.) High Temperature Oxidation of High Melting Alloys. Pt. 1. I. N. Frantsevich and R. F. Voitovich. Fizika Metallov i Metallovedenie, v. 10, Dec. 1960, p. 857-861.

Oxidation of Ti and binary W alloys with 15-75% Ti in air as a function of temperatures from 500-1000° C. and time. Effect of the Ti content on hardness of the alloys. 9 ref. (R1h, Q29n, 2-60; Ti-b, W)

694-R. (Russian.) High Temperature Oxidation of High Melting Alloys. Pt. 2. R. F. Voitovich. Fizika Metallov i Metallovedenie, v. 10, Dec. 1960, p. 862-865.

Zr and W-Zr alloys with 10-70% Zr are held in air at 500-900° C. for 0-11 hr. Effects of composition, temperature and time on oxidation. 5 ref. (R1h, 2-60, 2-61, 3-67; Zr-b, W)

695-R. (Russian.) "Caustic" Cracking of Steel Weldments. N. A. Langer, L. N. Yagupol'skaya and Z. V. Yushkevits. Avtomaticheskaya Svarka, Apr. 1961, p. 86-87.

Butt-welded M16S sheet is corrosion-tested in a solution containing 45% calcium nitrate and 35% ammonium nitrate. Samples exposed to the solution without previous heat treatment showed cracks after 24-48 hr. Heat treated samples showed cracks only after 240 hr. if at all. (R6, 2-64; ST, 7-51)

696-R. (Translation-ConBur.) The Effect of Corrosion Inhibtors on Mechanico-Corrosional Abrasion. E. M. Zaretskii, I. M. Katser and O. A. Petrova. Academy of Sciences of the USSR, Proceedings, Physical Chemistry Section, v. 135, Nov-Dec. 1960, p. 1117-1119.

The addition of sodium hexametaphosphate by an electrochemical process

to diminish the wear rate of 4 x 13 steel in aqueous solution. 9 ref. (R10b, 2-66; ST)

697-R. Protection of Cooling-Water Piping Systems Against Sea-Water Corrosion. J. Goudriaan. American Society of Mechanical Engineers, Paper no. 61-SA-36, 1961, 19 p. $1.

"In situ" applications of cement lining to protect corrosion resistance of unlined cast iron and PVC plastic piping, bitumen-lined steel piping and epoxy-lined steel piping. (R10, R4b, T29n, 4-60; CI, ST, NM-g)

698-R. (German.) Specific Reactions at Precious Metal Surfaces. A. Keil. Metall, v. 15, July 1961, p. 655-657.

Reactions of Ag and Au with S and O and adsorption and polymerization processes of plastic vapor on Pt metals at room and elevated temperatures. (R2r, R6, R7, 2-61; EG-c31, Ag, Pt)

699-R. (German.) Material Transfer Between Contacts of Precious Metals as Influenced by Preceding Heat Treatment Investigation on PdCu, AuCo and AuNi. W. Merl. Metall, v. 15, July 1961, p. 672-674.

Investigation of 500-800° C. heat treated contacts. Study of (60-40%) Pd-Cu, (97-3%) Au-Co, (90-10 and 84-16%) Au-Ni alloys. Material transfer and electrical and thermal conductivity as influenced by lattice transition or precipitation processes caused by heat treatment. (R2a, N-general, P-general, 2-64, T1; EG-c31, 17-57)

700-R. (German.) Antitarnishing of Silver. H. C. A. Burkhardt and H. Schlegel. Metall, v. 15, July 1961, p. 643-654.

The corrosion of Ag is reviewed in terms of nontarnishing Ag alloys, tarnishing of electrodeposited Ag-Cd alloys as influenced by current conditions, temperature and free cyanide, testing for susceptibility to tarnishing and control of tarnishing by passivation with Sn and by protective coating. (R2r, R10, L1n; Ag)

701-R. (Italian.) Metallic Materials Resisting Sulphuric Solutions. Il Nickel, no. 91, Apr. 1961, p. 14-18.

Study of the corrosion resistance of alloys and metals such as stainless steels, Ni-Cr alloys, Ta, Pt and cast iron placed in contact with sulphur acid solutions. Effect of concentration, temperature and flow velocity of the solutions on corrosive attack. (R6g, R7k; SS, Ni-b, Cr, Ta, Pt, CI)

702-R. Titanium Submerged Pumps. Light Metals, v. 24, July 1961, p. 193.

Application of Ti in a pump for use with 99.8% HNO_3, the corrosion resistance of Ti being compared favorably above 18-8 columbium stainless steel. (R6g, W13d; Ti, 17-57)

703-R. Electrochemical Corrosion of Platinum in Hydrochloric Acid Solutions. J. Llopis and A. Sancho. Electrochemical Society, Journal, v. 108, Aug. 1961, p. 720-726.

Attack by d-c. is increased by increasing temperature, high chloride ion concentration and high acidity and increases when a-c. is superimposed. If d-c. is high enough for passivation, no corrosion occurs until a critical value of a-c. is reached. At this point corrosion begins, increases and goes through a maximum with increasing a-c. 31 ref. (R1j, 2-60, 2-61; Pt)

704-R. The Influence of Iodide Ions and Carbon Monoxide on the Anodic Dissolution of Active Iron. K. E. Heusler and G. H. Cartledge. Electrochemical Society, Journal, v. 108, Aug. 1961, p. 732-740.

Adsorption of iodide ions on Fe is measured as a function of iodide ion concentration and anodic current density. Effect of iodide ions and carbon monoxide depend upon the amount adsorbed on the Fe surface. 12 ref. (R1a, P17c, 2-66; Fe, I)

705-R. (English.) Studies on Rust Inhibitors. Pt. 2. The Rust-Preventive Properties of Petroleum Sulphonates and Organic Carboxylic Acids. Motoo Koike and Tatsuo Abe. Journal of Japan Oil Chemists Society, v. 10, May 1961, p. 275-282.

Study of the effects of the polar groups of rust inhibitors by corrosion tests using various petroleum sulphonates and carboxylic acids. The anticorrosion properties of petroleum sulphonates

were indicated in the salt water immersion test, the nonferrous metal immersion test and the heat stability test. Rust inhibitors prepared with carboxylic acids added to lubricating oils showed good anticorrosion results in the shed storage conditions at a relatively low temperature. (R10b)

706-R. Australian Product Combats Pipe Corrosion in New Water Reticulation Scheme. Chemical Processing, v. 14, June 1961, p. 32-33.

A corrosion inhibitor "Taramel" is used to protect a steel pipe line for 50-100 yr. Production of high-grade enamels are discussed in terms of their application and temperature. (R10b, T26r; ST)

707-R. Caustic Stress Corrosion. Earl Howells. Chemical Processing, v. 14, June 1961, p. 35-37.

Study of the effect of hydroxide, stress levels and dilute caustic water solutions on cracking of stainless steel as a function of temperature and time. (R6j, R10, 2-61, 3-67; SS)

708-R. Cathodic Protection for an Uncoated Aluminum Pipeline. J. F. Whiting and T. E. Wright. Corrosion, v. 17, Aug. 1961, p. 9.

Mg anode beds are used in a hot spot cathodic protection program to prevent pitting of a thin-walled AA 3003 alloy pipeline carrying natural sweet gas. (R10d, R2j, T26r; Al-b)

709-R. Failure of High Strength 410 Bolts in Ammonia Contaminated Water. H. W. Wilten. Corrosion, v. 17, Aug. 1961, p. 10-11.

Stress corrosion cracking and subsequent failure of bolts submerged in a water jacket in an ammonia plant are traced to contamination of the water by leaking NH_3 and HNO_3. 7 ref. (R1d, R6, T7f; SS)

710-R. Reducing Corrosion of Power Plant Condenser Tubing With Ferrous Sulfate. Thomas W. Bostwick. Corrosion, v. 17, Aug. 1961, p. 12-16, 18-19.

Additions of ferrous sulphate to river water inhibit corrosion of aluminum brass tubing by forming a protective iron oxide film. The film is maintained by treatments at irregular intervals. 5 ref. (R10b, R4a; Cu-n, Al, 4-60)

711-R. Corrosion Control Aspects of Circulating Cooling Water Treatment. J. M. Brooke and B. G. Witt. Corrosion, v. 17, Aug. 1961, p. 22-23, 25.

Treatment of cooling water to control scale formation on the cooling surface and to prevent corrosion of metal in contact with cooling water, fouling of the cooling surfaces and deterioration of cooling tower wood. Effects of pH, blowdown control and low-alkalinity make-up. (R4a, R10b, W10h)

712-R. Relative Corrosion Resistance of Basic Oxygen Steel and Open-Hearth Steel. R. C. Talbot, R. N. Hobbs and W. A. Szymanski. Corrosion, v. 17, Aug. 1961, p. 83-84.

Forty day corrosion tests on pickled and degreased specimens exposed to NaCl, NaCl + NaOH, steam, steam condensate, city water, KOH, Cl, $HClO_4$ and H_2SO_4. (R4, R6, R11; ST)

713-R. Microbiological Corrosion in Waterfloods. J. M. Sharpley. Corrosion, v. 17, Aug. 1961, P. 92-96.

An hypothesis is advanced to explain a portion of the mechanism underlying bacterial pit corrosion. Role of sulphate-reducing bacteria, correlation between bacteriological examination and corrosion damage, cultural techniques, laboratory and field evaluation techniques and detection of sessile microorganisms. (R1g)

714-R. Use of Pipe-to-Soil Potential in Analyzing Underground Corrosion Problems. B. Husock. Corrosion, v. 17, Aug. 1961, p. 97-101.

Use of potential measurements to distinguish stray current corrosion from galvanic corrosion in coated or bare Cu or steel pipelines. General rules are given for the interpretation of a set of potential measurements in evaluating an underground corrosion problem in a non-stray current area. (R8, T26r; Cu, ST)

715-R. Use of Differential Thermal Analysis in Exploring Minimum Temperature Limits of Oil-Ash Corrosion. Norman D. Phillips and Charles L.

Wagoner. Corrosion, v. 17, Aug. 1961, p. 102-106.

Differential thermal analysis and pilot plant corrosion testing of melting and freezing characteristics of oil-ash deposits obtained from corrosion of superheater alloys. 11 ref. (R7d, R11, S11g, T26q; SS)

716-R. Factors Involved in Corrosion of Lead Cable Sheath. K. G. Compton. Corrosion, v. 17, Aug. 1961, p. 115-118.

Effect of stray current, galvanic cells, ionic content of soils, chemical corrosion, Pb sheath with cinders, use of steel armoring tape, factors in cathodic protection and soil burial tests. Solubility of Pb in solutions of varying pH, electrochemical behavior of Pb and potential of Pb-Sb cable sheath in soils as a function of pH. (R8, R10, R11a, P15; Pb)

717-R. Choosing Alloys for 1200° F. + Corrosive Applications. John J. Moran. Chemical Processing, v. 24, Aug. 1961, p. 49-53.

Behavior of Pt, Au, Ni, Inconel, Hastelloy B and C, stainless steels, carbon steel, Monel and Ni-Cr alloys in dry HCl and nitriding atmospheres. Effect of H_2S atmospheres; effect of carburization on ductility and impact resistance; methods to combat hydrogen attack; creep and stress rupture considerations; and effect of Si, Mo, Ti and Cb on sigma formation. (R6, 2-62, N6p, 2-60, Q-general, 2-64; Pt, Au, Ni, SS, CN)

718-R. Corrosion Keys--Tantalum. D. O. Jones and D. F. Taylor. Chemical Processing, Aug. 1961, p. 73-75.

Corrosion resistance of Ta to H_2SO_4, HCl, H_3PO_4, fuming H_2SO_4, HF, HNO_3 and other acids, KOH or NaOH solutions, liquid metals and HCl gas in various concentrations from 100-475° F. Density, strength and hardness, weldability and history of the element. (R6, 2-61, P10a, Q27a, Q29n; Ta)

719-R. Bright Metal Trim on Automobiles Evaluated. G. G. Levy. Inco Nickel Topics, v. 14, 1961, p. 6-7.

Corrosion resistance of duplex Ni-Cr, Cu-bright Ni-Cr and Ni-Cr plate on various base metals. Effects of plating thickness and composition and number of Ni layers. Comparison to 430 stainless steel and anodized Al. (R-general, 2-60, T21; Ni-b, Cr, 8-62, SS, Al, 8-73)

720-R. (Spanish.) Corrosion in the Potash Industry. Lamberto-Antonio Rubio Felipe. Instituto del Hierro y del Acero, v. 14, Jan-Mar. 1961, p. 293-301.

Corrosion of Cu and steel chemical equipment in the presence of a solution obtained during treatment of sylvinite with water at 25° C. Interaction of Cu and Fe ions and dissolved O. Cathodic protection by using Zn and Mg anodes. (R6k, R10d, T29m; ST, Cu, Zn, Mg)

721-R. Fasteners Versus Galvanic Corrosion. Francis L. LaQue and W. D. Mogerman. Fasteners, v. 16, Spring-Summer 1961, p. 12-18.

Galvanic current as a function of corrosion of metal fasteners. Relationships of base and noble metals are investigated in experimental conditions and a galvanic series is tabulated. (R1a, R11, 1-54, T7f)

722-R. Inhibition of the Corrosion of Aluminum-Zinc Alloy in Acid Solutions. K. G. Sheth and T. L. Rama Char. Journal of Scientific & Industrial Research, v. 20D, May 1961, p. 201-202.

Determination of the corrosion rates for aircraft Al-Zn alloy, DTD 687, in HCl solutions (0.05N-3N) at 32° C. in the presence of organic inhibitors. Acridine, nicotinic acid, strychnine and quinine hydrochloride are tested as inhibitors. 8 ref. (R6g, R10b; Al-b, Zn)

723-R. Metallurgical Problems of the Turbine Engine. E. R. Gadd. Chemistry & Industry, June 17, 1961, p. 811-816.

Investigation of the creep problem in turbine blades exposed to high temperatures, oxidation, air or sea water corrosion and abrasion. Some of these problems are solved by using stainless steel, Cr-Ni alloys or by plating or coating exposed surfaces. (R-general, T7h; SGA-g, SS, Cr-b, Ni)

724-R. (German.) Stress Corrosion of Soft Steel in Calcium-Nitrate Solutions. Anton Baumel and Hans-Jurgen Engell. Archiv fur das Eisenhuttenwesen, v. 32, June 1961, p. 379-386.

Current-density and potential curves of soft steel specimens in aqueous solutions of KNO_3-$NaNO_3$, and KCl-$(NH_4)_2$ SO_4 and during tensile stressing in boiling (115° C.) $Ca(NO_3)_2$ solution. 19 ref. (R1d, R6j, 3-66; ST)

725-R. (German.) Investigation of Pitting on Chemically Resistant Austenitic Steels. Erwin Brauns and Wilhelm Schwenk. Archiv fur das Eisenhuttenwesen, v. 32, June 1961, p. 387-396.

Pitting on homogenized (1050-1100° C.) and pickled specimens of austenitic steels (18% Cr, 0-12% Ni, 0-2.3% Mo) is investigated using the Turnbull blue color reaction by microscopy and by corrosion resistance and galvanostatic and potentiostatic polarization measurements. 17 ref. (R2j; SS-e)

726-R. (Translation-Brutcher no. 5199.) On the Role of Hydrogen in Corrosion Fatigue Failure of Steel. R. I. Krip'yakevich. Dopovidi Akademii Nauk Ukrainskoi RSR, v. 3, Mar. 1961, p. 325-327.

Superposition of cathode potential on specimens being fatigue tested in a corrosive agent to study the cathodic processes with special reference to electrolytic loading with hydrogen. (R1e)

727-R. (Italian.) Atmospheric Corrosion of Metals. Alberto Barberis. Rivista Di Ingegneria, v. 11, Aug. 4, 1961, p. 245-248.

Corrosion of Fe, Cu, Zn and Pb by SO_2, NO_2, NH_4Oh and solid residues. Experiments show a seasonal dependance for corrosive activity, since the winter atmosphere is more humid and contains a higher percentage of SO_2. (R3; Fe, Cu, Zn, Pb)

728-R. (Russian.) Structure of Oxide Films and Corrosion Resistance of Pearlitic Steel as Functions of Its Composition. S. A. Yuganova and Yu. G. Sorokina. Metallovedenie i Termicheskaya Obrabotka Metallov, June 1961, p. 53-56.

15Kh4M1F, 15Kh7M1F, 15Kh2M1F and 15Kh1M1F steels with varying Cr, Si, Al, Co, W and B contents are heated in air and held at 300-600° C. for 1 hr. and at 600° C. for 1-1000 hr. Corrosion behavior is studied as a function of composition. 7 ref. (R1h, 2-64; ST, 2-60)

729-R. (French.) Effect of Medium and Interface pH on Inhibition of Metals. J. Frasch. Corrosion et Anticorrosion, v. 9, July-Aug. 1961, p. 225-234.

Action of chromates, nitrites, phosphates, Zn salts, amines and complexes of these as inhibitors added to corrosive media on the formation of protective and corrosive films on metals as a function of pH of the solution. (R10b)

730-R. (French.) Recent Progress Report of the Corrosion Resistance of High Nickel Alloys. G. L. Swales. Corrosion et Anticorrosion, v. 9, July-Aug. 1961, p. 235-247.

The alloy systems Ni-Cr, Ni-Mo, Ni-Mo-Cr, Ni-Cr-Cu-Mo, Ni-Cr-Fe, Ni-W as well as commercial alloy products are evaluated in terms of resistance to corrosive action of acids, combustible fuels and fused salts (fluorides) as functions of concentration, temperature and time. (R6, R7d, 2-60, 2-61, 3-67; Ni-b)

731-R. Physical Metallurgy of Refractory Metals. B. F. Brown. Report of NRL (Naval Research Laboratory) Progress, July 1961, p. 24-25. (Available as PB 171320 from U. S. Office of Technical Services, Washington 25, D. C.)

Study of Cb-Zn compounds to develop oxidation-resistant coating for refractory metals. Vapor pressure is measured as a function of temperature; kinetics of compound formation and mechanism of oxidation are studied. (R1h, P12c, 2-61, P13; SGA-h, Cb, Zn)

732-R. Corrosion Mechanisms (The Effect of Nonadherent Corrosion Products on Localized Attack of Steel Exposed to Aqueous Media at Elevated Temperature). M. Krulfeld and M. C. Bloom. Report of NRL (Naval Research Laboratory) Progress, July 1961, p. 26-28. (Available as PB 171320 from U. S. Office of Technical Services, Washington 25, D. C.)

Effects of H_2O_2 concentration and exposure time on localized attack under the corrosion product alpha-Fe_2O_3. Steel specimens are exposed to H_2O_2 at 600° F. for one day to four weeks. (R6p, R1a, 2-62, 3-67; ST)

733-R. Cathodic Protection Studies (Determination of the Driving Potentials and Effective dc Resistance of Several Galvanic Anodes). L. J. Waldron and M. H. Peterson. Report of NRL (Naval Research Laboratory) Progress, July 1961, p. 29-30. (Available as PB 171320 from U. S. Office of Technical Services, Washington 25, D. C.)

Driving voltage (the effective difference in potential between anode and cathode) and internal resistance (electrolytic) between anode and calliode are studied for a cell consisting of a steel sea wall cathode and Zn, Mg and Al-Zn anodes. (R10d; ST)

734-R. Some Comments on the Necessity of Preventive Maintenance in Painting Schedules. Current Engineering Practice, v. 3, June 1961, p. 14, 17.

Prevention of corrosion of industrial structures and machinery through proper preparation of surface (shot blasting, flame cleaning), priming and painting. (R10b, L10, L26n; ST, SGB-s)

735-R. How Small Electrical Currents Reduce Salt-Water Corrosion. Iron Age, v. 188, Aug. 17, 1961, p. 100-101.

Corrosion test results on steel rods exposed to salt water for 5 yr. show that coatings which form on the cathodically protected rods reduce the amount of applied current needed for protection. (R10d; ST)

736-R. (Japanese.) The Relationship Between Rust-Preventive Additives and Their Bases. Pt. 4. Studies on Rust Inhibitors. Motoo Koike, Yoshiharu Takemoto and Tatsuo Abe. Metal Finishing Society of Japan, Journal, v. 12, June 1961, p. 226-231.

Corrosion protection properties of various oil, solvent, asphalt and organic compounds as a function of quantities of rust inhibitors added to the base compounds are investigated by salt spray, SO_2, humidity and weathering tests on coated steel panels. 13 ref. (R10f, R11, L26, 2-60; ST)

737-R. (Russian.) Oxidation of Titanium From 300-600° C. D. I. Lainer and M. I. Tsypin. Izvestiya Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk, Metallurgiya i Toplivo, Jan. 1961, p. 146-147.

One end of a wedge-shaped sample is held at 800° C. and the thickness of the oxide film forming at various temperatures below 800° C., corresponding to the distance measured from the heated end, is estimated by the color resulting from light interference. Film thickness as a function of temperature and time. 4 ref. (R1h, 2-61, 3-67; Ti)

738-R. An Experimental Survey of Rust Preventives in Water. Pt. 1. Methods of Testing. P. Hersch, J. B. Hare, A. Robertson and Sheila M. Sutherland. Journal of Applied Chemistry, v. 11, July 1961, p. 246-250.

Determination of minimum threshold concentration at which an additive prevents corrosion of ferrous materials in nonacid aqueous solutions containing dissolved air. Weight-loss experiments are used to measure inhibition of corrosion of Zn. (R10b; Fe, Zn)

739-R. An Experimental Survey of Rust Preventives in Water. Pt. 2. The Screening of Organic Inhibitors. P. Hersch, J. B. Hare, A. Robertson and Sheila M. Sutherland. Journal of Applied Chemistry, v. 11, July 1961, p. 251-265.

Screening of over 400 possible inhibitors, mainly organic, in nonacid aqueous solutions containing dissolved air for use in preventing corrosion of ferrous alloys. Polarization experiments. Inhibitors tested include sodium oxide, potassium ferrocyanide, carboxylates, ethers, sulphonates, amines, nonbasic nitrogen compounds and organic phosphorus compounds. 11 ref. (R10b; Fe)

740-R. An Experimental Survey of Rust Preventives in Water. Pt. 3. Some General Results. P. Hersch, J. B. Hare, A. Robertson and Sheila M. Sutherland. Journal of Applied Chemistry, v. 11, July 1961, p. 265-271.

Threshold concentration values of inhibitors given in tabular form. Table permits comparison of disk with drop tests, of brown with blue rusting tests, of chloride solutions with H_2O, of two complexant media with water and with each other and of mild steel with cast irons and Zn. Effect of pH and geometrical factors on thresholds. An hypothesis is presented to explain the action of some types of rust inhibitors. 8 ref. (R10b; CN, CI, Zn)

741-R. The High Temperature Steam Corrosion of Columbium-Vanadium Alloys. H. A. Fisch, D. L. Douglass and B. E. Dearing. Paper from "Columbium Metallurgy".

v. 10. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 597-612.

Corrosion behavior of binary Cb-V alloys containing up to 8.9 at.% V studied in steam at 360-482° C. Corrosion kinetics appear to fit a cubic rate law, the rates decreasing with increasing solute. Dilute alloys, containing less than 1.2 at.% vanadium form a Cb_2O_5 film, whereas alloys containing from 1.2 to about 3.6 at.% vanadium form a duplex scale of Cb_2O_5 and CbO_2. The 8.9 at.% alloy formed only CbO_2 which accounts for the superior corrosion resistance. (R4d, R1, 2-60, 2-61; Cb-b, V)

742-R. The Ignition of Columbium and Selected Alloys. J. W. Clark. Paper from "Columbium Metallurgy". v. 10. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 615-646.

Effects of environmental parameters on the oxidation characteristics of Cb and other alloys investigated at 1300-1500° C. When the energy release due to the exothermic oxidation reaction exceeds the heat removed by conduction, convection and radiation cooling, a spontaneous, self-propagating temperature rise occurs. This phenomenon, which has been termed "ignition," is observed in dynamic oxidation of unalloyed Cb at temperature of 1470° C. (R1h, 2-62; Cb-b)

743-R. The Oxidation of Columbium at Low Oxygen Pressures. H. Inouye. Paper from "Columbium Metallurgy". v. 10. Metallurgical Society of AIME. Interscience Publishers, Inc. New York 1, 1961, p. 649-664.

The oxidation of unalloyed Cb in O at pressures between 3 x 10-5 and 5 x 10-3 mm. Hg and temperatures of 850, 1000 and 1200° C. proceeds principally by solution of oxygen, internal oxidation, film formation and by an oxide-gas reaction. Characteristic rate curves for each of the oxidation stages are found and correlated with the formation of Cb-O solid solutions, CbO, CbO_2 and Cb_2O_5. (R1h, 2-61; Cb)

744-R. "Break-Away" Phenomena in the Oxidation of Columbium Single Crystals. R. E. Pawel, J. V. Cathcart and J. J. Campbell. Paper from "Columbium Metallurgy". v. 10. Metallurgical Society of AIME. Interscience Publishers, Inc. New York 1, 1961, p. 667-682.

Oxidation rate measurements and oxide morphology studies on single crystal specimens of Cb indicates that the process of gaseous oxidation from 400-245° C. is particularly dependent upon the crystallographic orientation of the metal. Specimens oriented within about 25° of (100) oxidize at least in the initial stages at a much slower over-all rate than is the case for the remaining orientations. (R1h, 2-61, 3-72; Cb, 14-61)

745-R. The Hot Water Corrosion Resistance of Columbium and Columbium Alloys. W. D. Klopp, W. E. Berry and D. J. Maykuth. Paper from "Columbium Metallurgy". v. 10. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 685-718.

Corrosion studies conducted in 600 and 680° F. water and in 750° G. steam on a large number of wrought binary and ternary Cb alloys. High purity Cb shows a greater degree of corrosion resistance than the commercial grade. However, base metal purity does not appear to have a significant effect on the corrosion behavior of Cb alloys. The effectiveness of binary Ti, Zr and V and of ternary Ti and Cr combinations is outstanding. (R4, 2-60, 2-61; Cb-b, Ti, Zr, V, Cr)

746-R. Oxidation Rate of Columbium as a Function of Temperature and Pressure. J. F. Brady and J. N. Ong, Jr. Paper from "Columbium Metallurgy". v. 10. Metallurgical Society of AIME. Interscience Publishers, Inc., New York 1, 1961, p. 719-737.

A simple model involving interactions between interstitial oxygen atoms in solution in a metal lattice accounts for the experimentally observed rate versus temperature cusps in Cb and correlates the experimental work over a wide range of experimental conditions. An analysis of data is performed under assumption of equilbrium but it is shown that subsequent kinetic processes may occur by the necessary extension of the model to include Schottky defects (vacancies). (R1h, M26s, 2-61, 3-74; Cb)

747-R. Developments in the End Use of Welded Pressure Vessels. G. K. Dudgeon. Canadian Welder, v. 52, Aug. 1961, p. 9-10, 12, 15.

Prevention and control of corrosion due to salts and acids in welded pressure vessels used in oil refinery units for topping and vacuum, catalytic cracking, naphtha desulphurization and catalytic reforming, distillate desulphurization and alkylation. (R10, R7, T26q, T29n; 7-51)

748-R. Stainless Steel for Corrosion and Oxidation Resistance. F. P. A. Robinson. South African Industrial Chemist, v. 15, Mar. 1961, p. 42-50.

Composition of conventional and newly developed stainless steels. Applications and mechanical working characteristics. Types of decomposition, their causes and means of prevention. (R-general, R1h, Q-general, 2-60; SS)

749-R. Atmospheric Corrosion on the South-East Coast. K. S. Rajagopalan, P. L. Annamalai and M. Sundaram. Journal of Scientific & Industrial Research, v. 20D, June 1961, p. 226-232.

Study of corrosion of mild steel, Zn, Al and Cu specimens exposed to marine and marine-industrial atmospheres containing sea water spray and SO_2 for 1-2 yr. periods at various sites along the coast of India. Corrosion rates are affected by both atmospheres and general climate conditions. 9 ref. (R3; CN, Zn, Al, Cu)

750-R. Influence of Anions and Acacia as Inhibitors on the Corrosion of Brass at Different PH Values. J. D. Talati, M. N. Desai and A. M. Trivedi. Journal of Scientific & Industrial Research, v. 20D, June 1961, p. 236-237.

Corrosion of 70-30 brass in solutions containing phosphate and acetate ions at 1.60-12.20 pH, with and without 1% additions of acacia powder. In the alkaline range phosphate and acetate ions act as inhibitors forming stable films. Acacia acts as an inhibitor in the acidic range but enhances corrosion in the alkaline range. (R10b, R1j, 2-60; Cu-n)

751-R. Oxidation of Iron in the Temperature Range of 260°-470° C. E. J. Caule, K. H. Buob and M. Cohen. Electrochemical Society, Journal, v. 108, Sept. 1961, p. 829-834.

The kinetics of the oxidation of ingot Fe in 19 mm. of O_2, rate constants and nature and composition of oxide films formed are studied as a function of time and temperature. Data are given for weight gain and order of occurrence of wustite, magnetite and hematite layers. 8 ref. (R1h, 2-61, 3-67; Fe)

752-R. The Annealing of Oxide Films on Iron. E. J. Caule and M. Cohen. Electrochemical Society, Journal, v. 108, Sept. 1961, p. 834-836.

The annealing reaction in vacuum of thin films of magnetite and hematite on Fe is studied at 463° C. The gravimetric curves obtained for growth of magnetite and decay of hematite are compared with the curves of growth of both during oxidation at 5.75 cm. pressure of oxygen. 4 ref. (R1h, 2-64; Fe)

753-R. Corrosion and Electrochemical Behavior of Chromium-Noble Metal Alloys. N. D. Greene, C. R. Bishop and M. Stern. Electrochemical Society, Journal, v. 108, Sept. 1961, p. 836-841.

Alloying Cr with 0.5% Pt, Pd, Ir, Rh, Ru or Os markedly improves its corrosion resistance to nonoxidizing acids such as H_2SO_4 or HCl. Rh, Pd or Os have little effect on resistance of an oxidizing acid such as HNO_3 while Pt, Ir or Ru greatly increases corrosion rates. The phenomena are related to the passive and transpassive behavior or Cr and the electrochemical nature and corrosion behavior of the metal. 28 ref. (R6g, P15, 2-60; Cr-b, Pt, Pd, Ir, Rh, Ru, Os, EG-c)

754-R. Microstructure Vs. Corrosion Resistance. W. K. Boyd. Metals Engineering Quarterly, v. 1, Aug. 1961, p. 15-29.

Analysis of the relationship between crystal structure and corrosion phenomena. Data are presented for stainless casting alloys, Ni-base casting alloys, wrought Ti and Zr-U alloys. 6 ref. (R4, M27, 2-60; SS, Ti-b, Zr-b, Ni-b)

755-R. (Ukranian.) Electric Transfer of Solid Gold. P. P. Kuzmenko and V. S. Hrim. Ukraninskii Fizichnii Zhurnal, v. 6, Jan. 1961, p. 140-142.

Determination of oxidation, evaporation and mass transfer in two samples of Au (99.99%) joined together as cathode and anode and activated by a d.c. current.

Measurement of mass transfer (from cathode to anode) by analytic scales. Tabulation of data. 10 ref. (R2a, R1h, N16n, 1-52; Au)

756-R. The Oxidation of Reactor Steels in Carbon Dioxide. C. Moore and T. Raine. Paper from "Steels for Reactor Pressure Circuits". no. 69. Iron and Steel Institute, London SW 1, England, 1961, p. 136-156.

Effects of carbon dioxide with small amounts of carbon monoxide and water vapor at elevated temperatures on various commercial and special low-alloy steels studied as part of a development program for steels to be used in graphite-moderated carbon dioxide cooled nuclear reactors. At the higher temperatures, nonuniform attack with attendant carburization at the grain boundaries is observed on most of the steels. (R1h, 2-62, 2-66, T26q; AY, 17-57)

757-R. The Corrosion of Pressure Circuit Materials in Boiling and Pressurized-Water Reactors. F. L. LaQue and M. A. Cordovi. Paper from "Steels for Reactor Pressure Circuits". no. 69. Iron and Steel Institute, London SW 1, England, 1961, p. 157-178.

Potential corrosion and erosion problems can be alleviated effectively by proper selection of materials for critical areas in such plants. The short operating time accrued to date in nuclear central stations does not afford a basis for assessment of the full extent to which deposition of activated corrosion products throughout the pressure circuit systems might complicate plant maintenance. Decontamination procedures give assurance that disposal of any activated crud can be accomplished in a practical manner. (R-general, T26q, T11)

758-R. The Corrosion of Iron and Steel in Liquid Sodium. C. Tyzack. Paper from "Steels for Reactor Pressure Circuits". no. 69. Iron and Steel Institute, London SW 1, England, 1961, p. 179-195.

Two types of processes may give rise to loss in metal section-solution or mass transport phenomena and processes involving chemical reactions between metal surfaces and impurities in the sodium. General thermodynamic considerations of the oxidation process. (R6m, R1h, 3-69; Fe-b, Na)

759-R. Why Does Stainless Steel Corrode? Morgan Sinclaire and Eugene Phillips. Metal Progress, v. 80, Sept. 1961, p. 92-96.

Unexpected corrosion of stainless steel can occur unless certain precautions are taken during fabrication and while parts are in service. Sensitization, carburization, sources of hydrochloric acid and dirt are the main causes of failure. (R-general, 2-66; SS)

760-R. Exposure Testing of Protective Paints for Metals. C. A. Lominska. Materials Research & Standards, v. 1, Aug. 1961, p. 620-624.

Preparation, installation and testing of painted or galvanized steel panels, as mounted in exposure fences and marine racks, to gage the effect of weather and salt water on corrosion resistance. (R3, R4, 1-54; ST, 8-65, 8-70)

761-R. Stress-Corrosion Cracking of the AZ31B Magnesium Alloy. Hugh L. Logan. Journal of Research, National Bureau of Standards, Engineering and Instrumentation, v. 65C, July-Sept. 1961, p. 165-169.

The incubation period prior to stress-corrosion cracking and its initiation in AZ31B Mg alloy specimens exposed to constant tensile load in an aqueous solution of NaCl and K_2CrO_4 are studied using electrochemical solution potential-time and extension-time oscillograph curves obtained simultaneously. Strain rate associated with crack initiation is analyzed with crystallographic data given for stress corrosion-cracked and crack-free crystals. 10 ref. (R1d, M-general, 2-66, 3-68; Mg-b)

762-R. Coatings Formed on Steel by Cathodic Protection and Their Evaluation by Polarization Measurements. W. J. Schwerdtfeger and Raul J. Manuele. Journal of Research, National Bureau of Standards, Engineering and Instrumentation, v. 65C, July-Sept. 1961, p. 171-181.

Carbonate and silicate protective coatings observed on cathodically protected cold rolled steel rods exposed to city water containing 3% NaCl addition. The instantaneous corrosion rates on the coated rods, scratched and unscratched, while without protective currents are measured by changes-in-slope in polarization curves. (R10d, R2; ST)

763-R. In-Pile Corrosion of an Aluminum Alloy. Noel P. Shiells, Robert O. Bolt and James G. Carroll. Nucleonics, v. 19, Sept. 1961, p. 99, 102-103.

The composition, causes and mechanism of corrosive deposits on a 6061 T6 Al alloy in-pile shuttle-tube apparatus are studied as functions of the design and operating conditions of the shuttle-tube, the effects of air and water radiolysis and the formation of nitric acid. 21 ref. (R1, R6g, T11, 1-53, 2-66, 2-67; Al-b)

764-R. (German.) New Applications of Lead. E. Meckelburg. Metall, v. 15, Aug. 1961, p. 780-781.

Review of applications and properties such as corrosion and radiation resistance of "Insmetals" which are metals plated with Pb by rolling, pressing or liquid coating including "Bauxilium" (Al or Al alloy base), "Cupralum" (Cu or Cu alloy base), "Ferrolum" (steel base), "Nicrolum" (alloyed steel base) and "Ferro-Nicrolum" (alloy steel-plated steel base). (R-general, Q-general, 2-67; Al-b, Cu-b, Fe-b, 8-65, 8-66, Pb, 17-57)

765-R. Corrosion Problems and Their Treatment--Materials of Building Construction. Corrosion Prevention & Control, v. 8, Aug. 1961, p. i-iv.

Environmental corrosive conditions in underground pipes, water and heating systems, gutters, window frames and outside metalwork are discussed with methods of preventing and combatting domestic corrosion. (R-general)

766-R. Oxide Films Formed on Metal Surfaces During Corrosion. Corrosion Prevention & Control, v. 8, Aug. 1961, p. v-vi, viii.

Thicknesses of cuprous oxide and cupric oxide films are measured on four different crystallographic planes of Cu single crystals immersed in oxygenated water to determine the effect of oxygen concentration on thickness and rate of film formation. (R1h, 2-66; Cu, 14-62, 14-68)

767-R. Titanium in Dilute Acids. Corrosion Prevention & Control, v. 8, Aug. 1961, p. vii-viii.

Pure Ti and Ti alloys are tested in sulphuric acid and phosphoric acid solutions at room temperature and 80° C. to determine resistance to acid attack. The use of anodic protection to prevent Ti corrosion is investigated. (R6g, Ti)

768-R. Advances in Nickel and Chromium Plating. T. E. Such. Corrosion Prevention & Control, v. 8, Aug. 1961, p. 29-35.

Mechanisms of corrosion of Ni-Cr plating are considered as functions of atmosphere, composition, thickness, possivity and plating parameters. Determination of the coating system giving maximum corrosion protection. (R1, 2-60, 2-66; Ni, Cr, 8-62)

769-R. Corrosion Resistance of Vitreous1 Enamel. R. H. Chandler. Corrosion Prevention & Control, v. 8, Aug. 1961, p. 42, 41.

The testing of vitreous enamel coatings used in washing machine tubs by alkaline corrosive solutions containing ingredients found in commercial detergents. Determination of the corrosion resistance of the enamels, of the effects of detergents upon corrosion resistance and of the composition of a standard test solution for enamels. (R6j, 1-54; 8-71)

770-R. The Transition From Internal to External Oxidation and the Formation of Interruption Bands in Silver-Indium Alloys. R. A. Rapp. Acta Metallurgica, v. 9, Aug. 1961, p. 730-741.

Wagner's theory for the transition as caused by the blocking of the diffusion processes upon the formation of a critical vol. % of the internal oxide in the matrix is evaluated for the Ag-In system and tested at 550° C. at oxygen pressures of 1 atm. to 10^{-4} mm. Hg. The formation of 30% In_2O_3 in the Ag matrix is a valid criterion for the transition. The formation of interruption bands when a sudden pressure drop occurs during the internal oxidation is evaluated with the conclusion that a double reversal of the oxidation front occurs as suggested by Meijering. 16 ref. (R2s, R1h, 2-60, 2-61, 3-74; Ag-b, In)

771-R. (Italian.) Department of Electrochemistry. Istituto Sperimentale dei Metalli Leggeri--Rapporto Annuale 1960, 1961, p. 47-57.

Study of corrosion phenomena in the chemical industry. Effect of climate, acids, bases and temperature on corrosion of light alloys. Control of efficiency

of protective coatings and investigation of anodic current as an accelerating medium in corrosion testing of Al-Mg alloys. (R6, 2-61, R10c, R11; EG-a39, Al-b, Mg)

772-R. (Translation-ConBur.) Corrosion and Electrochemical Behavior of Stainless Steels During Cathodic Polarization in Nitric Acid Solutions. E. N. Mirolyubov, M. M. Kurtepov and N. D. Tomashov. Academy of Sciences of the USSR, Bulletin, Division of Chemical Science, June 1960, p. 949-954.

Characteristics of dissolution of 1Kh18N11B steel in nitric acid solution during cathodic polarization are studied as functions of steel potential, acid concentrations and temperature in the corrosion rate. Corrosion of active stainless steel in dilute nitric acid is indicated to be controlled by diffusion because of the slow supply of acid to the steel surface. 14 ref. (R6g, 2-60, 2-61; SS)

773-R. (Translation-ConBur.) Some Results of a Study of Structural Transformations and Properties of the Oxide Film on Aluminum Surfaces. A. Domony and E. Lichtenberger. Journal of Applied Chemistry of the USSR, v. 33, Sept. 1960, p. 1920-1931.

Hydration and structural transformation of hydrargillite, boehmite, alumina and other oxides are studied as functions of temperature, pressure and Al ion diffusion. 20 ref. (R1h, N-general, 2-61, 3-74; Al-b, 14-68)

774-R. (Translation-ConBur.) Action of Concentrated Nitric Acid on Carbon Steel. I. P. Mukanov, S. D. Beskov and L. I. Kochetkova. Journal of Applied Chemistry of the USSR, v. 33, Sept. 1960, p. 2054-2063.

Study of the nature and mechanism of intergranular corrosion of Armco iron and 20, 40 and 70 steels with carbon contents of 0.195%, 0.39% and 0.69% respectively. Corrosion and dissolution rates are determined as a function of temperature and acid concentration at 20-60° C. at up to 500 hr. exposure. 11 ref. (R6g, 2-61; CN)

775-R. (Translation-ConBur.) Action of Molten Halides on Nickel, Copper, Iron and Certain Steels. E. I. Gurovich. Journal of Applied Chemistry of the USSR, v. 33, Sept. 1960, p. 2064-2068.

Measurement of corrosion resistance of Ni, Cu, Armco iron and Kh18N9T stainless steel in molten AlF_3-NaF, KBr and KI melts at 800-900° C. (R6j, 2-61; Cu, Ni, Fe-b, ST)

776-R. (Translation-ConBur.) Thickness and Protective Action of Passive Fil Films on Tin. A. I. Levin, M. E. Prostakov and V. P. Kochergin. Journal of Applied Chemistry of the USSR, v. 33, Sept. 1960, p. 2069-2074.

Thickness of passive films formed on Sn in alkaline solutions containing sodium chromate is measured by optical polarization and expressed as a function of time and current density. 25 ref. (R10c, L14c, 3-67; Sn)

777-R. (Translation-ConBur.) Corrosion and Electrochemical Behavior of Stainless Steels Under Cathode Polarization in Nitric Acid Solutions. Communication 3. Effect of Steel Composition. E. N. Mirolyubov, M. M. Kurtepov and N. D. Tomashov. Academy of Sciences of the USSR, Bulletin, Division of Chemical Science, July 1960, p. 1098-1103.

Effects of various alloying elements on the corrosion resistance of stainless steels in 3% nitric acid solution. Measurement of corrosion rates and electrochemical behavior of steels containing different concentrations of Cr, Ni, Mo and Ti. 12 ref. (R6g, R1j, 2-60; SS)

778-R. (Translation-ConBur.) Corrosion and Electrochemical Behavior of Stainless Steels Under Cathode Polarization in Nitric Acid Solutions. Communication 2. Cathode Processes on Stainless Steels in Nitric Acid Solutions. E. N. Mirolyubov, M.M. Kurtepov and N. D. Tomashov. Academy of Sciences of the USSR, Bulletin, Division of Chemical Science, July 1960, p. 1092-1097.

Formation of nitrous acid during cathode polarization of stainless steels in nitric acid solution. Measurement of corrosion rates and activation potentials at varying concentrations. Determination of the relationship of the cathode current density on the steel to the rate of dissolution in nitrous acid. 17 ref. (R6g, R1j; SS)

779-R. High-Temperature Oxidation of Aluminium-Magnesium Alloys in Various Gaseous Atmospheres. R. A. Hine and

R. D. Guninski. Institute of Metals, Journal, v. 5, July 1961, p. 417-422.

Oxidation kinetics for Al-Mg specimens in CO_2, Ar, O and dry and undried air studied at 440-540° C. Investigation of oxide film composition, the nature of discolorations and the effects of annealing and of composition including small additions of Be on oxidation mechanisms. (R1h, 2-60, 2-64, 2-66; Al-b, Mg, Be)

780-R. Atmospheric Corrosion Behavior of Two Structural Aluminium Alloys (H10 and H15). E. A. G. Liddiard and J. A. Whittaker. Institute of Metals, Journal, v. 5, July 1961, p. 423-428.

Exposure tests of up to 8 yr. in industrial and marine atmospheres on test panels and weldments showing that the atmospheric corrosion rate of HE10 decreases with time exponentially and that after a variable incubation period, HE15 suffers rapid exfoliation (layer) corrosion which is linear with time. Investigation of corrosion mechanism and effects of protective anodic coatings in preventing both exfoliation and short transverse stress corrosion. 7 ref. (R3, 3-67; Al-b)

781-R. (English.) Electrochemical Techniques in Stress-Corrosion Cracking. T. P. Hoar. TVF (Teknisk-Vetenskaplig Forskning), v. 32, Mar. 1961, p. 93-103.

Electrochemical methods of investigating the mechanism of cracking include measurement of potential under controlled conditions, applied to Al and Ti alloys, stainless and other alloy steels and brass. 13 ref. (R1d, 1-54; Al-b, Ti-b, SS, AY)

782-R. Corrosion Inhibition of Aluminum-Zinc in Hydrochloric Acid Solution. K. G. Sheth and T. L. Rama Char. Corrosion Technology, v. 8, Aug. 1961, p. 233-234.

Inhibitive efficiencies of acridine, nicotinic acid, thiourea, strychnine and quinine hydrochloride on the corrosion of D. T. D. 687 aircraft Al-Zn alloy measured as a function of concentration weight loss and by polarization methods of effect of current density on cathode polarization and anode weight loss. 14 ref. (R10b, R10d)

783-R. Economic Aspects of Preventive Maintenance of Refinery Tanks. P. W. Sherwood. Corrosion Technology, v. 8, Aug. 1961, p. 235-238, 249.

Cathodic protection, painting and metal and plastic lining methods for corrosion prevention and various repair techniques as opposed to replacement for steel refining tanks are evaluated in terms of maximum protection efficiency and over-all costs. (R-general, R10d, L-general, T29s, 17-52, 17-53, 18-72; ST, 17-57)

784-R. Automatic Impressed-Current, Sacrificial and Combined Cathodic Protection Systems. Corrosion Technology, v. 8, Aug. 1961, p. 250-252.

Automatic, variable current flowing through sacrificial Pb anodes is used to prevent corrosion of steel hulls, rudders and propellers. Operating principles and equipment design are reviewed for Readermatic, Readermajor and Readerminor control systems. (R10d, T22; ST, Pb, 17-57)

785-R. Humidity and Temperature Effects on Atmospheric Corrosion Rates. R. Le Mar. Rock Island Arsenal Laboratory. U. S. Office of Technical Services, PB 171547, Feb. 1961, 17 p. $.50.

The effectiveness of controlled warehouse storage in protecting steel against corrosion can be increased by the addition of absorption beds and filters to the warehouse's humidity control units. Use of absorption beds of iron oxide in warehouses is recommended to remove contaminant gases which might prove corrosive to the stored items. Filtering techniques using electrostatic precipitation and centrifugal or washing methods are considered feasible for eliminating airborne particles which act as corrosive agents on metal surfaces. (R10g; ST)

786-R. The Use of Volatile Corrosion Inhibitors as a Preservative Medium for Long Term Storage of Ordnance Material. Addendum 7. Results After Ten Years of Exposure. R. E. Johnson. Rock Island Arsenal Laboratory. U.S. Office of Technical Services, PB 171516, Feb. 1961, 49 p.

Volatile inhibitors prove as effective as petrolatum type corrosion preventives in protecting gun and howitzer tubes and other sintered and nonferrous specimens of ordnance material from rust during a 10-yr. storage period. Use of these inhibitors to impregnate paper for

packaging gun and howitzer tubes for storage should provide savings in time and labor because, unlike the petrolatum type preventive, they require no degreasing after removal of the material from storage. (R10b, R10e, T2)

787-R. (Translation-ConBur.) Study of Pitting Corrosion of a Metal Under Stress by a Model Method. L. N. Tarasova, V. V. Romanov and N. I. Kudinova. Journal of Applied Chemistry of the USSR, v. 33, Oct. 1960, p. 2252-2257.

Effect of tensile stresses, degree of stress concentration and pit diameter on current direction and strength in specific corrosion couples made up of d-16 Al alloy and Cu wire. 7 ref. (R1a, R1d, R2j, 3-66; Al-b, Cu, 4-61, 7-59)

788-R. (Translation-ConBur.) Study of the Corrosion Cracking of 1Kh18N9 Steel in Chlorides in Presence of Organic Inhibitors. N. I. Podobaev and S. A. Balezin. Journal of Applied Chemistry of the USSR, v. 33, Oct. 1960, p. 2258-2266.

Corrosion testing of stainless steel specimens in $MgCl_2$ and $CaCl_2$ media at 153° C to determine the effect of inhibitor concentration on corrosion resistance and of polarization on the effectiveness of the inhibitor. 10 ref. (R10b, R6j, 9-72; SS)

789-R. (Translation-ConBur.) An Inhibitor of Pitting Corrosion. N. G. Chen. Journal of Applied Chemistry of the USSR, v. 33, Oct. 1960, p. 2267-2271.

Low-carbon steel specimens are tested in salt water solutions at room and boiling temperatures to determine the effectiveness of coke oven waste waters as local corrosion inhibitors. 6 ref. (R2j, R10b, R11j; CN-g)

790-R. (Translation-ConBur.) Use of Coke-Oven Waste Waters for Protection of Metals Against Corrosion. N. G. Chen. Journal of Applied Chemistry of the USSR, v. 33, Oct. 1960, p. 2272-2276.

Protective properties of coke oven waste waters in neutral, alkaline and acid mediums are studied by corrosion tests on medium and low-carbon steel specimens. (R10b; CN)

791-R. (Translation-ConBur.) Electrochemical Behavior of Steel in Concrete. V. S. Artamonov. Journal of Applied Chemistry of the USSR, v. 33, Oct. 1960, p. 2277-2284.

Study of the corrosion resistance of steel in concrete under a d-c. by determination of corrosion losses with gravimetric methods and electrochemical investigations. 5 ref. (R1j, R6q, P15g; ST, NM-f43)

792-R. (Translation-ConBur.) Study of the Rates of Dissolution of a Titanium Alloy in Sulphuric and Hydrochloric Acid Solutions of Various Concentrations. E. S. Bruile and N. S. Dambrovskaya. Journal of Applied Chemistry of the USSR, v. 33, Oct. 1960, p. 2327-2329.

Investigation of the corrosion rate of a Ti-5.7% Al alloy as a function of nature and concentration of the acid. 4 ref. (R6g; Ti-b, Al)

793-R. (Translation-ConBur.) Amine Salts of Certain Inorganic Acids as Inhibitors of Atmospheric Corrosion of Metals. S. A. Gintsberg and A. V. Shreider. Journal of Applied Chemistry of the USSR, v. 33, Oct. 1960, p. 2334-2337.

Corrosion test results for steel, Zn and Ni specimens protected by packing paper containing tungstate, molybdate, phosphate and tetraborate amine inhibitors. Specimens are exposed to air atmospheres at 40-20° C. and 92-94% humidity. 4 ref. (R10b, R10e, R3; ST, Zn, Ni)

794-R. High Temperature Aqueous Corrosion of Aluminum-Uranium and Aluminum-Silicon-Uranium Alloys. H. C. Bowen and R. L. Dillon. Corrosion, v. 17, July 1961, p. 9-11.

Tests in deionized water at 350° C. to predict corrosion behavior show no significant sample distortion when there are minor openings in the jackets. Al alloys containing less than 6% U are unsatisfactory but Al-Si alloys containing up to 6% U are satisfactory. Some as-cast Al-U alloys are preferable to Al-Si in terms of corrosion resistance. (R4, T11; 2-60, 2-62, 2-66; Al-b, U, Si)

795-R. High Temperature Aqueous Corrosion of Aluminum-Plutonium and Aluminum-Silicon-Plutonium Alloys. H. C. Bowen. Corrosion, v. 17, July 1961, p. 12.

Alloys are tested in deionized water at 350-360° C. in a static autoclave indicating that low percentage Al-Pu alloys have little resistance to corrosion

but that resistance increases as a function of increased Pu. Working of material drastically decreases resistance. Si additions make some alloys resistant to attack, for at least 24 hr., and also less sensitive to working. (R4, T11, 1-53, 2-60, 2-62, 2-66; Al-b, Pu, Si)

796-R. Corrosion Problems of Central Power Station Turbines and Condensers. A. Bayard Sisson. Corrosion, v. 17, July 1961, p. 18-24.

Seizing of turbine control and stop valves at temperatures over 900° F. due to corrosion of nitrided surfaces indicates use of morpholine to control alkalinity. Turbine blade failure, originally attributed to corrosion fatigue, is discovered to be the result of inadequate fatigue limit of the blade material and not sodium hydroxide carry over. Wastage of turbine blades is attributed to corrosion-erosion where steam and water both are present. Gases responsible for the accelerated attacks are oxygen, carbon dioxide and sulphur dioxide at low pH values. Stainless steel, Al and brass are evaluated for use in condenser tubes. (R1c, 2-64, 2-66, T7h; SS, Al, Cu-n)

797-R. Laboratory Tests Give Rapid Evaluation of Ship Bottom Coatings. J. R. Brown. Corrosion, v. 17, July 1961, p. 28-30.

Rapid evaluation, easy replication and controlled conditions are possible with lab tests but not on ship trials. Tests are conducted to study dry dock variables, wash primer for pretreatment and influence of coatings on pitting rate of protected steel. (R4, 1-53, R10f, T22g; ST)

798-R. Deep Well Ground Beds for Cathodic Protection of Multiple Lines in Highly Congested Industrial Areas. J. R. Gates. Corrosion, v. 17, July 1961, p. 75-76.

Deep-well type installation with high Si-Fe anodes and elaborate control system protects seven pipe lines in highly congested area where conventional ground beds cannot be used. (R10d, T26r)

799-R. Pitting Corrosion by Water Flood Brines. P. J. Raifsnider and A. Wachter. Corrosion, v. 17, July 1961, p. 77-80.

Testing reveals trace amounts of oxygen are responsible for pitting in closed system floods of secondary recovery operations in oil fields and indicates that the addition of an oxygen scavenger, such as sodium sulphite, prevents corrosion. (R4h, R10b; T29n)

800-R. Corrosion of Steels in Boiling Potassium Carbonate Saturated With Carbon Dioxide and Hydrogen Sulphide. D. Bienstock and J. H. Field. Corrosion, v. 17, July 1961, p. 89-91.

Solutions of potassium carbonate used in absorbing CO_2 and H_2S are corrosive to carbon steels and 410 stainless steel and less corrosive to 304 and 347 stainless and Monel. Presence of H_2S with CO_2 reduces the corrosiveness of the solution. (R6, 1-53, T29)

801-R. Stress-Corrosion Cracking--A Review of Current Status. W. Lee Williams. Corrosion, v. 17, July 1961, p. 92-96.

Classification of various modes of cracking including static and cyclic stresses, tensile and compressive stresses, electrochemical mechanisms, molten phase attack and hydrogen cracking. Electrochemical phenomena and metallurgical and chemical factors in cracking mechanism. (R1d, R11)

802-R. Corrosion of Metals in Tropical Environments. A. L. Alexander, C. R. Southwell and B. W. Forgeson. Corrosion, v. 17, July 1961, p. 97-104.

Eight-year exposure tests in Panama Canal Zone in various marine or freshwater environments to evaluate structural steels, phosphor bronze and naval brass. Tests on stainless steel galvanically coupled to carbon steel strips indicate applications of stainless steel for temperate climates and in tropical fresh water but not for sea water service. (R4a, R4b; 1-54; ST, Cu-b)

803-R. Effect of Mineral Impurities in Water on the Corrosion of Aluminum and Steel. Leonard C. Rowe and Monte S. Walker. Corrosion, v. 17, July 1961, p. 105-108.

Several common mineral constituents in water including chloride, sulphate, bicarbonate, carbonate, Ca, Mg and silicate do not affect Al. Chloride and sulphate are detrimental to

steel. Mixed solution containing soluble salts of Cu, chloride and bicarbonate accelerates corrosion rate of Al. Pitting depends upon impurity, concentration and temperature. (R4, 2-60, 2-61, 3-69; ST, Al)

804-R. Oxidation of Iron-Chromium Alloys at 750-1025C. D. Lai, R. J. Borg, M. J. Brabers, J. D. Mackenzie and C. E. Birchenall. Corrosion, v. 17, July 1961, p. 109-116.

Investigation of rate of oxidation of Fe alloys containing 0.2-10% Cr. Factors affecting corrosion rate include chrome concentrations, scale fracture, temperature and chemical equilibrium. (R1h, 2-60, 2-61, 2-66; Fe-b, Cr)

805-R. Pipe-Type Cable Corrosion Protection Practices in the Utilities Industry. Corrosion, v. 17, July 1961, p. 119-124.

Factors affecting high pressure oil and gas cables with coatings of asphalt mastic, epoxy, coal tar and asphalt enamel as functions of operating conditions, coating thickness and the type of reinforcing and shielding used. Wider use of resistor-rectifier method of cathodic protection during investigation period (1953-1958). (R10d, R10f, T26r)

806-R. Magnesium Anodes for the Cathodic Protection of Naval Vessels. L. J. Waldron and M. H. Peterson. Corrosion, v. 17, July 1961, p. 125-127.

Investigation of performance of magnesium anodes on destroyers indicates that if excess coated anodes are attached to those required for initial protection, a 3-yr. service life can be obtained by removing the coating from time to time, as indicated by potential measurements. (R4b, R10d, R10f, T22)

807-R. (English.) Crack Formation in Steel During Electrolytic Hydrogen Absorption. F. de Kazinczy. TVF (Teknisk-Vetenskaplig Forskning), v. 32, Mar. 1961, p. 159-162.

Effect of hydrogen and its electrolytic absorption and mechanical stress on blister and delayed fracture types of crack formation in Cr-Ni, Mn-Mo and chromium-aluminum-molybdenum steels, mild steel and mild steel with Ti is examined to establish a means of reducing blister cracks. 5 ref. (R1, R2n, 2-66, 3-66; CN, ST, Al, Cr, Mn, Mo, Ni, EG-n)

808-R. (English.) Stress Corrosion Cracking in Austenitic Stainless Steels. Apparatus for Testing in High Pressure Water of High Temperature. Gunnar Lindh. TVF (Teknisk-Vetenskaplig Forskning), v. 32, Mar. 1961, p. 152-158.

Examination of the susceptibility of 18-8 Type steels to stress corrosion cracking in extended contact with water in an atomic reactor. Details on experimentation apparatus and high pressure system. (R1d, T11, 2-62, 2-66, 3-74; SS)

809-R. (English.) Influence of the Chloride Ion Concentration on the Stress Corrosion of Stainless Steels at Different Temperatures. Stig Berg and Sture Henrikson. TVF (Teknisk-Vetenskaplig Forskning), v. 32, Mar. 1961, p. 145-151.

Determination of minimum chloride ion concentration required to cause corrosion and of the influence of composition and stress in the specimen, composition of corrosive medium and temperature. 4 ref. (R1d, 2-60, 2-61, 2-66, 3-66; SS)

810-R. Evaluation of Metal Alloys for Cladding the Fuel Elements in a High Temperature Nitrogen-Cooled Reactor. G. W. Titus and J. S. Brunhouse. American Nuclear Society, Transactions, v. 4, June 1961, p. 148.

Hastelloy-X, Inconel 702 and Inconel compared for structural stability, corrosion resistance and resistance to intergranular oxidation. A relatively low thermal and epithermal neutron absorption cross section is necessary. (R1, R11, T11, 2-62, 2-67, 17-57; Ni-b)

811-R. The 'New Look' in Pipeline Insulation. Chemical Processing, v. 24, Sept. 1961, p. 96-98.

Chemical plant pipes are given for chemical, fire and abrasion resistance by stainless steel jacketed calcium silicate insulation. (R10, T29m; SS, NM-a37)

812-R. Coating Systems for Steel at 250-1200° F. Gatewood Norman. Corrosion, v. 17, Sept. 1961, p. 12-20.

Tests of coatings suitable for steel process vessels, piping and equipment operating at 250-1200° F. Materials tested include silicones, Al-coated steel, Al sheathings, alkyds, Zn-rich organics, catalyzed epoxy, air-drying phenolics and inorganic zinc silicates. Influence of grit size in sandblasting for surface preparation. (R11, L-general, T29, 1-52, 2-61)

813-R. Laboratory Development of Corrosion Inhibiting Coatings for Mine Hoist Wire Rope. W. Dingley. Corrosion, v. 17, Sept. 1961, p. 22-28.

Testing of a asphalt-zinc chromate-trichlorethylene compound designed to protect Zn-coated and galvanized steel wire rope. Results indicate better protection against corrosion from moisture in mine environments. 4 ref. (R10, T7g; ST, 4-61, 8-61)

814-R. Corrosion Problems in a Sinter Plant Exhaust Gas System. R. J. Schmitt. Corrosion, v. 17, Sept. 1961, p. 425t-429t.

Corrosion caused by condensation of sulphurous, sulphuric and hydrochloric acids is minimized by maintenance of metal-surface temperature above acid dew points and by use of insulation and protective coating. 5 ref. (R10, 2-61)

815-R. Effect of Solution pH on the Mechanism of Stress Corrosion Cracking of a Martensitic Stainless Steel. H. J. Bhatt and E. H. Phelps. Corrosion, v. 17, Sept. 1961, p. 430t-434t.

Investigation of stress corrosion cracking of USS 12 MoV stainless steel in a 3% NaCl solution saturated with oxygen indicates that time to failure increases with increase in pH (3 to 11) but that cracking does not occur when pH is 11.5 or higher. Effect of anodic and cathodic polarization on cracking at different pH levels. (R1d, R10d, 2-66; SS-c)

816-R. Hydrogen Service Failures of Welds With Insufficient Alloy Content. R. W. Manuel. Corrosion, v. 17, Sept. 1961, p. 435t-436t.

Hydrogen damage is examined in a weld in the channel of a reactor charge-effluent exchange operating at 950° F. and hydrogen partial pressure of 375 psi. Weld failures due to low Cr and Mo content of steel weld alloy. (R7d, T29n, 2-60, 2-61, 3-74; ST, Cr, Mo, EG-n, 7-51)

817-R. High Temperature Scaling of Hafnium in Air. J. D. Gadd and E. B. Evans. Corrosion, v. 17, Sept. 1961, p. 441t-445t.

Hf is compared with Zr at 600-1200° C. to determine effect of scale cracking on scaling rate and the influence of nitrogen, in the presence of oxygen, on crystal structure and compositional change. 12 ref. (R2q, 2-61, 2-66; Hf, Zr)

818-R. Continuous Recording of Pipe-To-Soil Potential Vs. Distance. Robert L. Davis. Corrosion, v. 17, Sept. 1961, p. 446t-448t.

Equipment and procedure for continuous recording of pipe to soil and other potentials significant in cathodic protection of underground metallic structures. Process locates "hot spots" with accuracy, thus improving protection efficiency at these points. (R10d, R8)

819-R. Tentative Recommended Minimum Requirements for Hot Applied Wax-Type Protective Coatings and Wrappers for Underground Pipelines. Corrosion, v. 17, Sept. 1961, p. 449t-450t.

Composition, physical properties and test methods for primers, microcrystalline, shield and outerwrap coating. Processes for application and maintenance of coverings. (R10, T26r; 11-62)

820-R. Tentative Recommended Specifications and Practices for Prefabricated Plastic Films for Pipeline Coating. Corrosion, v. 17, Sept. 1961, p. 451t-452t.

Specifications and practices for prefabricated plastic films utilized for coating metal pipelines. Material considered include pressure-sensitive plastic tapes, plastic film with adhesive coating, tape laminates and extruded plastic coatings. Application, cleaning, priming, coating, wrapping, inspection and repair processes for films. (R10, T26r, 17-57; NM-d, 11-62)

821-R. (Italian.) Advantages and Disadvantages of Light Alloys. Giacomo Storace. Macchine, v. 16, Aug. 1961, p. 873-881.

Painting, plating, insulating and passivation of Al and Al alloys to prevent chemical and electrochemical corrosion. (R10; Al-b)

822-R. (English.) Sulphuration of Copper and Silver With Benzene Solutions of Sulphur. J. Llopis, J. M. Gamboa and L.

Arizmendi. Electrochimica Acta, v. 4, Aug. 1961, p. 294-305.

Type and rate of corrosion and nature of films formed during surface reactions. Relationship between kinetic law and time and experimental energy of activation. 26 ref. (R7g, P13a; Cu, Ag)

823-R. (Japanese.) On the Crack Length and the Low Temperature Brittleness of a Carbon Steel Subjected to Corrosion Fatigue. Kichiro Endo, Kin-ichi Nagai and Kenji Arizaki. Japan Society of Mechanical Engineers, Transactions, v. 27, July 1961, p. 1100-1106.

Study of cracks caused in smooth specimens by corrosion fatigue in saline solutions and of the effect of such fatigue on low temperature brittleness. Effect and relationship of cyclic rates, stress, notch effects, time and transition temperature. 6 ref. (R1e, R6k, Q26s; CN)

824-R. (French.) Temporary Corrosion Protection. Trempe, no. 39, Sept. 1961, p. 22-33.

Protection of metal parts by removable coatings and corrosion testing in a salt spray. Various coating substances are listed with the corresponding times, in months, for which they provide corrosion protection. (R10f, R11j)

825-R. (Italian.) The Behavior of Various Types of Aluminum in Continuous Immersion Tests in Presence of Fouling. E. Mor. Alluminio Nuova Metallurgia, v. 30, June 1961, p. 299-310.

Corrosion testing of Al, Aluman, Pe 25, Pe 50, Ac 11, Av 22 and Eg 55 alloys at the marine stations in Genoa harbor. The degree of corrosion, which is less in super purity Al, Aluman, Pe 25 and Pe 50 alloys, is increased in others by differential aeration. Effect of the pH variation on corrosion resistance. (R4b, 1-54, R11h, 2-60, 2-66; Al-b)

826-R. Prevention of Exfoliation Corrosion of an Aluminium Alloy (HE_{15}) by Extended Ageing. Winifred A. Bell and Hector S. Campbell. Institute of Metals, Journal, v. 89, Aug. 1961, p. 464-471.

Laboratory produced Al alloy extrusions containing 3·8 to 4·6% Cu and aged for various times between 165 and 200° C. are subjected to intermittent salt spray. Provided that the Cu content is not exceptionally low, exfoliation corrosion of this material can be practically eliminated by aging at 185° C. for 24 hr. Data are given for aging and composition effects on mechanical properties. (R2n, R11j, Q-general, 2-60, 2-65; Al-b)

827-R. (German.) Economical Importance of Corrosion and Corrosion Protection. Kurt Schwabe. Chemische Technik, v. 13, May 1961, p. 249-252.

Tabulation of financial losses incurred by corrosion of steel, Fe and nonferrous metals by various means throughout the world with a summary of the principle methods of corrosion protection. (R-general, R10, A4, 10-54)

828-R. (German.) Material Problems and Defects Caused by Corrosion in the VEB Leuna Werke "Walter Ulbricht". Georg Sille. Chemische Technik, v. 13, May 1961, p. 253-264.

Corrosion damage to plant equipment is micrographically examined and related to corrosion of unalloyed and heat resistant steels by gases including H, H_2O, CO, NH_3 and Cl and of austenitic alloyed steels by acid and alkaline solutions at elevated temperatures. (R3n, R6, 2-62; ST)

829-R. (German.) Corrosion Protection by Metallic Electrocoatings. W. Burkhardt. Chemische Technik, v. 13, May 1961, p. 265-268.

Review of corrosion mechanisms and means of corrosion protection of Fe and steel by electroplating with Zn, Ni, Sn, Pb, Cu and Ag duplex coating with Cr and Ni and coating with Zn-Ni alloys. (R-general, L17; ST, Fe, Zn, Ni, Sn, Pb, Cu, Ag, Cr)

830-R. (German.) Use of Radioactive Isotopes in Investigation of Corrosion Problems. Kurt Schwabe. Chemische Technik, v. 13, May 1961, p. 275-280.

Radioactive ions are used in the adsorption of anions on metal surfaces such as Fe, Ni and Pt. Investigation of surface heterogeneity; examination of efficiency of inhibitors; investigation of oxidation mechanism. 18 ref. (R-general, 1-59)

831-R. (German.) New Nonferrous Materials for Chemical Engineering. Martin May, Gunter Haussler, Wolfgang John and

Hans Sabath. Chemische Technik, v. 13, May 1961, p. 281-289.

Metals used for chemical apparatus include Ni alloys resistant to acid and alkaline liquids and gases, Ti and Ti alloys and Ta. Corrosion resistance is reviewed as a function of temperature and concentration of the corrosive media and of the mechanical and physical properties of the metal. (R6, P-general, Q-general, T29, 2-61, 2-66, 17-57; Ni-b, Ti-b, Ta)

832-R. (German.) Corrosion and Precipitation Processes on Heat Resistant Alloy Steels in Petrochemical and Oil Processing Engineering. Pt. 2. Paul Hermann Huppertz. Erdol und Kohle, v. 14, June 1961, p. 469-473.

Review of corrosion at elevated temperature of Cr-Ni steels (20-20, 20-15 and 25-12), caused by gases containing sulphur V_2O_5 or by corrosive welding slag; embrittlement at 475° C. of ferritic Cr steels; and sigma phase embrittlement of ferritic Cr steels or ferritic austenitic Cr-Ni steels at 500-900° C. (R-general, 2-60, 2-61, 2-66, 10-54; SS)

833-R. (Russian.) Corrosion Resistance of a Welded Apparatus for Reprocessing Naphtha. E. M. Kuzmak and N. N. Koshelev. Khimiya i Tekhnologiya Topliv i Masel, June 1961, p. 41-47.

Effect of composition, deformation and heat treatment on corrosion resistance and mechanical properties of manually and automatically welded 1KH18N9T steel weldments. 6 ref. (R7d, Q-general, 2-60, 2-64, 3-68; 7-51)

834-R. (German.) Materials in Chemical Apparatus Construction. W. Wiederholt. Chemische Industrie, v. 13, May 1961, p. 281-285.

Review of corrosion resistant metals such as alloy steel, Al, Ti and Ta; acid resistant metals such as bronze and other Cu alloys; metals resistant to melted alkaline solutions such as Ni and Co and their alloys. Metal and enamel coatings are considered as methods of increasing corrosion resistance. (R-general, T29, 17-57; ST, Al, Ti, Ta, Cu-b, Ni, Co)

835-R. (French.) Corrosion of Stainless Steels in Water at High Temperatures. Pouillard. Chemische Rundschau, v. 14, Aug. 1, 1961, p. 436-437.

Pitting and intercrystalline corrosion in technically pure water at 300-350° C. of 2 megohms per cm. resistivity containing less than 0.2 ppm. NaCl, up to 0.2 mg. per liter oxygen and having an acidity of 6-7 pH. (R2h, R2j, R4e, 2-61; SS)

836-R. (French.) Special Corrosion Studies. Hochmann. Chemische Rundschau, v. 14, Aug. 1, 1961, p. 437.

Immersion of a steel containing 0.03% C, less than 0.3% Si, 25% Cr, 20% Ni and 0.2% Cb in highly concentrated boiling nitric acid. Elimination of intercrystalline corrosion by keeping carbon content low and stabilizing with Cb. Passivating effect of 1% uranyl sulphate added to boiling H_2SO_4. (R6g, R2h, R10c, 2-60; AY)

837-R. (French.) Passivation of Stainless Steels. Guitton. Chemische Rundschau, v. 14, Aug. 1, 1961, p. 437.

Treatment with a mixture of hydrofluoric and nitric acid. Irradiation of the steel surface is assumed to have an activating effect similar to that of cold working. Effect of irradiation on water in contact with the steel. Formation of hydrogen and H_2O_2 during irradiation. (R10c, 2-67; SS)

838-R. (German.) Stainless and Acid Resistant Steels for Chemical Engineering--Properties and Applications. Helga Andersch. Chemische Technik, v. 13, June 1961, p. 339-346.

Chemical composition, microstructure and corrosion porperties of stainless and chemically inert ferritic, pearlitic-martensitic and austenitic alloy steels containing Ni and Cr. (R-general, M27, T29m; SS, AY, SGA-g, 17-57)

839-R. (English.) Local Corrosion of Stainless Steels in the Atmosphere. Masayoshi Tagaya and Tatsvichi Inaba. Osaka University, Technology Reports, v. 11, Mar. 1961, p. 129-135.

Microscopic and chemical analysis to determine the shape, number and distribution of pinholes at which corrosion occurs for commercial and vacuum melted stainless steels of types 302, 304, 304L, 316, 316L, 321, 347 and 430. (R3, 9-68; SS)

840-R. Developing Steels to Resist Hydrogen Sulfide. Eugene Herzog. IEC (Industrial and Engineering Chemistry), v. 53, Sept. 1961, p. 64A-67A.

Development of new alloys and especially a steel designated APS 10 M 4 which when quenched and tempered resists stress corrosion cracking by H_2S. Tensile tests are conducted in H_2S-saturated NaCl solution under 30-100 kg. per $mm.^2$ stress. Results of field tests conducted in a gas well. Theory of sulphide attack. 7 ref. (R1d, R6p, Q27, 3-66; AY)

841-R. (German.) Corrosion of Ferritic Steels in Lead-Bismuth Solutions of Eutectic Composition. Pavel Grobner and Vladimir Cikal. Archiv fur das Eisenhuttenwesen, v. 32, July 1961, p. 479-482.

Corrosion testing of Ti and Cb stabilized and nonstabilized steels in eutectic Pb-Bi melts at 400-750° C., with and without additions of 0.03% Ti, Zr, Cb and Ta, to the melt. Microscopic investigation of corrosion mechanism. (R6m, 2-60; ST)

842-R. Study on Stress Corrosion Cracking of Austenitic Stainless Steels. Pt. 2. Masaki Watanabe and Yoshihiko Mukai. Osaka University, Technology Reports, v. 11, Mar. 1961, p. 137-148.

The stress corrosion cracking of specimens under tensile stress and under residual stress due to welding is prevented by electrical contact with a less noble metal (Al, Fe, Cu). 5 ref. (R11s, 1-53, 3-66; SS-e, SGA-r)

843-R. Why Boilers Corrode. Jeffrey Jackson. New Scientist, v. 11, Aug. 10, 1961, p. 333-336.

Causes and methods of prevention of scaling and corrosion in water tube boilers. Prevention of scaling by chemical water softening and prevention of corrosion by mechanical or chemical deoxygenation. (R4c, 9-52, R10, T26q)

844-R. Theoretical Background to Practical Anti-Corrosive Paint Systems. T. G. Edwards. South African Industrial Chemist, v. 14, Nov. 1960, p. 211-215.

Mechanisms of corrosion of metals, especially steel, Fe, Al and Zn, by direct combination with O_2, direct chemical attack and electrochemical attack. Effects of surface preparation and of various films, pigments and surface coatings in combating each type of corrosion. Application of the galvanic series of metals and alloys to the solution of this problem. 14 ref. (R1, R10, L-general; Al, Fe-b, Zn)

845-R. (Translation-ConBur.) The Crevice Effect in Inhibition of Atmospheric Corrosion. A. V. Shreider and S. A. Gintsberg. Journal of Applied Chemistry of the USSR, v. 33, Nov. 1960, p. 2506-2511.

The use of volatile organic inhibitors to prevent atmospheric corrosion of U12 steel specimens is shown to be accompanied by increased crevice corrosion unless certain surface active substances such as various benzoates are added. 13 ref. (R3, 9-72, R10b; ST)

846-R. (Translation-ConBur.) Investigation of the Rate of Hydrogen Corrosion of Carbon Steel Pipes. Yu. I. Archakov. Journal of Applied Chemistry of the USSR, v. 33, Nov. 1960, p. 2512-2517.

Determination of the relationships between the degree of decarburization and pressure, time of action, wall thickness and internal pipe radius. Experiments are conducted at hydrogen pressures from 50-800 kg. per $cm.^2$ and 525° C. 9 ref. (R6q, 1-53, 2-61, 3-67, 3-73, 3-74; CN, 4-60)

847-R. (Translation-ConBur.) Derivation of a Formula for Calculation of the Depth of Decarburization. Yu. I. Archakov. Journal of Applied Chemistry of the USSR, v. 33, Nov. 1960, p. 2518-2521.

Derivation of a general kinetic equation representing the effects of temperature, pressure, time of exposure, wall thickness and internal pipe radius on the depth of decarburization in corrosion occurring in steel 20 pipes at high temperatures and high pressures of industrial hydrogen. (R6q, 2-61, 3-67, 3-73, 3-74; ST, 4-60)

848-R. (Translation-ConBur.) Variations of Solution pH in Corrosion of Carbon Steels in Sea Water. I. B. Ulanovskii. Journal of Applied Chemistry of the USSR, v. 33, Nov. 1960, p. 2522-2526.

Solution pH as affected by current density, polarization time, anode and cathode processes and ratio of solution volume to metal area. (R4b, 1-53; CN)

849-R. (Translation-ConBur.) The Effect of Metallic Ions on the Corrosion of Stainless Steel in Concentrated HNO_3 Solutions. M. M. Kurtepov and A. S. Gryaznova. Academy of Sciences of the USSR, Proceedings, Physical Chemistry Section, v. 135, Dec. 1960, p. 1129-1131.

Discussion of the effect of compounds containing metals of variable valency (Mn, Cr, Fe) on the rate of corrosion of stainless steel in boiling concentrated nitric acid solutions. 10 ref. (R6g, 2-66; SS)

850-R. (German.) Corrosion and Welding Tests on NiCrFe Alloys for Heat Exchangers. Heinz Anders. Kerntechnik, v. 3, June 1961, p. 279.

Corrosion testing of welded and nonwelded heat treated Inconel alloys with varying C and Cr content using 18/8 stainless steel as reference material, in autoclaves containing primary and secondary reactor water (pH-value 9.8-10.8) and in the gas phase adjacent to the secondary water. Evaluation of alloy weldments for application in reactor construction. (R4d, 2-60, 2-64, T11, W13b; Ni-b, Cr, Fe, 7-51, 17-57)

851-R. Oxidation of Tungsten. V. D. Barth and G. W. P. Rengstorff. Defense Metals Information Center, Battelle Memorial Institute, DMIC Report 155, July 17, 1961, 165 p.

Emphasis on high temperatures (700-1200° C.), pressure and water vapor as influencing oxidation and on high-temperature reactions of W with other materials and other gases. 186 ref. (R1, 2-62, 2-66, 3-74, 10-54; W)

852-R. Oxidation Resistance and Vacuum Hot Hardness of Refractory Tungsten Base Alloys Prepared by Arc Melting. A. A. Machonis. Paper from "Vacuum Metallurgy Conference, Transactions, 1960". Interscience Publishers, Inc., New York 1, 1961, p. 339-352.

Binary and ternary alloys of W, containing 1-40% Re, Ta or Cb, 1-48% Ti or 0.5-1% Ni, are prepared from sintered bars by arc melting in Ar atmospheres. Hot hardness is tested in vacuum by Rockwell indentation at 20-1600° C., with oxidation resistance determined in flowing air at 1200° C. for various times, as a function of composition. (R1h, Q29p, 1-73, C5h, 2-60, 2-62; W-b, Re, Ta, Cb, Ti, Ni)

853-R. (French.) Corrosion of Austenitic Steels by Nitric Acid in the Presence of Hexavalent Chromium. G. Plante. Bulletin de la Societe Francaise des Electriciens, v. 2, May 1961, p. 286-289.

Samples of low-carbon chromium-nickel steels are degreased, descaled and subjected to potential measurements in boiling HNO_3 of varying concentration. The addition of 1 g. per liter of potassium bichromate is studied as it affects corrosion behavior and microstructure. 7 ref. (R6g, 1-53, 2-60; SS-e)

854-R. (Italian.) Metal Corrosion at High Temperature Due to Vanadic Anhydride. Relation Between Accelerated Oxidation Resistance and Chemical Compositions of Alloys. A. Burdese. Metallurgia Italiana, v. 53, July 1961, p. 370-376.

Effect of small quantities of Mn, Mo, Cu, Be and Zr on resistance of refractory alloys and steels to accelerated oxidation. Examination of behavior of alloys and steels with regard to the formation of protective surface layers in the V_2O_5 vapor atmosphere. (R1h, 2-60; EG-d37, ST)

855-R. (English.) The Relation Between Microstructure and Stress Corrosion in Aluminum Alloys. B. Strom. TVF (Teknisk-Vetenskaplig Forskning), v. 32, Mar. 1961, p. 122-131.

Electrochemical phase potential, grain size, composition, heat treatment and stabilizers are considered as they affect electrochemical behavior. 11 ref. (R1d, M27, P15, 2-59, 2-60, 2-64, 2-66; Al-b)

856-R. Touch of Hand to Metal May Ruin Finish Coat. Industrial Finishing, v. 37, Sept. 1961, p. 99-100.

Acidic human perspiration attacks reactive metals (for example, Zn, Mg, Al, brass and Cu) and corrodes through coating. Preventive measures include providing gloves, or vapor degreasing and drying before application of finish coat. (R7p, R10g, L12; Zn, Mg, Al, Cu-b)

857-R. Growth Rate of Oxide Films on Copper. Technical News Bulletin (National Bureau of Standards), v. 45, Aug. 1961, p. 134-135.

Thickness of oxide films is measured as they increased on four different crystallographic planes of Cu single crystals immersed in oxygenated water. (R1h; Cu, 14-61)

858-R. (English.) The Metal Physics of Stress Corrosion. A. J. Forty. TVF (Teknisk-Vetenskaplig Forskning), v. 32, Mar. 1961, p. 109-121.

Analysis of stress corrosion of single crystals of alpha brass, Cu-Au alloy and stainless steel with particular consideration of transgranular failure. Effect of corrosion and mechanical properties and chemical dezincification on crack initiation and propagation. 27 ref. (R1d, M26; SS, Cu-b, 14-61)

859-R. (English.) Stress Corrosion in Brass Against the Background of Potential/pH Diagrams for the Corroding System. Einar Mattsson. TVF (Teknisk-Vetenskaplig Forskning), v. 32, Mar. 1961, p. 132-138.

Measuring the influence of pH and redox potential on the electrochemical behavior and corrosion of brass using the potential/pH diagram. Properties affected and studied include surface coating, time to cracking and nature of cracks. 9 ref. (R1d, 2-66; Cu-n)

860-R. First International Congress on Metal Corrosion. T. L. Rama Char. Journal of Scientific & Industrial Research, v. 20A, July 1961, p. 348-350.

Summary of papers presented on inhibitors, fundamental studies, cathodic protection, practical experience, high temperature oxidation and paint protection. Materials include Cb, Pt, Sn, Zn, Al, Mn, Al-Mg and Al, ferrous, Ni and Ni-Cr, Zr, Fe-C and Fe-Si alloys and mild, stainless and Cr-Ni-Mn steels. (R-general, R10, L26, 10-54)

861-R. Some Contributions of Soviet Scientists to the Science of Corrosion and Its Prevention. I. P. Anoshchenko. Journal of Scientific and Industrial Research, v. 20A, July 1961, p. 359-365.

Subjects include the theory of homogeneous dissolution of metals, theory of local cells, research on inhibitors, null-point of metals, seawater corrosion and electroplating. 77 ref. (R-general, L17, 10-54)

862-R. The Effect of Environment on Embrittlement in Metals. E. A. G. Liddiard. Paper from "Toughness and Brittleness in Metals". Institution of Metallurgists, London, S. W. 1., by Iliffe Books Ltd., London S. E. 1., England, 1961, p. 41-63.

Factors causing metal fracture without significant deformation include temperature, gaseous diffusion, hydrogen, delayed fracture, coating cracks, corrosion and corrosion products, rock salt, water, surface tension and others. Control of metal surface environment to prevent brittle fracture. 18 ref. (R-general, R10a, Q26s)

863-R. (Translation-ConBur.) Mechanism of the Protective Action of Sodium Arsenate in Acid Media. V. A. Khitrov and N. A. Dugin. Journal of Applied Chemistry of the USSR, v. 33, Dec. 1960, p. 2673-2676.

The surface of low-carbon steel after treatment in 1 and 7N H_2SO_4 and HCl solutions containing 1% sodium arsenate at 0-80° C. is investigated by X-ray and electron diffraction methods to determine the nature of the protective film. Anodic and cathodic polarization curves are given. (R10b, R6g, M28m; CN-g)

864-R. (Tranlation-ConBur.) Effect of Chlorine on Corrosion of Titanium by Hydrochloric Acid. Kh. L. Tseitlin and V. A. Strunkin. Journal of Applied Chemistry of the USSR, v. 33, Dec. 1960, p. 2768-2770.

Corrosion resistance of Ti sheet containing small amounts of C, Ni, Fe, Al, Si and N at 60-90° C. in HCl continuously saturated with Cl_2. 11 ref. (R6g, 2-60; Ti-b, 4-53)

865-R. Refinery Beats Graphitic Corrosion With Ni-Resist Iron. Inco Nickel Topics, v. 14, no. 7, 1961, p. 1, 3.

Parts resisting accumulation of layers of graphite are indicated for desalting water and the handling of hydrochloric and sulphuric acids, caustic soda, organic acids and sulphur compounds. (R2p, R6, R7, T29n; Fe, Ni)

866-R. (Russian.) Corrosive Destruction of Heated Iron by Fast Flowing Cold Air. V. I. Prosvirin and L. Ya. Nesgovorov. Doklady Akademii Nauk SSSR, v. 138, Mar. 1961, p. 628-630.

Corrosive and erosive interaction is determined at various temperatures (800-1000° C.) and air speeds. 8 ref. (R1h, 1-53, 2-61; Fe)

867-R. An Investigation Into the Causes of Intercrystalline Corrosion in Zinc-Aluminium Alloys. C. W. Roberts. Metallurgia, v. 64, Aug. 1961, p. 57-66.

Study of the intercrystalline attack occurring in high-purity Zn-Al alloys and the action of impurity or alloying elements in accelerating or retarding corrosion. Susceptibility to this form of attack in the presence of moisture is substantially counteracted by the addition of Mg provided that the concentrations of impurities present are below the limits closely defined in the British Standard specification for commercial alloys. (R2h, 2-60; Zn-b, Al, Mg)

868-R. Corrosion Resistance of Aluminum Alloy 5083 in Marine Environments. W. H. Ailor and R. I. Lindberg. American Society of Naval Engineers Inc., Journal, v. 73, Aug. 1961, p. 545-547.

Welded and bare specimens are exposed to marine environment at full submersion, half tide submersion and in atmosphere showing a maximum of 3 mils of corrosion on one sample. (R3p, R4b, 1-54; Al-b, 7-51)

869-R. (Russian.) Oxidation of Some Metals With Low Melting Point. R. F. Voitovich. Izvestiya Akademii Nauk SSSR--Metallurgiya i Toplivo, Mar. 1961, p. 90-95.

Study of Mg, Zn, Cd, Ca, Sr, Pb, Sn, Bi, La and Ce at 20-500° C. to determine the effect of temperature on the intensity of scale formation. 6 ref. (R1h, 2-61; SGA-d)

870-R. An Electrometric and Electron Diffraction Study of Air-Formed Oxide Films on Iron. P. B. Sewell, C. D. Stockbridge and M. Cohen. Electrochemical Society, Journal, v. 108, Oct. 1961, p. 933-941.

Oxide films formed at 20-200° C. on Fe single crystals and polycrystals are investigated by electron diffraction and electrochemical methods. The structure of the oxide varies from an Fe_3O_4 type at the metal/oxide interface to a gamma Fe_2O_3 type material at the oxide/gas interface as a function of the crystallographic orientation of the Fe substrate, the mode of formation and the time of subsequent air exposure. 14 ref. (R1h, M-general, P15; Fe)

871-R. The Formation of Porous Oxides on Metals. Pt. 2. Tungsten and the Parabolinear Rate Law. W. B. Jepson and D. W. Aylmore. Electrochemical Society, Journal, v. 108, Oct. 1961, p. 942-947.

The mechanism of paralinear oxidation, in which an inner, compact layer of oxide forms at a parabolic rate and transforms to an outer, porous layer at a linear rate, is tested for samples oxidized at 750 and 800° C. for increasing times with the amount of porous oxide present being examined by the method of Ky sorption and by metallography. The rate of formation is not constant but decreases with time to reach an almost constant value. 22 ref. (R1h, 3-67, M-general; W)

872-R. Effect of Reynolds Number on Corrosion of Copper by Sulphuric Acid. I. Cornet, E. A. Barrington and G. U. Behrsing. Electrochemical Society, Journal, v. 108, Oct. 1961, p. 947-953.

Corrosion of electrolytic tough-pitch Cu pipe in aerated 2.1N sulphuric acid at 30° C. in a closed loop circulating system with 1 in., 3/4 in. and 1/2 in. diameter test sections. There is a gradual increase of corrosion rate with increasing Reynolds number in the laminar flow regime; a rapid increase in corrosion rate with increasing Reynolds number in the low turbulent flow regime and a relatively constant corrosion rate due to polarization at Reynolds number less than 10^4. 43 ref. (R6g, 3-67; Cu, 4-60)

873-R. The Role of a Displacement Reaction in the Kinetics of Oxidation of Alloys. Roger L. Levin and J. Bruce Wagner, Jr. Electrochemical Society, Journal, v. 108, Oct. 1961, p. 954-959.

The oxidation of some 70-95% Cu-Zn and a 68% Cu-Ni alloy in pure oxygen at 700° C. is studied to determine the occurrence of a displacement reaction as proposed by C. Wagner. The reaction is observed through a change in the oxide scale by metallographic examination and by noting a change in the rate of oxidation as given by the parabolic reaction rate constant. 15 ref. (R1h, 3-67; Cu-b, Ni, Zn)

874-R. Extending Storage Tank Life. C. K. Aldrich. New Zealand Engineering, v. 16, Aug. 15, 1961, p. 297-298.

Design considerations for eliminating corrosive conditions in storage tanks of Al and Cu alloys, stainless and mild steel,

Monel, Inconel and Ti. Use of stress relieving heat treatment to prevent cracking. (R10, T26q; Al-b, Cu-b, Ni-b, ST, SGA-g, 17-57)

875-R. Inhibition of the Corrosion of Steel Embedded in Mortar. M. G. Arber and H. E. Vivian. Australian Journal of Applied Science, v. 12, Sept. 1961, p. 339-347.

Corrosion by inorganic admixture salts is investigated in mild steel mortars containing $SnCl_2$, $CaCl_2$, $Na_2S_2O_3$, $NaNO_3$, NaH_2PO4 and $NH_4H_2PO_4$, as a function of mortar composition and curing treatment. (R6g, R6j, R10b; CN)

876-R. Corrosion Mechanisms (The Effect of pH on the Corrosion of Steel at 316° C.) W. A. Fraser and M. C. Bloom. Report of NRL (Naval Research Laboratory) Progress, Aug. 1961, p. 27-28. (Available as PB171321 from U. S. Office of Technical Services, Washington 25, D. C.) $1.25.

The corrosion rate of mild steel at 316° C. in solutions containing 0.4-0.7 g per l. of NaOH is determined by the hydrogen effusion method. The corrosion mechanism involves at least two pH effects, one of which disappears with time. (R6j, R10a, 3-67; CN)

877-R. Corrosion Resistance of Chromium. T. P. Hoar. Platinum Metals Review, v. 5, Oct. 1961, p. 141-143.

Effects of additions of small percentages of Pt, Pd or other noble metals on corrosion of Cr in nonoxidizing acids. Passivation mechanisms and dissolution rate data given for specimens containing 0.5% Ir, Rh, Ru, Os, Au, Re or Ag, 2% Cu, 0.1-5.0% Pt and 0.5-1.0% Pd in boiling H_2SO_4 (10% to concentration), HCl (5-15%) and HNO_3 (65%). 4 ref. (R6g, R10b, 2-60; Cr, EG-c)

878-R. (German.) Effect of Alkali-Hydroxide Melts on Various Noble Metals and Oxides. Hermann Lux, Erich Penauer and Erhard Betz. Zeitschrift fur Anorganische und AllgemeineChemie, v. 310, July 1961, p. 305-319.

Investigation of corrosion resistance of metals and oxides to KOH and NaOH melts at 200-400° C., as influenced by partial pressure of H_2O. Materials include Au, Ag, Rh, Ir, PtRh alloy, Co and Al_2O_3, ZrO_2, HfO_2 and ThO_2. (R-general, 1-54)

879-R. The Comparative Roles of Oxygen and Inhibitors in the Passivation of Iron. Pt. 4. Osmium (VIII) Oxide. G. H. Cartledge. Journal of Physical Chemistry, v. 65, Aug. 1961, p. 1361-1367.

Galvanostatic cathodic polarization is observed in the oxygenated solution. Passive corrosion current density is measured. Osmium oxide is reduced to Os $(OH)_4$ by deposition. 28 ref. (R10c, 1-54; Fe)

880-R. (German.) Zirconium and Its Use. F. Sperner. Metall, v. 15, Sept. 1961, p. 892-894.

Corrosion resistance of Zr to liquid chemicals at elevated and room temperature. Applications of corrosion resistant Zr alloys such as Zircaloy, in nuclear reactor technology, chemical apparatus construction and electronic engineering. (R6, R7, 2-61; Zr-b, 17-57)

881-R. (German.) Influence of Small Amounts of Titanium and Boron on Properties of Oxide Layers Formed on Aluminum Surfaces. A. Domony. Metall, v. 15, Sept. 1961, p. 900-901.

Influence of small amounts of boron on composition and structure of oxide layers of Al melts and continuously cast Al ingots. Results of alloying with small amounts of Ti. (R1h, 2-60; Al, 5, B, Ti)

882-R. (German.) Corrosion of Zirconium and Its Alloys in Hot Water and Steam. H. W. Schleicher. Metalloberflache, v. 15, Aug. 1961, p. 234-240.

Corrosion testing of pure Zr and Zr alloys with Sn including Zircaloy 2 and 3 and with Ta (0.5%), Cb (1%), Ni, Fe and Pd in pure water and steam at temperatures from 250-500° C. and pressures of 100-300 atm. Kinetics and mechanism of corrosion. (R4d, R4e, 1-66, 2-61, 3-67; Zr-b, Cb, Fe, Ni, Pd, Sn)

883-R. (German.) Investigation of Oxidation of Copper-Beryllium Alloys at Elevated Temperatures. Fritz Maak. Zeitschrift fur Metallkunde, v. 52, Aug. 1961, p. 538-545.

Oxidation of pure Cu sheets at 750-1050° C. and of Cu-Be alloy sheets containing 0.77-12.6 at.% Be at 850° C. by air. Continuous measurement of oxidation rate by suspension of specimens on a balance and investigation of oxide structure and oxidation mechanism by microscopic investigation. (R1h, 1-54, 2-62; Cu, Be)

884-R. (German.) Evaluation of Film Thickness Measurements on Binary Alloys With Internal Oxidation and Simultaneous External Oxidation. Fritz Maak. Zeitschrift fur Metallkunde, v. 52, Aug. 1961, p. 545-546.

Computation of oxygen solubility as a function of diffusion in a binary Cu-Be alloy (0.77-6.6 at.% Be) oxidized at 850° C. by microscopic measurement of zone of internal oxidation. (R1h, R2s, P12, 1-54; Cu, Be)

885-R. Corrosion Resistance of Titanium, Zirconium and Tantalum Used for Chemical Equipment. Clifford A. Hampel. Corrosion, v. 17, Oct. 1961, p. 9-10, 12, 14, 16-17.

Chemical resistance, mechanical and physical properties of Ti, Zr and Ta for use in corrosive environments are reviewed with particular reference to ductility, strength, fabricability and weldability. Relation of hydrogen absorption properties and resistance to numerous corrosives at varying temperatures are related in the text and tabulated data. 13 ref. (R-general, P-general, Q-general, T29; Ta, Ti, Zr, 17-57)

886-R. Corrosion Damage on Automobile Exhaust Systems. Corrosion, v. 17, Oct. 1961, p. 18, 20-24, 26-29.

Effect of acid condensates from engine fuel combustion, operating temperatures and weathering conditions, exhaust system design and component composition on automobile exhaust systems of aluminized, Zn-coated, Cr-rich diffusion coated and stainless steels. Use of phosphate oil solution for rust inhibition. 20 ref. (R7g, R7b, T21c; ST, 8, 17-57)

887-R. Polyester and Epoxy Based Non-Solvent Coatings for Corrosion Control. William C. Hodges and John J. Bogner. Corrosion, v. 17, Oct. 1961, p. 34-36, 38, 40, 42.

Chemical resistance, composition, physical and mechanical properties and polymerization mechanics of coatings with reactive resins for bases which give greater films thicknesses and impermeability in one application than do conventional coatings. Survey of spraying equipment and application procedure. Comparison with solvent-type coatings for shrinkage, thermal expansion, resistance to erosion and corrosion, cold flow and stability. Examples are given for application to steel. (R-general, L26p; NM-g33)

888-R. Premature Failure of Copper-Nickel Alloys in Sea Water. H. E. Stover. Corrosion, v. 17, Oct. 1961, p. 461t-462t.

Monel and 90/10 Cu-Ni bands normally having long service life when used to tie plastics around pilings fail after 1-yr. exposures in salt water. The corrosion seems greatest near the mudline, the black material on both metals being a mixture of sulphides and alloyed metals and with the strips being somewhat magnetic. Several possible theories are advanced to explain the failures. (R4b, 3-67; Cu-b, Ni-b)

889-R. Galvanic Anodes and Fresh Water Rinse Reduce Tanker Corrosion. E. E. Nelson. Corrosion, v. 17, Oct. 1961, p. 463t-468t.

Types of tanker corrosion are classified under operating conditions including the presence or absence of ballast water and petroleum material cargoes of low or high viscosity. Pitting is explained as simple galvanic corrosion with data analyzed for cathodic protection systems using Al, Mg and Zn anodes. Appreciable H is generated by Mg systems but not by Zn systems. 20 ref. (R1a, R7a, R10d, T22, T26q; Zn, Mg, 17-57)

890-R. Corrosion Problems Encountered in a Nickel Refinery Ammonia Absorption System. R. B. McIntosh. Corrosion, v. 17, Oct. 1961, p. 469t-474t.

Corrosion of carbon and stainless steel piping and chemical processing equipment encountered in a nickel refinery, ammonia recovery circuit resulting from entrainment and carbon dioxide in leach gases. Slurry picked up by the gas leaving the autoclave settles out when the gas velocity decreases sufficiently near the cooler outlet creating ideal conditions for corrosion attack. Corrosive cooling water is also a factor. 5 ref. (R4c, R6p, T29m; ST, 17-57)

891-R. Evaluation of Tantalum, Molybdenum and Beryllium for Liquid Bismuth Service. J. W. Seifert and A. L. Lowe, Jr. Corrosion, v. 17, Oct. 1961, p. 475t-478t.

Tilting capsule and dynamic loop tests determination of the suitability of Ta, Mo and Be for the containment of liquid Bi in a liquid metal fuel reactor. All the materials tested had adequate corrosion resistance at 750 and 975° F. The corrosion resistance of Ta appears to be related to the surface finish and increasing velocity seems to adversely affect the corrosion resistance of Mo + 0.5 Ti. 10 ref. (R6m, 2-62, 3-67; Ta, Mo-b, Be, Bi)

892-R. Effect of Nitrogen Tetroxide on Metals and Plastics. C. W. Alley, A. W. Hayford and H. F. Scott, Jr. Corrosion, v. 17, Oct. 1961, p. 479t-484t.

The corrosion rates of A-285 carbon steel, 304-L and PH 15-7 Mo stainless steels, 5086 Al, 75 A and 6Al-4V Ti, polytetrafluorethylene, polychlorotrifluoroethylene, nylon and a number of elastomers are determined in dry and wet liquid N_2O_4 under static and dynamic exposure conditions at -9 to 74° C. (R6p)

893-R. Stress Corrosion Cracking of Admiralty Exchanger Tubes in Reformer Service. K. R. Walston. Corrosion, v. 17, Oct. 1961, p. 114.

Metallurgical examinations, chemical analysis and hydrostatic tests are used to determine cause for stress corrosion cracking occurring unexpectedly on admiralty tubes removed from a reactor effluent cooler. Strong ammonia concentrations gathered during downtime, ammonia being liberated when ammonium chloride came in contact with brass causing the cracking. A contributing factor was the lack of offsetting inhibition resulting from low sulphur content in the stream. (R1d, R6p, T29; Cu-n, 17-57)

894-R. A New Test for Estimating Soil Corrosivity Based on Investigation of Metal Highway Culverts. R. F. Stratfull. Corrosion, v. 17, Oct. 1961, p. 493t-496t.

Corrosion rates of several thousand steel highway culverts buried in California soils are studied with respect to soil resistivity and pH, a new test method being derived from this relationship for estimating soil corrosivity. Statistical analysis is used to compare the accuracy of the method with standard techniques such as the Dension Cell method. 19 ref. (R8, R11a, T26r; ST, 17-57)

895-R. Cavitation Erosion of Structural Materials and Coatings. J. A. Lichtman, K. H. Kallas, C. K. Chatten and E. P. Cochran, Jr. Corrosion, v. 17, Oct. 1961, p. 497t-505t.

Monel, Stellite, stainless and mild steels, bronzes, brass and Al alloys, structural plastics and ceramic, glass, metallic, elastomeric, plastic and silicate coatings are tested with a rotating disk cavitation apparatus. Relationships are studied between cavitation erosion resistance and physical and mechanical properties. 16 ref. (R1c, R2m, Q-general; ST, Cu-b, Ni-b, Al-b, NM-d, NM-g34)

896-R. Corrosion Mechanisms (Protective Spinel Films on Steel--Their Stabilization to Deterioration on Room Temperature Exposure to Aqueous Media). M. Krulfeld and M. C. Bloom. Report of NRL (Naval Research Laboratory) Progress, Sept. 1961, p. 46-48. (Available as PB 171322 from U. S. Office of Technical Services, Washington 25, D. C.) $1.25.

Effect of time of 600° F. exposure, concentration of Li in the aqueous solution, change of the anion present with the Li and use of another alkali cation (K) rather than Li in the solution on the breakdown of protective spinel film and corrosion rate of mild steel in boiler waters. Electron microscopy study of films formed in KOH solution and tested in air saturated and distilled water. (R1h, R4c, 2-61, 2-62, 3-67; CN)

897-R. Corrosion Problems and Their Treatment. Corrosion Prevention & Control, v. 8, Sept. 1961, p. 1-4.

Review of methods of corrosion protection in various applications in water, soil and atmosphere, with special reference to the role of the corrosion engineer. (R10, L-general, 10-54)

898-R. Corrosion Protection for Farm Machinery. R. B. Chandler. Corrosion Protection & Control, v. 8, Sept. 1961, p. 33-35, 41.

Coatings and primers used on farm equipment include phosphoric acid for surface cleaning, red oxide and ZnCr primer. Hot spraying and air drying is used along with flow coating and electrostatic spraying. Alkyl resins and epoxy esters are evaluated. (R-general, L-general, 1-52)

899-R. Erosion Effects of Water Droplets. Corrosion Prevention & Control, v. 8, Sept. 1961, p. 36, 44.

Water drop erosion and the effects of water under controlled conditions of speed and force are studied to establish a basis for choosing materials for use in turbines. Materials studied include copper, stainless steel, Stellite and tungsten carbide. (R1c, 1-54; SS, Cu, Co-b, 14-68)

900-R. (Italian.) Behavior of Riveted Aluminum and Aluminum Alloy Plates in City, Industrial and Marine Atmospheres. G. Luft. Alluminio, v. 30, Sept. 1961, p. 401-424.

Tests on Al, AG25, AG35, AM12, ASO4GTA16 and AZ45 Al alloys indicate that mechanical characteristics are affected by marine, urban and industrial atmospheres, in that order. The behavior of anodized materials is also investigated. (R3, 1-54; Al, Al-b)

901-R. Compatibility, With Aluminum, of a Number of Chemicals Used in the Aerosol Industry. F. M. Languedoc and R. M. Howe. 47th Mid-Year Meeting of the Chemical Specialties Manufacturers Assoc., Inc., Proceedings, May 1961, p. 45-49.

Staining, pitting, etching and non-localized evidence of corrosion attack are studied in Al cups, valves and cans used to store aerosol formulations for 7-200 days at 100° F. (R-general, T10g, 1-54; Al)

902-R. The Effect of Mineral Impurities in Water on the Corrosion of Aluminum and Steel. Leonard C. Rowe and Monte S. Walker. 47th Mid-Year Meeting of the Chemical Specialties Manufactures Assoc., Inc., Proceedings, May 1961, p. 77-81.

Comparison of the corrosion rates of alloy strips of SAE 1020 carbon steel and 1145 H aluminum in water at 26° C. The effect of mineral impurities (SO_4, Cl, HCO_3, CO_3, Ca, Mg and silicate) on the corrosion and pitting of steel and Al. The effect of temperature (26-71°C.) on the corrosion of Al at various bicarbonate concentrations. A study is made on protection offered by silicone oil, n-heptane and borax. 10 ref. (R4, 2-61, 3-69; CN, Al)

903-R. Corrosion of Molybdenum-Bearing Austenitic Stainless Steels and Other Alloys in Tall Oil Distillation. Harold C. Templeton. Tappi (Technical Assoc. of the Pulp and Paper Industry), v. 44, Oct. 1961, p. 702-707.

Test data with reference to limits of usability of various Mo steels and alloys including 304, 310, 317, CF8, 316, CF-8M, CG-8M, Alloy 20, Nionel, Inconel, Monel, Hastelloy B, C and F, CH 10 (25-12), 25-10 Mo (cast), Reg. Incoloy, Incoloy 901 and 804, 2S Al, RC70-Ti and U.S.S. Corex. (R7, 17-57; SS-d, Ni-b, Al, Mo)

904-R. (German.) Internal Corrosion of Oil Tanks of Thin Steel Sheets and Its Prevention. Hans Stoffels. Technische Uberwachung, v. 2, Sept. 1961, p. 342-345.

Pitting is investigated by corrosion tests of dented oxidized and bright sheet specimens of unalloyed steel (0.04% C) in oil with a drop of sea water in the dent. Means of protection include removal of water from oil and surface treatment of steel, as by lacquering and cathodic coating. (R2j, R10d, L26n, 1-54; ST, 4-53)

905-R. Microscope Speeds Diognosis of Refinery Corrosion. Harry M. Wilten. Hydrocarbon Processing & Petroleum Refiner, v. 40, Oct. 1961, p. 151-158.

Cavitation, pitting, caustic cracking, caustic embrittlement, intergranular corrosion, stress corrosion, chloride cracking, corrosion fatigue and hydrogen attack on 18-8 stainless steel, mild steel brass admiralty metal and Cr, Ni and Al alloys. (R7g, R2, T29n; ST, Cu-n, Al-b, Cr-b, Ni-b)

906-R. (Japanese.) Corrosion Resistance of Commercially Pure Zirconium in Some Media. Shujiro Suzuki. Sumitomo Light Metal Technical Reports, v. 2, July 1961, p. 198-204.

Corrosion testing of plate specimens in HCl, H_2SO_4, HNO_3, H_3PO_4, H_2O_2, $(COOH)_2$, NAOH and SO_2 solutions of varying concentrations at 4-164° C. for varying times. Effect of acid concentration, time and temperature on surface appearance and corrosion weight loss. 6 ref. (R6, 2-61, 3-67; Zr, 4-53)

907-R. (French.) The Presence of Dispersed Hematite in the Magnetite Phase of Oxide Whiskers of Iron at Elevated Temperatures. J. Paidassi. Acta Metallurgica, v. 9, Oct. 1961, p. 961-963.

Metallographic examination of Fe_2O_3 needles precipitated in Fe_3O_4 whiskers formed during oxidation of Puron and

Armco iron specimens by heating at 400-1200° C. and cooling in air and water vapor. A mechanism is proposed for the reaction in terms of oxygen supersaturation and penetration into grain boundary cracks in the magnetite. 5 ref. (R1h, M-general, N7, 2-61; Fe-a)

908-R. Thermal History From Corrosion Product. P. K. Foster. Iron and Steel Institute, Journal, v. 199, Sept. 1961, p. 18-21.

X-ray diffraction analyses of scale from a failed boiler showing that part of the furnace tube was heated above 570° C. not more than 16 hr. before failure. The techniques used offer a nondestructive method of detecting prior heating of steel above 570° C. in oxidizing media and in certain cases of establishing roughly the date of overheating. 6 ref. (R1h, T26q, M22g, 2-62; ST, 17-57)

909-R. (Russian.) Effect of Ionizing Radiation on Corrosion Behavior of Metals in CCl_4. A. V. Byalobzheskii and V. N. Lukinskaya. Atomnaya Energiya, v. 11, Feb. 1961, p. 170-176.

Investigation of corrosion properties of Ti, Al, Zr, Cu, Monel, ST-3 alloy and two stainless steels in irradiated CCl_4. Corrosion and Cl formation are affected by radiation, time, moisture content of the air and CCl_4 and type of atmosphere. 14 ref. (R6p, 2-67, 3-67; ST, Al, Zr, Cu, Ni-b)

910-R. Growth Rate of Oxide Films on Copper. Products Finishing, v. 26, Nov. 1961, p. 98-106.

Study of the formation of oxide films on Cu during corrosion process by measuring film thickness on Cu single crystals immersed in oxygenated water, indicating that the type of oxide formed, its growth rate and thermodynamic stability are influenced by oxygen concentration. (R1h; Cu)

911-R. Effect of Dodecyl Alcohol on Fatigue Crack Propagation. Technical News Bulletin (National Bureau of Standards), v. 45, Oct. 1961, p. 178-179.

Tests are conducted with sharply notched cylindrical specimens of steel, Al, Cu and Be alloys both clean and coated with dodecyl alcohol. Results indicate that the use of alcohol may significantly reduce the rate of fatigue crack propagation due to the fact that the polar compound forms a film on the metal which prevents a corrosive reaction between the metal and the atmosphere. (R1e, L10b, 1-54, 17-57; ST, Al-b, Be-b, Cu-b, NM-b)

912-R. (French.) Atmospheric Corrosion of Chromium Plated Aluminum. Galvano, v. 30, Sept. 1961, p. 577-582.

Corrosion testing in salt water mist and semirural and industrial atmospheres of specimens coated with Cr by various processes including duplex plating with Cu or Ni and coating by the Vogt process. Effect of priming deposits on corrosion resistance. (R3, L17; Al, Cr, 8-62)

913-R. Increasing the Corrosion Resistance of Plated Parts. Digest of "A Progress Report on Experiences in Improving Corrosion Resistance of Automobile Parts". Paper presented at the 47th Annual Convention of the American Electroplaters' Society, Los Angeles, July 1960. J. D. Thomas, D. W. Hardesty and C. F. Nixon. Metal Progress, v. 80, Nov. 1961, p. 182.

A more rapid test for determining corrosion on plated automobile parts has helped to improve corrosion resistance. The new test is based upon the CASS test with modifications. (R-general, T21, 1-53, 8-62)

914-R. (German.) Corrosion of Steels in Hot Gases. H. Keller. Dechema Monographien, v. 39, no. 600-615, 1961, p. 177-187.

Corrosion of ferritic Cr steels and austenitic Cr-Ni steels by S and V_2O_5 contained in gases at up to 1300° C. Preliminary testing of corrosion resistance of steel in contact with coke containing 3% S and a gas atmosphere containing 5-10% CO and N at temperatures from 800-1100° C. (R6r, R7, 2-62; ST)

915-R. (German.) Effects of Coatings on Susceptibility to Stress Corrosion of Austenitic and High-Strength Steels. E. Baerlecken and K. Lorenz. Dechema Monographien, v. 39, no. 600-615, 1961, p. 213-228.

Inhibition of stress corrosion of ferritic and austenitic Cr-Ni steels by Cr coating and of high-strength

steels by Pb coating. Influence of composition of steel and surface coating on stress corrosion rate. (R1d, L17; SS-e, SGB-a, Cr, Pb, 17-57)

916-R. Corrosion Research Trends in the U.S.S.R. W. G. Cass. Corrosion Technology, v. 8, Oct. 1961, p. 309-311.

Survey of metal corrosion studies with regard to electrochemical, atmospheric and underground corrosion; corrosion under conditions of mechanical stress, corrosion properties of metal semiconductors such as Ge or Si, corrosion protection using organic and inorganic metallic coating, plating and cladding; and diffusion and heat treatment processes. Classification of film formation and surface phenomena and thickness determination. (R-general, L-general, 10-54)

917-R. (German.) Improvement of Resistance to Tarnishing of Silver and Electrocoatings of Silver. G. H. Schmidt. Elektrie, v. 14, Aug. 1961, p. 245-248.

Increase of corrosion resistance of Ag surfaces by alloying with emphasis on use of Ag-Pd alloys and corrosion protection by electrochemical passivation and mechanical or electrolytic protective coating. Testing of usefulness of protection in various atmospheres and surroundings such as open air, enclosed rooms, industrial and green-house climates. (R2r, 2-60, R10c, L-general; Ag-b, Pd)

918-R. (German.) Chemical Passivation of Metallic Surfaces. C. Kalauch. Elektrie, v. 14, Aug. 1961, p. 253-256.

Review of passivation methods for metal surfaces including alloying (stainless steel); anodic passivation (Al, Fe, Ag, Sn); dipping in aqueous salt solutions of controlled pH; use of passivating gas atmospheres and thermal treatments in water-free salts. Survey of reaction mechanisms and passivation technology. (R10c)

919-R. (German.) Action of Inhibitors in Metal Corrosion and Precipitation of Metallic Electrocoatings. H. Fischer. Dechema Monographien, v. 39, no. 600-615, 1961, p. 25-54.

Mode of action of organic and inorganic physical and chemical inhibitors including primary and secondary surface inhibitors and electrolytic film inhibitors. Reaction mechanisms are discussed in terms of capacity-voltage, current-potential and metal recovery-current density curves, chemisorption and passivation. 19 ref. (R10b, R10c; 8-62)

920-R. (German.) Inhibition of Acid Corrosion of Iron by Adsorption Inhibitors. H. Kaesche. Dechema Monographien, v. 39, no. 600-615, 1961, p. 55-82.

Investigation of mechanism and kinetics of corrosion inhibition for Fe by cathodic, anodic and mixed adsorption-inhibitors using current-potential measurements in H_2SO_4 and Na_2SO_4 solutions of various concentration. 34 ref. (R10b, R6g; Fe)

921-R. Characteristics of Moisture Deposition on Corrosion Specimens. P. J. Sereda. Materials Research & Standards, v. 1, Sept. 1961, p. 719-723.

The appearance of moisture on specimens of steel, Zn, stainless steel and Cu having different thickness and surface conditions and exposed to rain and dew is studied by time-lapse photography. The temperatures of the specimens are recorded during time of wetness to show effects on different metals and different thicknesses of the same metal. 5 ref. (R11k; ST, Zn, Cu)

SECTION S

INSPECTION and CONTROL

1-S. A Composite Procedure for the Analysis of Aluminium Bronze Alloys. M. Freegarde and B. Allen. Analyst, v. 85, Oct. 1960, p. 731-735.

Spectrophotometric determination of Cu, Al, Fe, Ni, Zn, Mn, Pb, Si and Sn in aluminum bronze alloys. 10 ref. (S11a; Al-b, Cu-s)

2-S. The Determination of Copper in Lead and Lead Cable-Sheathing Alloys. J. H. Thompson and M. J. Ravenscroft. Analyst, v. 85, Oct. 1960, p. 735-738.

Optical density of dithizone extracted and complexed Cu is measured spectrophotometrically. Cu content is read from a calibration graph. 6 ref. (S11a; Pb-b, Cu)

3-S. The Determination of Zinc in Indium and Nickel. E. G. Towndrow, R. Hutchinson and H. W. Webb. Analyst, v. 85, Oct. 1960, p. 769-770.

Samples are dissolved in HCl, transferred to a cellulose column and eluded with butyl alcohol to separate the Zn which is determined polarographically. (S11m; In, Ni, Zn)

4-S. (Polish.) An Isotopic Contactless Thickness Meter for Hot Rolled Steel Strip. Tadeusz Florkowski and Ludwik Gorski. Hutnik, v. 27, July-Aug. 1960, p. 273-278.

Thickness of steel strip is measured with an accuracy of ± 0.04 mm. by a thickness meter based on the absorption of gamma rays from Cs^{137} radioactive isotopes. Deviations from the specified thickness are registered on an optical indicator. 9 ref. (S14e, 1-59; ST, 4-53)

5-S. (French.) Local Analysis of Metals by Secondary Ionic Emission. R. Castaing, B. Jouffrey and G. Slodzian. Comptes Rendus, v. 251, Aug. 22, 1960, p. 1010-1012.

Bombardment of a metal by a beam of primary ions producing emission of secondary ions characteristic of the region bombarded which are used to determine spectrographically the distribution of elements in the specimen. 6 ref. (S11c)

6-S. Does a Radiographed Vessel Cost More to Build Than One That Isn't? Robert Chuse. Welding Design & Fabrication, v. 33, Nov. 1960, p. 31-33.

Comparison of plate thickness and weld size requirements for radiographed and nonradiographed pressure vessels welded according to the ASME code. Cost analysis. (S13e, T26q)

7-S. Application of the Microemission X-Ray Spectrograph. Comparison of Analyses From Small Areas. J. F. Norton. Paper from "Advances in X-Ray Analysis", v. 1. Plenum Press, Inc., New York, N. Y., 1960, p. 219-229.

Techniques for determining spot size and sensitivity of the instrument. Application to composition and phase analysis, determination of transformations and identification and analysis of inclusions in Ni, Fe, Cr, Sc, W metals. Uses in measurements of thin films. (S11p, 1-52)

8-S. X-Ray Spectrographic Determination of Tantalum, Columbium, Iron and Titanium Oxide Mixtures Using Simple Arithmetic Corrections for Interelement Effects. Betty J. Mitchell. Paper from "Advances in X-Ray Analysis", v. 1. Plenum Press, Inc., New York, N. Y., 1960, p. 253-270.

A method of specific arithmetic corrections for absorption and enhancement interelement effect is developed

for X-ray composition analysis. Comparison of results with optical spectrographic and chemical analysis of Ta, Cr, Fe and Ti. 9 ref. (S11p; Cb, Fe, Ta, Ti)

9-S. Determination of Uranium Dioxide in Stainless Steels by the X-Ray Fluorescence Solution Method. Lavada Moudy, Louis Silverman and William Houk. Paper from "Advances in X-Ray Analysis", v. 1. Plenum Press, Inc., New York, N. Y., 1960, p. 271-281.

X-ray composition analysis of 304 stainless steel-UO_2 mixture in perchloric acid solution to determine the homogeneity of UO_2 in nuclear reactor fuel elements fabricated from powdered stainless steel and UO_2. 6 ref. (S11p, T11g; SS, U, 14-68, 17-57)

10-S. Microanalysis by X-Ray Absorption, Fluorescence, Emission and Diffraction Using Ultra-Fine X-Ray Sources. V. E. Cosslett, P. Duncumb, J. V. P. Long and W. C. Nixon. Paper from "Advances in X-Ray Analysis", v. 1. Plenum Press, Inc., New York, N. Y., 1960, p. 329-337.

X-ray microanalysis using high intensity point source developed for X-ray microscopy. Application to thin sections and areas of about 10 microns in diameter. 7 ref. (S11e, M21f, 1-52)

11-S. Applications of the Electron Probe Microanalyzer. L. S. Birks and E. J. Brooks. Paper from "Advances in X-Ray Analysis", v. 1. Plenum Press, Inc., New York, N. Y., 1960, p. 339-349.

Composition analysis of metals, minerals and alloys including stainless steel, Inconel X and a Fe-C alloy. Effect of specimen preparation on analytical results. (S11e, 1-52)

12-S. X-Ray Spectrographic Analysis of Nickel Containing Alloys With Varied Sample Forms. C. Manning Davis and George R. Clark. Paper from "Advances in X-Ray Analysis", v. 1. Plenum Press, Inc., New York, N. Y., 1960, p. 351-366.

Direct analysis, with and without internal standards, of alloys and metallurgical products which come to the laboratory in the form of drillings, millings, filings and powders. 7 ref. (S11p, 3-73; Ni-b)

13-S. Direct Assay for Molybdenum and Ruthenium in Uranium Alloys by X-Ray Emission Spectrometry. D. S. Flikkema and R. V. Schablaske. Paper from "Advances in X-Ray Analysis", v. 1. Plenum Press, Inc., New York, N. Y., 1960, p. 387-398.

Concentration of Mo and Ru in nonradioactive ternary uranium alloys representative of high burn-up reactor fuels is determined for flat surfaced specimens by examining the intensity of the Ru and Mo K emission lines. (S11p; U-b, Mo, Ru)

14-S. Determination of Oxygen in Zirconium and Zircaloy by the Inert Gas Fusion Method. Phineas Elbling and G. W. Goward. Analytical Chemistry, v. 32, Nov. 1960, p. 1610-1613.

Fusion of the samples in the presence of carbon and Pt reduces the oxygen to CO, which is removed from the furnace by a stream of argon, oxidized to CO_2 and determined conductometrically in NaOH solution. Coefficient of variation is about ±6% at 1000 ppm. (S11m; Zr, Zr-b, O)

15-S. Determination of Oxygen in Yttrium and Yttrium Fluoride by the Inert Gas Fusion Method. Charles V. Banks, Jerome W. O'Laughlin and George J. Kamin. Analytical Chemistry, v. 32, Nov. 1960, p. 1613-1616.

Fusion of the samples in the presence of carbon and molten Pt reduces the oxygen to CO which is removed from the furnace by argon, oxidized to CO_2 and measured conductometrically in $Ba(OH)_2$ solution. Results were compared with those from vacuum fusion and distillation, emission spectroscopy and $KBrF_4$ techniques. 10 ref. (S11m; Yt, O)

16-S. Determination of Oxygen in Beryllium Metal by the Inert Gas Fusion Method. Silve Kallmann and Fred Collier. Analytical Chemistry, v. 32, Nov. 1960, p. 1616-1619.

Fusion of the sample in the presence of carbon and molten Ni reduces the oxygen to CO which is removed from the furnace with argon, oxidized to CO_2 and measured conductometrically in $Ba(OH)_2$ solution. 23 ref. (S11m; Be, O)

17-S. Use of Tritium Tracer for the Determination of Hydrogen in Aluminum.

Arthur S. Gillespie, Jr. Analytical Chemistry, v. 32, Nov. 1960, p. 1624-1626.

Hydrogen is extracted as tritium from Al by solid extraction methods and assayed in an ion chamber. No surface gas corrections are required. (S11s; Al, H)

18-S. X-Ray Fluorescence Method for Determination of the Transition-Metal Content in Very Small Specimens of Alloys. P. J. Brown. Journal of Scientific Instruments, v. 37, Oct. 1960, p. 394-397.

Quantitative determination of the transition metal content of $(FeCu)Al_6$ alloys containing transition metals of the first long period. Method depends on measurement of the intensity of the fluorescent X-rays emitted by the specimen. (S11p; Al-b, Fe, Cu)

19-S. (French.) Specific Cases of Ultrasonic Inspection of Iron Castings. R. Rasschaert. Fonderie Belge, v. 30, Oct. 1960, p. 257-262.

Procedure and equipment; permeability of cast irons to ultrasonic waves; examination of a number of castings, chiefly in nodular iron; interpretation of oscillograms and evaluation of defects. (S13g; CI)

20-S. A Chemical-Spectrographic Method for the Determination of Boron in Iron and Nickel-Base Alloys. R. Anerson. Applied Spectroscopy, v. 14, May 1960, p. 123-125.

Base metals of the alloys are removed by Hg cathodes and replaced by a Cu matrix. Samples are thin compared to boron standards with the same matrix. (S11k; Fe-b, Ni-b, B)

21-S. Spectrographic Analysis of Indium Metal for Impurities. H. M. Hyman. Applied Spectroscopy, v. 14, May 1960, p. 125-127.

Determination of Cu, Ga, Fe, Pb, Ni, Ag, Sn and Zn in In using a high-voltage a-c. arc excitation on a platform-centerpost electrode coated with dried sample salts for analysis. (S11k; In, Ag, Cu, Fe, Ga, Ni, Pb, Sn, Zn)

22-S. (German.) Volumetric Analysis of Lead-Tin Bronzes. H. Korner. Metall, v. 14, Nov. 1960, p. 1106-1107.

Titrimetric determination of Cu, Sn and Pb in bronzes composed of 67.5-83% Cu, 5-22% Pb and 5-10% Sn. (S11j; Cu-s, Sn, Pb)

23-S. (Czech.) Spectrographic Analysis of Steel. J. Zahradnik. Strojirenstvi, v. 10, Sept. 1960, p. 702-704.

Simultaneous determination of Mn, Si, Cr, V, W, Ni, Co, Mo and Al in steel using a Cu electrode to produce the spark. For Cu determination, a carbon electrode is used. (S11k; ST, Al, Co, Cr, Mn, Mo, Ni, Si, V, W)

24-S. (German.) Radiographic Analyses. Hans Neff. VDI Zeitschrift, v. 102, Oct. 21, 1960, p. 1433-1437.

X-ray analysis of Al, Fe, Mn, Si, Zn and steel to determine lattice structure, residual stress and chemical composition. (S11p, M26, Q25h; Al, Fe, Mn, Si, Zn, ST)

25-S. (Japanese.) Spectrophotometric Determination of Phosphorus in Steels Containing Columbium. M. Kawahata, H. Mochizuki and T. Misaki. Japan Analyst, v. 9, Sept. 1960, p. 727-730.

Determination of phosphorus in 18-8 stainless steel containing trace amounts of P, Cb or Ta by absorption spectrophotometry. 8 ref. (S11a; SS, Cb, P, Ta)

26-S. (English.) The Electrochemical Jet Method for Determination of the Thickness of Electrodeposits on Metals and Their Alloys. D. Singh. Banaras Hindu University, Journal of Scientific Research, v. 10, Dec. 1959, p. 13-20.

Measurement of average and local thickness of electrodeposited Ni, Cd, Cu, brass and bronze coatings by anodic dissolution. 4 ref. (S14, R2g; Cu-n, Cu-s, Cu, Cd, Ni, 8-62)

27-S. (French.) Industrial Applications of Ultrasonic Testing. Pt. 2. P. Hermadinquer. Pratique des Industries Mecaniques, v. 46, Sept. 1960, p. 241-247.

Location and evaluation of defects in machine parts, welded joints and rails. Equipment design and operation. (S13g, 1-52, T7, T23q; 7-51)

28-S. Gamma Ray Inspection of Steel Castings. J. Taylor. Engineer and Foundryman, v. 26, Sept. 1960, p. 21-23.

Detection of flaws in steel castings by radiological examination using a Co source. (S13e; ST, 5)

29-S. Standards and Specifications in the Foundry. G. C. Webster. Engineer and Foundryman, v. 26, Sept. 1960, p. 24-31.

Specifications for the composition of gray iron, Mn steel and Cu base alloys. (S22, E-general; CI-n, Cu-b, ST, Mn)

30-S. Radioisotopes Broaden Field for Non-Destructive Tests. Robert Hamlin. Iron Age, v. 186, Dec. 1, 1960, p. 127-129.

Use of radioisotopes for inspection of stainless steel components, welds, castings, tanks and pressure vessels. (S13e, T26q; SS, 5, 7-51)

31-S. A Precision Instrument for Testing the Thickness of Electroplates by Electrolytic Stripping Method. P. B. Mathur. Plating, v. 47, Nov. 1960, p. 1274-1276.

Thickness of Ag, Cu, Ni, Cd, Cr, Sn, Zn, Au and Pb deposits is measured by a device consisting of a current divider, potential divider and potential recorder which does not require calibration. 5 ref. (S14c; Ag, Cd, Cr, Cu, Ni, Sn, Zn, 8-62)

32-S. (Russian.) New Gamma-Defectoscope With Scintillation. V. N. Fainberg. Khimicheskoe Mashinostroenie, no. 2, 1960, p. 41-43.

Detection of defects in steel and cast iron parts using a device which passes an amplified stream of electrons produced by irradiation of phosphorus with gamma rays through the metal. 4 ref. (S13e; CI, ST)

33-S. (Russian.) New Method for Determination of Gases in Metals. Yu. A. Klyachko and O. D. Larina. Zavodskaya Laboratoriya, v. 26, Sept. 1960, p. 1047-1051.

Armco iron 02 rimmed steel and OKH18N9T stainless steel samples are analyzed for O, N and H content by anodic dissolution. 6 ref. (S11r; Fe, SS, ST-d, H, N, O)

34-S. (Russian.) Control of Metal Parts by Eddy Currents Measurements. L. M. Suvorov. Zavodskaya Laboratoriya, v. 26, Sept. 1960, p. 1096-1101.

Measurement of thickness and electrical conductivity of Al, Au, Cd, Pb and Sn coatings using a measuring coil. 5 ref. (S14h, P15g; Al, Au, Cd, Pb, Sn, 8)

35-S. (Russian.) Factors Influencing Sensetivity of Ultrasonic Defectoscopy. A. K. Gurvich. Zavodskaya Laboratoriya, v. 26, Sept. 1960, p. 1102-1103.

Measurement of the effect of oil and water coatings on the sensitivity of ultrasonic flaw detection methods using rolled steel and duralumin samples. (S11g; Al-b, ST, 4-60, 8)

36-S. Industrial Radiography. G. F. MacKnight. Welding Fabrication and Design, v. 4, Oct. 1960, p. 31-37.

Theory and techniques of X-ray and gamma ray examination of steel welds and castings for various types of defects. Design of X-ray tubes, film and intensifying screens. Interpretation of the radiograph. Safety precaution requirements. (S13e, X8g; ST, 5, 7-51)

37-S. "Black Light" Pin Points Flaws in Tube-Conditioning Line. Iron Age, v. 186, Nov. 24, 1960, p. 98-99.

By automatic start-stop turning of 10 in. diam. rounds, an operator checks the entire surface for seams and other flaws. Without excessive waste defects are removed by flame scarfing in the conditioning area. (S13; 4-60)

38-S. Nondestructive Testing of Reactor Materials. Metal Progress, v. 78, Dec. 1960, p. 148, 151-A, 152, 154, 156, 158.

Specifications for reactor materials. Radiation test methods--conventional radiography, autoradiography, fluoroscopy, electron radiography; ultrasonic testing; electromagnetic testing and other methods. (S13, T11)

39-S. Nondestructive Testing of Small Tubing. J. R. Grieve and A. M. Bounds. Metal Progress, v. 78, Dec. 1960, p. 110-114, 126, 128.

This article compares eight nondestructive testing methods--visual, boroscopic, eddy current, dye penetrant, magnetic particle, ultrasonic, radiographic and hydrostatic. Though eddy current testing is considered to be the most versatile, no one test can give a complete answer by itself. (S13; 4-60)

40-S. Determination of Uranium in Flotation Concentrates and in Leach Liquors by X-Ray Fluorescence. G. L. Smithson, R. L. Eager and A. B. Van Cleave. Paper from "Advances in X-Ray

Analysis", v. 2. Plenum Press, Inc., New York, 1960, p. 175-191.

X-ray analysis of sulphate liquors and U_3O_8 concentrates obtained from pegmatite. Determination of U and Fe using Sr, Yt and Br internal standards. 9 ref. (S11p; RM-n, Fe, U)

41-S. X-Ray Spectrographic Determination of Uranium and Plutonium in Aluminum and Other Reactor Fuel Materials. Maurice C. Lambert. Paper from "Advances in X-Ray Analysis", v. 2. Plenum Press, Inc., New York, 1960, p. 193-213.

X-ray fluorescence measurement of Al cladding thickness over Pu cores, determination of UO_2 in cryolite and Bi and determination of U and Pu in Al alloy fuel rods and plates. Modifications in design of spectrographic and radiation detection equipment with attention to increased sensitivity. (S11p, T11g; Al-b, U, Pu)

42-S. Crystal Chemical Studies by X-Ray Fluorescence. Eugene W. White, Herbert A. McKinstry and Thomas F. Bates. Paper from "Advances in X-Ray Analysis", v. 2. Plenum Press, Inc., New York, 1960, p. 239-245.

X-ray fluorescence spectroscopy detection of peak shifts in the characteristic radiation for Al, S, Cl, Ti, V and Fe crystals using flat crystals of NaCl, LiF and EDT as analyzers. Influence of valence state and coordination number on radiation wave length. 6 ref. (S11p; Al, Fe, Ti, V, 14-61)

43-S. Quantitative Analysis of Trace Amounts of Tin in Steel by Means of X-Ray Fluorescence. T. S. Whitehouse. Paper from "Advances in X-Ray Analysis", v. 2. Plenum Press, Inc., New York, 1960, p. 257-260.

Measurement of Sn concentration as low as 0.01% in steel to an accuracy of 0.003% by X-ray fluorescence using a pulse height analyzer to reduce the background. (S11p; ST, Sn)

44-S. Cladding Thickness of Fuel Elements by X-Rays. Beverley James Lowe, Payson D. Sierer, Jr., and Robert B. Ogilvie. Paper from "Advances in X-Ray Analysis", v. 2. Plenum Press, Inc., New York, 1960, p. 275-281.

Thickness of Al, 304 stainless steel and Zr claddings on tubular uranium fuel elements fabricated by co-extrusion. X-ray fluorescence measurement by attenuation of the characteristic X-radiation from the uranium base metal by the cladding material and Compton scattering of X-rays from the cladding surface. (S14e, T11g; U, Al, SS, Zr, 8-66)

45-S. (Czech.) Determination of Pipe in Ingots and Blooms. F. Khol and J. Schmied. Hutnicke Listy, v. 15, Oct. 1960, p. 763-765.

Billets and blooms rolled from steel ingots to a maximum 200 mm. thickness are tested for pipe defects by exposure to gamma rays obtained from the isotope Co_{60}. Effects of size of defect, material composition, distance between irradiation source and detector and irradiation and detector parameters on the accuracy of results. 6 ref. (S13e, 9-67; ST, 4-52)

46-S. (Czech.) Photometric Determination of Silicon in Steel. Miroslav Pangrac. Hutnicke Listy, v. 15, Oct. 1960, p. 807-808.

Use of various solutions containing ammonium molybdate, oxalic acid and Mohr's salt for the determination of 0.05-0.48% Si in alloy steels with 0.14-0.95% C, 0.26-0.64% Mn, 1.18-4.06% Cr, 0.27-8.38% W, 0-2.85% V, 0-1.94% Mo and 0-1.94% Ni. 29 ref. (S11a; AY, Si)

47-S. (Czech.) Spectrographic Determination of Trace Elements in Iron. Marie Kotrbova. Hutnicke Listy, v. 15, Oct. 1960, p. 802-803.

High-purity Fe dissolved in diluted H_2SO_4 with $CuSO_4$ added is heated to boiling temperature and a stream of H_2S is passed through it. The precipitate formed is filtered off, washed, dried and held at 450° C. for 2 hr. with subsequent spectrographic determination of Mo, Sn, Sb and Bi. 4 ref. (S11k; Fe-a, Bi, Mo, Sb, Sn)

48-S. Ultrasonic Setup Tests Heavy Sections. Steel, v. 147, Dec. 5, 1960, p. 104-105.

Immersion ultrasonic inspection of steel forging squares, round bars and large seamless tubing, using a testing tank which handles sections of steel up to 12 in. sq. or 11 in. in diameter. (S13g; ST, 4-51, 4-55, 4-60)

49-S. Navy Will Set New Casting Standards. Steel, v. 147, Dec. 5, 1960, p. 106-107.

Radiographs are obtained on defective castings of 4130, 4140, 4330, 347 and 410 steels for use as acceptance standards during inspection of aircraft and missile castings. (S13e; SS, 5)

50-S. Non-Metallic Inclusions, Their Quantitative Extraction From Steel. H. Walz and R. A. Bloom. Journal of Metals, v. 12, Dec. 1960, p. 928-932.

Electrolytic extraction of oxide inclusions and subsequent treatment of the residue by vacuum drying, chlorination, vacuum sublimation and oxidation. Effect of procedures on isolation of nonmetallic inclusions is studied using ingot scums. Technique applied to 1040 and 4340 alloy steels. 27 ref. (S11f; AY, 9-59)

51-S. (Russian.) Spectral Analysis of Inclusions in Iridium and Rhodium. A. A. Kuranov, V. D. Ponomareva and N. I. Chertsova. Zhurnal Analiticheskoi Khimii, v. 15, Apr. 1960, p. 476-480.

Preparation of reference standards for spectral analysis from metal powders. Method for quantitive determination of Pt, Pd, Ru, Au, Ba, Si, Rh, Fe, Ni, Cu, Al and Pb in Ir and Rh. 15 ref. (S11c; Ir, Rh, 9-69)

52-S. (Dutch.) Nondestructive Testing of Weldments. W. J. Kaufman. Lastechniek, v. 26, Sept. 1960, p. 153-165.

Inspection of weldments by ultrasonics and by exposure to X-rays, electrons or radon particles for detection of cracks and included slag. (S13e, S13g; 7-51)

53-S. Non-Destructive Testing of Colliery Gear by Radiographic Methods. Pt. 1. Mining Journal, v. 255, Nov. 4, 1960, p. 498-500.

Detection of structural defects in metal parts and welds, especially of Fe and steel, by X-ray or X-ray penetration techniques. (S13e, T28; Fe-b, ST, 7-51)

54-S. (Italian.) Contribution to the Study of Spanish Casehardening Steels and the Direct Measurement of Case Depth. Pt. 2. P. G. Gomez and E. Asensi. Tecnica Metalurgica, v. 16, Mar-Apr. 1960, p. 55-93.

Critical, comparative study of methods of measuring case depth and hardness of carbon steel, Cr-Mo steel, two Cr-Ni steels and a Cr-Ni-Mo steel treated in cyanide bath and with "Caron" mixture, a solid casehardening agent composed of carbon and barium carbonate, at temperatures of 875-925° C. for 1 to 8 hr. 56 ref. (S14, J28, Q29n; CN, ST, Cr, Mo, Ni)

55-S. (English.) Radiometric Estimation of Traces of Zirconium. K. R. Kar and B. C. Sawhney. Journal of Scientific & Industrial Research, v. 19B, Oct. 1960, p. 401-403.

The amount of phosphorus precipitated by a ZR sample from a standard pyrophosphate solution tagged with P^{32} is used to determine Zr in the presence of interfering elements such as Ag, Ce and La. 3 ref. (S11q; Zr)

56-S. Polarographic Determination of Titanium in Red-Mud. G. S. Deshmukh and J. P. Srivastava. Journal of Scientific Research of Banaras Hindu University, v. 10, Dec. 1959, p. 101-107.

Determination of Ti in red mud, a by-product obtained in manufacture of Al and titaniferrous minerals by polarography in 0.4 M sodium citrate at an optimum pH of 5.5. Comparison with gravimetric and colorimetric methods. (S11m; Ti, 14-59)

57-S. (German.) Photometric Analysis of Vanadium in Hard Metals, Carbides and Oxides of Tungsten, Tantalum and Titanium. Heinz Schwarz. Zeitschrift fur Analytische Chemie, v. 176, Apr. 1960, p. 241-249.

Determination of up to 3% vanadium in the presence of WO_4 ions by photometric measurement of yellow-brown color of pervanadic acid against water. Influence of free H_2SO_4, salt concentration, H_2O_2 and alloying elements (W, Ta, Ti, Nb). (S11a; Ta-b, Ti-b, W-b, V)

58-S. (Japanese.) Fractional Determination of Quartz and Silicate in Manganese and Reduced Manganese Ores. Shiro Watanabe. Japan Institute of Metals, Journal, v. 24, Aug. 1960, p. 479-482.

Ore specimens dissolved in H_3PO_4 and $Na_2O(BF_3)_4$ solutions, with paper pulp added, are washed in HCl and water, filtered and ignited at 950° C. Silicate and quartz are determined using HF and HCl. 6 ref. (S11j; Mn-b, RM-n)

59-S. (Japanese.) Rapid Volumetric Method for Determining Si in Al Alloy. Masami Hasegawa. Japan Institute of Metals, Journal, v. 24, Aug. 1960, p. 493-496.

Alloys containing 0.39-5.81% Si are dissolved in HNO_3, HF and H_2O, with Si being precipitated by KNO_3 to form K_2SiF_6. The Si content is determined by titration with NaOH. 4 ref. (S11j; Al-b, Si)

60-S. (Japanese.) Rapid Determination of Zn in Al Alloys by EDTA Titration Method. Shigeo Wakamatsu. Japan Institute of Metals, Journal, v. 24, Aug. 1960, p. 504-506.

Zn in the presence of Sn and Al is titrated with EDTA, NH_4F being used to mask the interference of Al and Sn. Specimens are treated in NaOH and H_2O_2 and Na_2S solutions. 10 ref. (S11j; Al, Zn)

61-S. (Japanese.) Fractional Determination of Various Elements and Rational Analysis in Manganese and Reduced Manganese Ores by Chemical Analysis. Shiro Watanabe. Japan Institute of Metals, Journal, v. 24, Aug. 1960, p. 483-486.

Ore specimen of Mn silicate dissolved in H_2SO_4 and H_2O_2, with paper pulp added, is washed in H_2O and H_2SO_4, ignited and fused with Na_2CO_3 Fe and Mn and their oxides and silicates are determined by titration. 10 ref. (S11j; Mn-b, RM-n)

62-S. (Translation-Columbia.) Spectroscopic Determination of the Major Components of Noble Metal Alloys. N. I. Varlamova and N. S. Sventitskii. Academy of Sciences of the USSR, Bulletin, Physical Series, v. 23, Sept. 1959, p. 1124-1125.

Cu content in binary Ag-Cu alloys and in ternary Cu-Ag alloys containing Ni or Au is determined by spectroscopic analysis using a low energy, high frequency spark light source. 8 ref. (S11k; Ag-b, Cu-b, Ni, Au)

63-S. (Translation-Columbia.) Local Analysis of Complex Alloys. I. L. Mirkin and E. P. Rikman. Academy of Sciences of the USSR, Bulletin, Physical Series, v. 23, Sept. 1959, p. 1164-1166.

Local spectroscopic analysis of alloy steel microsections containing Cb and Tl and of cast iron microsections containing Mg using an arc unit rectified by a kenotron to supply high-frequency current. 4 ref. (S11k, S11e; AY, CI, Cb, Mg, Tl)

64-S. (Translation-Columbia.) Determination of Nitrogen in Chromium and Titanium. S. A. Skotnikov. Academy of Sciences of the USSR, Bulletin, Physical Series, v. 23, Sept. 1959, p. 1119-1121.

Spectroscopic analysis of Cr, Ti and steel for nitrogen content using an electric spark in a CO_2 atmosphere. Optimum spark parameters are determined for maximum sensitivity. (S11k; Cr, ST, Ti, N)

65-S. (Translation-Columbia.) Methods of Calibration in Analysis of Alloys. E. S. Kudelya and A. S. Dem'yanchuk. Academy of Sciences of the USSR, Bulletin, Physical Series, v. 23, Sept. 1959, p. 1135-1136.

Quantitative spectrochemical analysis of steel to determine Si, Ni, P and C content using a single or three standard calibration method. (S11k; ST, C, Ni, P, Si)

66-S. (Translation-Columbia.) Analysis of Heat Resistant and Light Alloys and Steels by the Photoelectric Procedure. K. A. Sukhenko, K. A. Moiseeva, L. D. Metalina, I. G. Tishin, N. V. Penkina and D. G. Bakanov. Academy of Sciences of the USSR, Bulletin, Physical Series, v. 23, Sept. 1959, p. 1099-1101.

Photometric analysis of Al, Mg and Ni alloys and steels using a photoelectric steelometer and counterelectrodes. 3 ref. (S11a; Al-b, Mg-b, Ni-b, ST, SGA-h)

67-S. (Translation-Columbia.) Influence of the Chemical Composition and Heat Treatment of Steel Samples on the Results of Spectroscopic Determination of Nitrogen. N. Buyanov, L. Fedorova and V. Korotkov. Academy of Sciences of the USSR, Bulletin, Physical Series, v. 23, Sept. 1959, p. 1117-1118.

Influence of Al, Cr, Si and Ti content and of quenching and annealing heat treatments on the results obtained from spectroscopic analysis of ST-10, Kh25, Kh25t, Kh25Yu10 and transformer steels for nitrogen content. (S11k, 2-60, 2-64; ST, N)

68-S. (Translation-Brutcher no. 4887.) Determination of Hydrogen in Steel by the Carrier-Gas Method. K. Abresch, W. Dobner and H. Lemm. Archiv fur das Eisenhuttenwesen, v. 31, June 1960, p. 351-354.

Advantages of carrier-gas method of precise and speedy determination of hydrogen in steel, using two different temperature ranges. Separation of hydrogen by diffusion through Pd; design of apparatus. (S11r; ST)

69-S. (Translation-Brutcher no. 4888.) Effect of pH Value of Electrolyte Upon Quantity and Composition of Oxide Inclusions Extracted From Fully Killed Basic Bessemer Steels. E. Piper, H. Hagedorn and M. Frohlich. Archiv fur das Eisenhuttenwesen, v. 31, June 1960, p. 355-358.

Experimental study of loss-free electrolytic separation of oxides from basic Bessemer steels fully killed with calcium silicide, at low pH values. New type of electrolysis cell used by authors for continuous measurement and recording of the pH composition of residues after separation at pH values from 6.8 down to 1.0. (S11f; ST-g, 9-69)

70-S. (Translation-ConBur.) Spectrographic Determination of Aluminum in Uranium. E. A. Vernyi and V. N. Egorov. Journal of Analytical Chemistry of the USSR, v. 15, Jan-Feb. 1960, p. 23-25.

Method using fractional distillation with a carrier is developed for determination of small amounts of Al. Experiments are carried out to determine effect of Ba and carbon powder on the intensity of Al lines. Effect of third elements on the results of Al determination. 6 ref. (S11c, 2-60; Al, U)

71-S. (Translation-Columbia.) Spectroscopic Determination of High Concentration Components in Steels and Other Alloys. A. G. Komarovskii. Academy of Sciences of the USSR, Bulletin, Physical Series, v. 23, Sept. 1959, p. 1126-1127.

Research spectroscopy on complex alloys and steels to determine the causes of the influence of "third" elements on the analytical result and to find means of reducing or eliminating this effect in spectrographic analysis by spark discharge. (S11k; ST)

72-S. (German.) Method for Photometric Determination of Phosphorus in Tungsten Ores. Christoph Winterstein. Zeitschrift fur Erzbergbau und Metallhuttenwesen, v. 13, Nov. 1960, p. 546-549.

Determination of phosphorus in WO_3 samples containing P, Si and As by measuring the intensity of the orange-yellow color, which occurs on H_3PO_4 addition to a nitrate solution of NH_4VO_3 and NH_4MbO_3 Method for separation of W, Si and As. (S11a; W-b, P)

73-S. Electronic Analysis of the Iron-Nickel System. S. Yamaguchi. Electrochemical Society, Journal, v. 107, Dec. 1960, p. 1011-1012.

Magnetized Invar (36 wt.% Ni) is analyzed by electron diffraction at 50 and 120° C. 4 ref. (S11p; Fe-b, Ni-b)

74-S. (Italian.) Methods and Apparatus Used in Control of Surface Finishes at the Ansaldo Co.'s Machinery Plant. L. Cavazzoni and P. Delfanti. Ingegneria Meccanica, v. 9, Sept. 1960, p. 45-55.

Direct, indirect, optical and electrical control of roughness of machined surfaces; use of standard roughness samples and Fax-Film. (S15)

75-S. (Japanese.) Determination of Impurities in Some Non-Ferrous Metals by Fluorescent X-Ray Spectroscopy. Kichinosuke Hirokawa. Japan Institute of Metals, Journal, v. 24, Sept. 1960, p. 555-558.

Determination of Cd, Fe, Pb and As in Zn; Pb and As in Sn; and Fe in Ti. Data are given for calibration curves and instrumentation. 6 ref. (S11p)

76-S. (Japanese.) Determination of Alloying Elements in Binary and Ternary Alloys by X-Ray Fluorescent Spectroscopy. Pt. 1. Kichinosuke Hirokawa. Japan Institute of Metals, Journal, v. 24, Sept. 1960, p. 559-562.

Preparation of calibration curves for X-ray fluorescent analysis of Sn-Pb, Pb-Sb, Sn-Sb and Sn-Sb-Pb alloys. Comparison of background substraction method with integrated area method for rapidity of analysis. 5 ref. (S11p, M24; Pb-b, Sb-b, Sn-b)

77-S. (Japanese.) Determination of Alloying Elements in Binary and Ternary Alloys by X-Ray Fluorescent Spectroscopy. Pt. 2. Kichinosuke Hirokawa. Japan Institute of Metals, Journal, v. 24, Sept. 1960, p. 562-564.

Application of a calculation method proposed by Brissey, Sherman and others to the determination of Sn, Sb and Pb in binary and ternary Sn-Pb-Sb compounds (in conjunction with the calibration curve method described in Pt. 1 of the report). (S11p, M24; Pb-b, Sb-b, Sn-b)

78-S. (Japanese.) Determination of Mg in Cast Iron by EDTA Titration Method. Shigeo Wakamatsu. Japan Institute of Metals, Journal, v. 24, Sept. 1960, p. 571-573.

Cast iron specimens dissolved in HNO_3 and HCl are subjected to methyl-isobuthyl-Ketone extraction and treated with

ammonium oxalate and NH_4OH. Mg is titrated with EDTA using EBT as an indicator. 10 ref. (S11j; CI, Mg)

79-S. Investigation of an Electrical Nondestructive Method of Measuring the Depth of Surface Hardness in Flame-Hardened Steels. J. A. Betts and J. P. Newsome. Institution of Electrical Engineers, Proceedings, Part C, v. 107, Sept. 1960, p. 265-271.

Use of an a-c. electric method based on measurement of the complex impedance of a search coil magnetically coupled to the test surface by a ferrite cup-core. Probe-coil electrical parameters and depth of hardness data are correlated for EN17, EN19, V9D, V10 and V13 steels. 9 ref. (S14b, Q29; ST)

80-S. Inspection Is the Key to Welded Tubing Acceptance. Steel, v. 147, Dec. 19, 1960, p. 110-111.

Ultrasonic and magnetic particle inspection of tubing. After mill inspection, the tubing goes through normalizing furnaces to eliminate the difference between the weld area and the body of the tubing. (S13; 4-60)

81-S. Determination of Low Concentrations of Aluminum and Chromium. L. R. Pittwell. Analyst, v. 85, Nov. 1960, p. 849-850.

Low concentrations of Al and Cr are determined by precipitation of the hydroxide using La as a carrier and subsequent examination of the precipitate by d.c. arc emission spectography. (S11k; Al, Cr)

82-S. The Determination of Boron in Aluminum and Silicon-Aluminum Alloys. E. G. Towndrow and H. W. Webb. Analyst, v. 85, Nov. 1960, p. 850-851.

Direct colorimetric procedure for determination of boron using dianthrimide solution. The use of boron-containing glassware has been avoided. (S11a; Al-b, Si-b, B)

83-S. Method for the Separation of Titanium, Zirconium, Iron and Aluminum From One Another and for Their Subsequent Determination. T. J. Murphy, W. S. Clabough and R. Gilchrist. National Bureau of Standards, Journal of Research, Pt. A. Physics and Chemistry, v. 64A, Nov-Dec. 1960, p. 535-542.

Precipitation of Ti, Zr, Fe and Al from Ba titanate ceramic dielectrics after dissolving by digestion in a solution of equal volumes of HCl and H_2O. The elements are then separated from the alkaline earths, alkalies and Si by a double precipitation with 8-hydroxyquinoline. Application to analytical problems other than those of ceramic dielectrics. 16 ref. (S11b; Al, Fe, Ti, Zn, 6-70)

84-S. Spectro Photometric Determination of Indium With 1-(2-Pyridylazo)-2-Naphthol. Shozo Shibata. Analytica Chimica Acta, v. 23, Nov. 1960, p. 434-438.

Determination of Zn in Zn residues using 1-(2-Pyridylazo)-2-Naphthol in chloroform solution to produce a red chelate with absorbance maxima at 530 and 560 millimicrons. (S11a; Zn, In)

85-S. Ion-Exchange Separation of Titanium From Steels and Its Determination With H_2O_2. Analytica Chimica Acta, v. 23, Nov. 1960, p. 438-440.

Quantitative separation of Ti from its associated elements in steels as the fluoride complex on an anion exchange resin. Results are given for stainless steel, cast iron, hematite iron and a permanent magnet alloy. (S11f, S11k; CI, Fe, SS, Ti)

86-S. Separation of Microgram Amounts of Cobalt in Ni Metal by TBP. V. T. Athavale, S. V. Gulavane and M. M. Tillu. Analytica Chimica Acta, v. 23, Nov. 1960, p. 487-490.

Major amounts of Ni are separated by extraction with tributyl phosphate after which Co is determined spectrophotometrically with nitroso-R salt. (S11f, S11k; Ni, Co)

87-S. (German.) Simplified Computation of the Thickness of Fillet Welds Withstanding Static Loads. H. Gut. Werkstatt und Betrieb, v. 93, Nov. 1960, p. 723-727.

Fillet welds are made from St 37, 50, 52, 35.8 and 45.8 steels. Computation of the weld thickness for various shearing stresses, with and without simultaneous bend stress, taking into account various structural shapes. (S14, 3-66; ST, 7-51)

88-S. (Japanese.) Sampling Method for Determination of Hydrogen Content in Molten Pig Iron. Shizuya Maekawa, Yohitoka Nakogawa, Masao Soga and Minoru Sudo. Imono (Japan Foundrymen's Society, Journal), v. 32, Sept. 1960, p. 658-663.

Vacuum sampling method and apparatus which is unaffected by gas evolution during metal solidification. Comparison to ladle sampling technique for hydrogen determination in molten pig iron at 1300-1450° C. 15 ref. (S11; CI-a, H)

89-S. (Russian.) Spectrometric Determination of Nickel in Pure Indium and Aluminum. V. M. Peshkova, V. M. Bochkova and L. I. Lazareva. Zhurnal Analiticheskoi Khimii, v. 15, May 1960, p. 610-613.

Spectrometric method of determining small amounts of Ni using alpha-furildioxime as a reagent. Effect of Cu content and pH on the accuracy of Ni determination. 6 ref. (S11a; Al, In, Ni)

90-S. Determination of Zirconium With Benzoylphenylhydroxylamine. D. E. Ryan. Canadian Journal of Chemistry, v. 38, Dec. 1960, p. 2488-2492.

Zr is completely precipitated by benzoylphenylhydroxylamine from 0.5 N acid solutions. The complex formed in H_2SO_4 solutions has a constant composition, Zr $(C_{13}H_{10}O_2N)_4$, and can be weighed directly to determine Zr. Product precipitated from HCl solutions must first be ignited to the oxide. 16 ref. (S11b; Zr)

91-S. Radiography as an Inspection Tool. Aluminium Courier, Sept. 1960, p. 22-23.

Inspection of Al castings and welds by X-rays or gamma-rays to detect gas cavities, sand or slag inclusions, shrinkage defects, lack of root penetration and lack of fusion. (S13e; Al, 5, 7-51)

92-S. Method Control in Testing--Key to Reliability. A. E. Christensen. Tool and Manufacturing Engineer, v. 45, Dec. 1960, p. 61-64.

Nondestructive testing of ball separators by magnetic particle methods to illustrate ways in which an inspection operation can be made more reliable. Magnetic particles are applied as dry powder or as a suspension in an oil or water vehicle. A magnetic field is usually introduced by passage of a current either through or around the part being tested. Missile applications. (S13j, W15r)

93-S. (German.) Quantitative Chemical Analysis of Individual Nonferrous Metals Alloyed in Iron and Steel. A. Klinkmann. Metall, v. 14, Dec. 1960, p. 1190-1194.

Analysis of Mn in unalloyed steel by titration with Na_3AsO_3 using the Smith Method and in alloyed steel with up to 2% Mn by the Volhard-Smith Method. Photometric analysis of Cu in alloyed or unalloyed steels. Oxidimetric determination of Si (up to 1%) and Cr (up to 5%). Volumetric and potentiometric analysis of Cr and V for Cr contents up to 30% and vanadium over 1% using the silver nitrate-persulphate process. (S-general; Fe, ST, Cr, Cu, Mn, Si, V)

94-S. (Japanese.) Nondestructive Determination of Trace Amounts of Manganese in Steel by Neutron Activation. Hisashi Mori and Hirokazu Vmezawa. Japan Institute of Metals, Journal, v. 24, Oct. 1960, p. 641-645.

Neutron activation analysis using a JRR-1 reactor for irradiation of specimens, the induced radioactivity of Mn-56 being measured by a well type scintillation counter and a gamma ray spectrometer. Mn determinations are compared to chemical analysis. (S11q; ST, Mn)

95-S. (Japanese.) A Rapid Volumetric Method for Determination of Si in Al Alloys (Quinoline Method). Masami Hasegawa. Japan Institute of Metals, Journal, v. 24, Oct. 1960, p. 654-657.

Volumetric analysis of 0.39-12.74% Si-Al specimens by precipitation of the Si as the quinoline complex, $(C_9H_7N)_4H_4(SiO_4.12MoO_3)$, with subsequent titration. 7 ref. (S11j; Al-b, Si)

96-S. Recommended Practice for X-Ray Inspection of Fusion Welded Joints on Al and Its Alloys and Mg and Its Alloys, Up to Two Inches Thick. Lastechniek, v. 26, Nov. 1960, p. 231-234.

Directions for surface preparation, marking of the part tested and evaluation of radiographs by quality indicators. Recommended positions for radiation source and film. (S13e; Al-b, Mg-b, 7-51)

97-S. (Russian.) Determination of Vanadium in Steel and Ferroalloys by Amperometric Titration Using Two Indicator Electrodes. L. S. Studenskaya and O. A. Songina. Zavodskaya Laboratoriya, v. 26, Oct. 1960, p. 1102-1104.

Determination of vanadium by titration in the presence of potassium permanganate. (S11j; ST, V)

98-S. Measuring the Roughness Factor of a Small Disk. ASTM Bulletin, Sept. 1960, p. 56-57.

The steel disk is weighed in both air and water and thickness measured by a vernier micrometer. Calculation of the roughness factor from these data requires no assumed density of the material. (S15; ST)

99-S. (Japanese.) Shrinkage Defects in Spheroidal Graphite Cast Irons Treated With Spheroidizing Reagents. Hiroshi Nakamura and Takao Takase. Imono (Japan Foundrymen's Society, Journal), v. 32, Oct. 1960, p. 703-712.

Cast specimens treated with spheroidizing reagents such as pure Mg metal, calcium-silicide and mixtures of calcium-silicide and rare earth oxides are tested by ultrasonic inspection to determine the effect of these reagents on the volume and height of shrinkage voids and the damping properties of the castings. 7 ref. (S13g, Q8, 9-67; CI-r, 5)

100-S. (Czech.) Spectrograph Determination of Carbon in Steel. Vladimira Janosikova and Jan Chlebour. Hutnicke Listy, v. 15, Nov. 1960, p. 886-889.

Description of an apparatus which resolves C and Fe lines in the spectrum. Comparison of the results of spectrographic and chemical analyses. (S11k; ST, C)

101-S. (Czech.) Photometric Determination of Tin in Steel. Ivan Janousek and Karel Studlar. Hutnicke Listy, v. 15, Nov. 1960, p. 889-893.

Various carbon and alloy steels, cast iron and ferrochromium containing 0-0.044% Sn are analyzed by photometric determination after distillation and separation by ion exchange. 56 ref. (S11a; AD-n, AY, CI, CN, Sn)

102-S. (German.) Assessment of Testing Methods for Nonmetallic Inclusions in CK 22 Steel. Hans-Joachim Eckstein and Klaus Schneider. Neue Hutte, v. 5, Oct. 1960, p. 607-617.

Samples of electro-furnace melted and rolled CK 22 steel are tested and examined by magnetic particle, ultrasonic, microscopic and vacuum hot extraction methods, blue brittleness and deformation and pickling tests and extraction residues analysis. Correlation and evaluation of inclusion analysis efficiency. (S13, 9-69; ST-f)

103-S. Spectrographic Determination of Boron in Steel by Rotating Electrode Method. M. K. Ghose, S. Pait and B. C. Kar. NML Technical Journal (National Metallurgical Laboratory, India), v. 2, Aug. 1960, p. 12-14.

Boron in steel is detected up to a lower limit of 0.001% with an accuracy of ±5% using a rotating boron-free graphite disk as a lower electrode and a Hilger large quartz spectrograph. (S11k; ST, B)

104-S. Radiography of Large Solid Propellant Rocket Motors. Paper from "Symposium on Nondestructive Testing in the Missile Industry". American Society for Testing Materials, STP no. 278, p. 3-11.

Experimental data on the radiography of the Polaris motor. Discontinuities can be detected from 30-60 in. in diameter. 7 ref. (S13, T24e)

105-S. Mobile Field Testing of Missiles and Aircraft. A. Barath and D. J. Hagemaier. Paper from "Symposium on Nondestructive Testing in the Missile Industry". American Society for Testing Materials, STP no. 278, p. 12-19.

X-ray, ultrasonic, magnetic particle, penetrant and hardness testing of airframe and landing gear members. (S13, T24e)

106-S. Radiography of Weldments in Motion. W. C. Hitt and D. J. Hagemaier. Paper from "Symposium on Nondestructive Testing in the Missile Industry". American Society for Testing Materials, STP no. 278, p. 40-46.

In-motion X-ray techniques for the inspection of Al and steel weldments. Comparison of in-motion and conventional X-ray techniques. (S13e; 7-51)

107-S. Ultrasonic Inspection of Adhesive-Bonded Aluminum Sandwich Structures. Calvin C. Kammerer. Paper from "Symposium on Nondestructive Testing in the Missile Industry". American Society for Testing Materials, STP no. 278, p. 47-52.

Equipment and techniques for detection of flaws in missile rudder assemblies. (S13g; Al, 5-59)

108-S. Company Shop-Inspects Many Nuclear-Plant Pressure Vessels. Condenser, v. 13, Dec. 1960, p. 4-8.

Nondestructive testing by radiography, ultrasonics, dye penetration

and X-rays to determine the quality of welds in pressure vessels fabricated from steel plates. (S13, T26q; ST, 7-51)

109-S. Polarographic Determination of Niobium in Highly Alloyed Steels. D. J. Brindley. Analyst, v. 85, Dec. 1960, p. 877-883.

Method for determining up to 3% of Cb in stainless steel, 266 permanent magnet alloy and mild steel. Cb is separated by hydrolysis in the presence of sulphurous acid. Oxides are ignited and fused with KOH then the melt is extracted with dilute KOH solution, adjusted to pH 1.9 in the presence of EDTA and the polarographic wave of Cb determined by polarographic procedures. 19 ref. (S11m; CN, SS)

110-S. (Book.) Symposium on Nondestructive Testing in the Missile Industry. ASTM Special Technical Publication no. 278, 71 p. 1960. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. $2.

Papers presented at the 3rd Pacific Area National Meeting, ASTM, San Francisco, Calif., Oct. 12, 1959. Papers are abstracted separately. (S13, T24e)

111-S. Low-Level Radiochemical Separation of Manganese. J. M. Matusek, Jr., and T. T. Sugihara. Analytical Chemistry, v. 33, Jan. 1961, p. 35-36.

Mn-56, obtained as a beta-decay product of fission-product Cr-56, is extracted into nitrobenzene as tetraphenylarsonium permanganate and counted and determined as the dioxide. 13 ref. (S11f, S11q; Mn)

112-S. X-Ray Rayleigh Scattering Method for Determination of Uranium in Solution. J. C. McCue, L. L. Bird, C. A. Ziegler and J. J. O'Connor. Analytical Chemistry, v. 33, Jan. 1961, p. 41-43.

The technique is evaluated for the quantitative determination of uranium in dilute nitric acid solution. Effects of Fe and Al on accuracy of results. (S11q; U)

113-S. Spectrophotometric Determination of Niobium and Molybdenum With 8-Quinolinol in Uranium-Base Alloys. Kenji Motojima and Hiroshi Hashitani. Analytical Chemistry, v. 33, Jan. 1961, p. 48-52.

The quinolinolates are extracted into chloroform and measured spectrophotometrically. Extraction of uranium is prevented by a fluoride masking agent. Up to 5% Cb or Mo may be determined. (S11k; U-b, Cb, Mo)

114-S. New Rapid Method for the Determination of Nickel in Ferrous and Ferromagnetic Materials. C. L. Luke. Analytical Chemistry, v. 33, Jan. 1961, p. 96-98.

Ni is isolated by precipitation as the hexamminoperchlorate and titrated by the cyanide method. The sample must contain at least 10 milligrams of Ni and no more than 0.5 milligrams of Cu or 3 milligrams of Co. 3 ref. (S11j; Fe-b, Ni)

115-S. Flame Photometric Determination of Copper in Mineral Mixes. Ion Exchange Technique for Sample Preparation. W. G. Schrenk, Kenton Graber and Russell Johnson. Analytical Chemistry, v. 33, Jan. 1961, p. 106-108.

Anion exchange with controlled chloride concentrations in the feed and eluant solutions is used to quantitatively separate Cu from other ions. The resulting HCl acid solution of Cu can be used for flame photometry. 11 ref. (S11a; Cu)

116-S. Extraction of Zirconium With Di-n-Butyl Phosphate and Direct Determination in the Organic Phase With 1-(2-Pyridylazo)-2-Naphthal. Application to Fluoride Solutions. R. F. Rolf. Analytical Chemistry, v. 33, Jan. 1961, p. 125-128.

Al and Mg alloys containing microgram quantities of Zr are dissolved in a mixture of fluoboric and mineral acids. The fluoride is complexed with ammonium nitrate and the Zr extracted with di-n-butyl phosphate in chloroform. Addition of alcoholic 1-(2-pyridylazo)-2-naphthal to the Zr extract gives an intense red color which is measured spectrophotometrically. 19 ref. (S11k; Al-b, Mg-b, Zr)

117-S. (French.) Determination of Hydrogen, Oxygen and Nitrogen in Metals by Melting Under Reducing Conditions in Argon Atmosphere. J. Hancart and J. Marot. Revue de Metallurgie, v. 57, Oct. 1960, p. 911-917.

Apparatus and procedure for simultaneous determination of oxygen and

nitrogen combines extraction of gases during melting in argon atmosphere with gas chromatography. Apparatus is used which permits instant switch from analysis of these gases to determination of hydrogen in same specimen. 4 ref. (S11f, 1-53)

118-S. (French.) Application of Chromatography to the Analysis of Gas Mixtures Extracted From Metals by Vacuum Melting Under Reducing Conditions. C. Baque and L. Champeix. Revue de Metallurgie, v. 57, Oct. 1960, p. 919-923.

Determination of H_2, CO and N_2 by gas chromatography technique using a column containing Linde molecular sieves. Reproducibility of results, sensitivity and accuracy of method. 3 ref. (S11f, C25)

119-S. (French.) Determination of Nitrogen in Steels, Cast Irons and Ferroalloys. J. Calmettes and H. Guinot. Revue de Metallurgie, v. 57, Oct. 1960, p. 925-933.

Comparative study of wet and dry analysis methods shows that no single technique is generally applicable to determination of total hydrogen in all ferrous metals. Certain steels contain complex nitrides which do not respond to wet analysis except under limited conditions. 6 ref. (S11f; ST, CI, Fe-b, N)

120-S. Quality Control in the Wire Industry. E. F. Jubb. Wire Industry, v. 27, Nov. 1960, p. 1105-1107.

Statistical quality control of annealing, galvanizing and drawing during manufacture of wire. (S12, J23, L16, F28)

121-S. (English.) Autonomics--Problems and Experiences in Automatic Production Testing. G. Alexander Rankin. Materialprufung, v. 2, Nov. 20, 1960, p. 421-428.

Ultrasonic testing by portable probe units and a servo-operated mechanical scanning unit of light-alloy cast billets, notched steel plates and extruded high-temperature alloy parts. Effect of surface roughness of tested material on results. Scope and limitations of autosonic techniques. (S13g; ST, SGA-h; 4-52, 4-53, 4-58, 5)

122-S. (German.) Contribution to Quantitative Aluminum Analysis in Special Materials, Particularly in Magnetic Alloys. W. Dubel and W. Flurschutz. Chemische Technik, v. 12, Sept. 1960, p. 538-540.

Method and apparatus for quantitative separation of Al from other elements (except Ti, Zr, V) by acid (0.1n H_2SO_4) electrolysis with Hg cathode and Pt anode without mechanical stirring. Magnetic removal of non-amalgam forming ferromagnetic elements (Fe, Co, Ni, Cr, etc.). (S11f; SGA-n, Al)

123-S. (French.) Direct Analysis of Calcium and Magnesium in the Presence of Iron, Aluminum and Titanium. Z. Zalessky, J. Debras-Guedon and I. A. Voinovtich. Analytica Chimica Acta, v. 23, Dec. 1960, p. 523-530.

Volumetric determination of Ca and Mg using Complexon III as the titrating agent. Calcium and Eriochrome black are used as indicators. 14 ref. (S11j; Ca, Mg)

124-S. The Gravimetric Determination of Cadmium With the Sodium Salt of 1-Phenyl-Tetrazoline-5-Thione. Carl E. Moore and Thomas A. Robinson. Analytica Chimica Acta, v. 23, Dec. 1960, p. 533-537.

Determination of Cd using aqueous 5% and saturated solutions of the reagent to produce a crystalline precipitate. Effect of pH and cation contamination on the accuracy of the results. 5 ref. (S11b; Cd)

125-S. Spectrophotometric Determination of Chromium (III) With EDTA. G. Den Boef, W. J. DeJong, G. C. Krijn and H. Poppe. Analytica Chimica Acta, v. 23, Dec. 1960, p. 557-564.

Determination of Cr by a method based on complexing of Cr (III) in aqueous solution. 10 ref. (S11a; Cr)

126-S. (French.) Polarographic Study of Bivalent Germanium. GH. Sauvenier and G. Duyckaerts. Analytica Chimica Acta, v. 23, Dec. 1960, p. 569-574.

Oxidation and reduction waves of Ge (II) in hypophosphorous and oxalic acid are related to pH and concentration. 7 ref. (S11n; Ge)

127-S. (French.) Macro and Microanalysis of Cobalt Traces. Spectrophotometric and Polarographic Analysis of Cobalt in MA 2B Alloy. D. Monnier, W. Haerdi and J. Vogel. Analytica Chimica Acta, v. 23, Dec. 1960, p. 577-584.

Determination of Co in 18-8 stainless steel by a process in which Fe is removed by solvent extraction and Co separated by an ion-exchange resin. 9 ref. (S11a, S11m; SS, Co)

128-S. (Czech.) Rapid Determination of Silicon in Gray Cast Iron Melted in an Arc Furnace. Milan Brhel and Drahomir Vlach. Slevarenstvi, v. 8, Nov. 1960, p. 400-401.

A wedge-shaped test piece is cast. After volumetric determination of carbon content in shavings cut from the wedge, the height of the hardened portion is measured. Si is determined from this height and the carbon content. (S11j; CI-n, Si, 5)

129-S. Monitor for the Quantitative Determination of Beryllium in the Atmosphere. M. S. W. Webb, R. J. Webb and P. C. Wildy. Journal of Scientific Instruments, v. 37, Dec. 1960, p. 466-471.

Direct spectrophotometric method for analyzing Be in industrial atmospheres using a device in which air is drawn through a triggered intermittent arc and the intensity of the Be doublet is monitored. Accuracy and sensitivity are unaffected by chemical form of Be and particle size. (S11a, X7j; RM-g30, Be)

130-S. British Magnesium Alloys. Metal Progress, v. 79, Jan. 1961, p. 100-B.

Data sheet showing British specifications, approximate American equivalents, typical compositions, typical mechanical properties and general descriptions. (S22; Mg-b)

131-S. (German.) Contribution to Isolation and Analysis of Oxide Inclusions. Siegfried Meyer and Othmar G. Koch. Archiv fur das Eisenhuttenwesen, v. 31, Nov. 1960, p. 651-657.

Electrolytic oxide isolation without protective atmosphere for unalloyed steels by ion exchanger, by covering of electrolyte to keep off air and by addition of reducing agents (hydrazin sulphate) with emphasis on latter method. Treatment of anodic residues by Cl and analysis of oxide inclusions by microchemical and spectrographic methods. (S11f, 9-69; ST)

132-S. Spectrum Analysis. Iron & Coal Trades Review, v. 181, Dec. 23, 1960, p. 1355-1358.

A Baird-Atomic direct reading spectrometer is used to obtain quick and accurate analysis of samples of Fe and of slag from a cupola-converter steelworks. (S11a, E10a; Fe, RM-q)

133-S. Radiographic Standards to be Developed for Thin-Section Castings. Materials in Design Engineering, v. 53, Jan. 1961, p. 11.

Production of 4130, 4140, 4330 and 4340 alloy steel and 347 L, 410, 430, 17-4 PH stainless steel castings containing only one of the following defects: inclusions, cold shut, shrinkage cracks, porosity, hot tears and misruns. The castings are to be used as reference radiographs in future testing. (S13e; AY, SS, 5)

134-S. X-Ray Inspection of Hot Steel Billets During Rolling. W. J. Oosterkomp, J. Proper and M. C. Teves. Metallurgia, v. 62, Dec. 1960, p. 257-260.

Steel billets are examined for cavities and inclusions using X-rays with images appearing on a cloud circuit television system. 50% of all 3 mm. thick holes are detected and 90% of all mm. holes. (S13e; ST, 4-52)

135-S. (Russian.) Phase Analysis of Low Carbon Steels Containing Columbium. Yu. A. Klyachko, M. M. Shapiro and E. F. Yakovleva. Zavodskaya Laboratoriya, Nov. 1960, p. 1219-1223.

Chemical analysis of a nitrocarbide phase isolated by anodic dissolution of low carbon nitrided steel containing Cb using electrolytes containing 15% NaCl and 2.5% tartaric acid, as well as waterless solutions of 50 ml. HCl and 1150 ml. methyl alcohol. 8 ref. (S11; CN-g, Cb, 14-68)

136-S. (Russian.) Ultrasonic Control of Frame Structures. B. M. Petrov, A. I. Safonov and F. Ya. Zaslavskii. Zavodskaya Laboratoriya, Nov. 1960, p. 1241-1244.

Parameters for ultrasonic detection of nonfusion defects, slag inclusions, gaseous pores and transversal and longitudinal cracks in weldments of 15 to 30 mm. thickness. Comparison to radiographic methods for economy. (S13g; 7-51)

137-S. Activation Analysis of Minor Constituents in High Alloy Steels. J.

Hoste. Pure and Applied Chemistry, v. 1, Jan. 1960, p. 99-110.

Discussion of the importance of activation analysis, not only in determining trace elements but in accurately measuring the concentrations of minor constituents in complex materials. Samples of N. B. S. steels 101D, 123B, 132A, 153, 155, 161 and 167 are activated with neutrons in an Amsterdam cyclotron analyzed for V, Mn, Cr, W and Ni isotopes. 4 ref. (S11q; SS, Cr, Mn, Ni, V, W)

138-S. Activation and Deactivation Studies With Copper on Sphalerite. A. M. Gaudin, D. W. Fuerstenau and G. W. Mao. American Institute of Mining, Metallurgical and Petroleum Engineers, Transactions, v. 214, 1959, p. 430-436.

Chemical exchange of Cu^{++} for Zn^{++} in the sphalerite lattice during activation and sequestering of Cu ions in solution during deactivation as determined by radioactive tracer studies, using Cu 64 and C 14, with various complexing agents, at room temperature. 19 ref. (S11q, 1-59; RM-n, Zn)

139-S. Fabrication and Working of the Vacuum Fusion Apparatus for the Determination of Gases in Metals and Alloys. N. G. Banerjee. NML Technical Journal (National Metallurgical Laboratory, India), v. 2, Nov. 1960, p. 10-14.

Gas collection and analysis using Ambler's apparatus and vacuum fusion apparatus made up of a mercury diffusion pump, generator set and toepler pump. Data are given for breakdown of gases in Cu, Ni-free stainless steel, Ni castings and depolarized Ni. (S11r; Cu, Ni-b)

140-S. (German.) New German Standards on Surface Roughness and Their Effects on Surface Measurement. Herbert von Weingraber. Stahl und Eisen, v. 80, Dec. 22, 1960, p. 1933-1939.

Explanation of the new standards DIN 4760, DIN 4762 and DIN 4763 in which reference profiles rather than the line of arithmetic mean are used as reference systems for defining surface roughness. Graphical evaluation of roughness according to the new standards. Suggestions for development of significant testing machines. (S15, 15-56)

141-S. A Summary of the Characteristics of Structural Steels. Nathan W. Morgan. Welding Fabrication and Design, v. 4, Dec. 1960, p. 17-19, 21-23.

Standards and specifications of structural steels for bridges, buildings and fasteners. Data are given for high strength, low-alloy steels, Mn, Si and Ni steels and quenched and tempered high strength steels. (S22; ST, SGB-s)

142-S. (Japanese.) Determination of Platinum and Palladium in High Purity Gold. Masuo Miyamoto. Japan Analyst, v. 9, Nov. 1960, p. 925-929.

Spectrophotometric determination of trace impurities in Au by dissolution of the specimen in aqua regia and hydrobromic acid, extraction of the Au with isopropyl ether and extraction of Pd with dimethyl-glyoximine-chloroform. Pan reagent is used for determining Pd, with the dithizone method being used for Pt. 5 ref. (S11a; Au, Pd, Pt)

143-S. (Japanese.) Rapid Determination of Carbon and Sulphur in Nickel-Copper Alloy by the High Frequency Combustion Method. Shikao Hashimoto and Reizi Tanaka. Sumitomo Light Metals, Technical Reports, v. 1, Oct. 1960, p. 254-259.

Samples are burned in pure O, with pure Fe and Sn as fluxes, with the dioxides of S and C being separated. Carbon is determined by weighing and S by titration. Analytical accuracy and speed of the method is compared to electrical resistance furnace heating methods. 6 ref. (S11g; Ni-b, Cu-b, C, S)

144-S. Investigations on "Active Iron". Pt. 2. Techniques Used in Studying Reactivity. G. V. L. N. Murty and T. R. Ramaswami. Metallurgia, v. 62, Nov. 1960, p. 207-209.

Design of an apparatus in which active Fe, in the form of a deposit on a metal foil, can be made to react with water or a solution of sodium citrate and the evolved gases accurately measured at atmospheric pressure. A rapid dichomate method is used for the volumetric determination in the presence of a large excess of sodium citrate. (S11j; Fe)

145-S. Why Nondestructive Testing Is Needed. Robert C. McMaster. Metal Progress, v. 79, Feb. 1961, p. 70-75.

The constant increase in competition coupled with the growing demand for quality has caused manufacturing industries to concentrate on nondestructive testing as a means for reducing waste and improving reliability. A number of the general aspects, including both production and economic standpoints, to be considered in applying such testing are discussed in the article. (S13)

146-S. Defects That Nondestructive Tests Can Find. Metal Progress, v. 79, Feb. 1961, p. 76-79.

A group of pictures illustrates the wide variety of flaws which can be found in a product before it goes into service. (S13)

147-S. X-Ray Machine Does Double Duty at Clinic. Ed Howard. Western Metalworking, v. 19, Jan. 1961, p. 26-27.

Defects in steel aircraft and missile parts and castings are located radiographically using X-rays from a 2 Mev. Van de Graaf belonging to a cancer center. (S13e, T24; ST, 5)

148-S. Sampling Metals and Residues. F. L. Jameson. Metal Industry, v. 98, Jan. 13, 1961, p. 28-29.

Sampling of deliquescent materials such as Monel, stainless steel, nonferfous ingots, and Sn, Pb and Zn residues. Sample is weighed, heated with a boiling saturated solution of soda ash, dried and then ground to produce an homogenous fine. (S12h; Ni-b, Pb, Sn, SS, Zn)

149-S. (Japanese.) Proceedings of the Plating Section of the JIS. Matsuhei Kishi. Metal Finishing Society of Japan, Journal, v. 11, Oct. 1960, p. 454-456.

Japanese Industrial Standard specifications for Ni, Cr, Ag, Cd, Zn and hard Cr platings. (S22; Ag, Cd, Cr, Ni, Zn, 8-62)

150-S. (German.) Spark Excitation. Pt. 7. K. Zimmer and T. Torok. Acta Chimica, v. 24, Jan. 1960, p. 1-16.

Apparatus and method for spectrographic analysis of liquid (800° C.) and solid Al alloys with influence of diffusion effects and structure of specimen on spark excitation being eliminated. (S11k, S10n; Al-b)

151-S. Sampling of Liquid Metals. Thomas B. King. Paper from "Determination of Gases in Metals". Iron and Steel Institute, London, England. 1960, p. 3-18.

Techniques for sampling liquid metals for gas analysis, with particular attention given to sampling liquid steel from industrial furnaces for hydrogen with evacuated glass tubes. A modified bomb method is found to be best for oxygen samples. 46 ref. (S12h; ST)

152-S. The Determination of Oxygen in Metals. W. T. Elwell. Paper from "Determination of Gases in Metals". Iron and Steel Institute, London, England. 1960, p. 19-42.

Review of vacuum fusion, inert-gas fusion, chemical and physical procedures for determining oxygen in steel, Mo, Zr and other metals. Sampling methods for solid and liquid materials. 129 ref. (S11r; Mo, ST, Zr, O)

153-S. The Determination of Gases in Metals by Vacuum Fusion. J. E. Still. Paper from "Determination of Gases in Metals". Iron and Steel Institute, London, England. 1960, p. 43-63.

Gas contents of Ti, Zr, Mo and Be are determined by vacuum fusion, using both Fe and Pt baths. (S11r, C25; Be, Mo, Ti, Zr)

154-S. The Determination of Gases in Metals by the Semi-Micro Vacuum Fusion Technique. Paper from "Determination of Gases in Metals". Iron and Steel Institute, London, England. 1960, p. 64-74.

Determination of oxygen, nitrogen and hydrogen in Cb, Ta, Ti, Th, U, V, Zr, Zircaloy-2 and Be by a semi-micro vacuum-fusion technique using Pt and Fe as bath materials. 7 ref. (S11r, C25; Cb, Ta, Th, Ti, U, V, Zr)

155-S. An Assessment of Carrier-Gas Methods for the Determination of Gases in Metals With Particular Reference to Steel. C. E. A. Shanahan. Paper from "Determination of Gases in Metals". Iron and Steel Institute, London, England. 1960, p. 75-92.

Advantages of using carrier gas techniques instead of vacuum extraction procedures for determination of

O, N and H in metals, with particular emphasis on Fe and steel. Comparison of reactive and unreactive carrier gas methods. 31 ref. (S11r; Fe, ST, H, N, O)

156-S. The Determination of Oxygen in Beryllium by Activation Analysis. R. F. Coleman. Paper from "Determination of Gases in Metals". Iron and Steel Institute, London, England. 1960, p. 93-102.

Be samples are irradiated in a flux of atomic particles to form unstable radioactive isotopes which decay at a characteristic rate. Activity is proportional to the amount of oxygen in the sample. 5 ref. (S11q, S11r; Be, O)

157-S. Emission Spectrometric Determination of Oxygen, Nitrogen and Hydrogen in Metals. Velmer A. Fassel. Paper from "Determination of Gases in Metals". Iron and Steel Institute, London, England. 1960, p. 103-120.

Description of analysis techniques based on melting the metal and extracting the gaseous elements with a d-c. carbon arc discharge in pure argon. Emission spectra of the extracted gases are excited with the same arc discharge. Results are given for steel, V, Ti and other metals. 9 ref. (S11r; ST, Ti, V, H, N, O)

158-S. The Determination of Oxygen and Nitrogen in Iron and Steel by an Isotope-Dilution Method. M. L. Pearce and C. R. Masson. Paper from "Determination of Gases in Metals". Iron and Steel Institute, London, England. 1960, p. 121-132.

Isotope-dilution and vacuum fusion analyses are compared. Evidence is presented to show that vacuum fusion results may be too low because of retention of gas in the colder parts of the furnace assembly. 11 ref. (S11r, 1-59; Fe, ST, N, O)

159-S. The Determination of Nitrogen in Metals. J. D. Hobson. Paper from "Determination of Gases in Metals". Iron and Steel Institute, London, England. 1960, p. 151-182.

Review of chemical methods for the determination of nitrogen in steel and other metals which depend on conversion to ammonia and of alternative methods which are modifications of the Dumas combustion technique used with organic compounds. 163 ref. (S11r; ST, N)

160-S. Determination of Nitrides in Metals. H. F. Beeghly. Paper from "Determination of Gases in Metals". Iron and Steel Institute, London, England. 1960, p. 183-191.

Analysis of tool, die and alloy steels and Cb, Al, V and Zr alloys for nitrides using ester-halogen reagents or aqueous acids to dissolve the matrix. Effect of thermal treatment on the amount of nitride recoverable. (S11r; AY, Al-b, Cb-b, TS, V-b, Zr-b, N)

161-S. The Determination of Hydrogen in Metals. R. Eborall. Paper from "Determination of Gases in Metals". Iron and Steel Institute, London, England. 1960, p. 192-218.

Review of vacuum hot extraction, combustion and equilibration methods of gas analysis. Sampling and handling procedures for steel, Al, Cu and their alloys, Ti and Zr. 114 ref. (S11r; Al-b, Cu-b, ST, Ti, Zr, H)

162-S. The Determination of Hydrogen in Cast Iron. J. V. Dawson. Paper from "Determination of Gases in Metals". Iron and Steel Institute, London, England. 1960, p. 219-228.

Determination of hydrogen content by the hot extraction process at 1070° C., using chill cast samples of Fe. Extracted gases are pumped into a known collecting volume and divided into two sections by a heated Pd thimble. Partial pressure of hydrogen in the section is measured by McLeod and Pirani gages. 5 ref. (S11r; CI, H)

163-S. An Improved Carrier-Gas Technique for the Determination of Hydrogen in Steel. F. R. Coe and N. Jenkins. Paper from "Determination of Gases in Metals". Iron and Steel Institute, London, England. 1960, p. 229-235.

Small amounts of hydrogen from steel are detected in a high purity argon stream using a thermal conductivity cell and a carrier gas technique. System is calibrated with a simple burette which injects accurately measured volumes of hydrogen into the Ar stream, the resulting peak areas being measured with a planimeter. (S11r; ST, H)

164-S. X-Ray Emission Analysis and the Determination of Gases in Metals. T. Mulvey. Paper from "Determination of Gases in Metals". Iron and Steel Institute, London, England. 1960, p. 255-269.

Review of electron-probe methods of exciting the spectra of the light elements and comparison of this method with others of high mass sensitivity. Description of improvements in the design of the X-ray analyzer and in the technique of microanalysis. Application to analysis of Fe alloys for C, H and O. 43 ref. (S11r, S11p; Fe-b, C, H, O)

165-S. Application of Internal Friction Measurements to the Study of Gases in Metals. G. M. Leak. Paper from "Determination of Gases in Metals". Iron and Steel Institute, London, England. 1960, p. 270-295.

Review of the damping mechanism and methods of measuring it with the torsion pendulum. Results are discussed for nitrogen in Fe, Si-Fe-N alloys and hydrogen in Fe. 55 ref. (S11r; Fe-b, H, N)

166-S. Two-Color Electronic Systems for Metallurgical Pyrometry in the Infrared Region of the Spectrum. D. Ya. Svet. Paper from "Contemporary Problems of Metallurgy". Consultants Bureau, Inc., New York, 1960, p. 323-327.

Application of spectral-ratio pyrometer-regulator system using Ge photodiodes to measure color temperature of metals. Measurement of spectral distribution of the missivity of Ag, Cu, Co, Fe and Ni. 5 ref. (S16, X9r, 17-57; Ag, Co, Cu, Fe, Ni)

167-S. (Translation-ConBur.) The Removal of Gases From Electrolytic Nickel. A. L. Rotinyan and E. Sh. Ioffe. Journal of Applied Chemistry of the USSR., v. 33, Feb. 1960, p. 358-363.

Results of experiments on the vacuum extraction of gases from electrolytic Ni, with data for determination of amounts of C, H_2 and O_2 in the metal when obtained at different pH values. Theory is presented to explain the lack of dependence between the mechanical properties of the deposit and the amount of gaseous hydrogen. 12 ref. (S11r, Q-general, 2-60; Ni, C, H, O)

168-S. (Translation.) Chromatographic Purification of Technetium. A. F. Kuzina and Vikt. I. Spitsyn. Russian Journal of Inorganic Chemistry, v. 5, May 1960, p. 482-486.

Purification of Tc concentrates isolated from molybdic oxide after irradiation with neutrons. Radioactive and stable impurities are removed from nitric acid solutions on cation exchange resins. (S11f; Tc)

169-S. (Translation.) Determination of Gold and Platinum Metals in Refined Silver and Cathode Nickel by Means of the Radioactivation Method. O. E. Zvyagintsev and A. I. Kulak. Journal of Inorganic Chemistry, USSR., v. 2, 1957, p. 376-384.

Technique for determination of Au, Pt, Pd and Ir by the radioactivation method using isotope carriers to chemically separate the elements. 16 ref. (S11q; Ag, Ni, Au, Pt)

170-S. Resonance Testing Without Contact. Robert V. Harris. Ultrasonic News, v. 4, Winter 1960, p. 10-11, 14-15.

Inspection and measurement of the ultrasonic resonance thickness of Zircaloy, Cu, Al, steel, Pb, glass and plastic by combined immersion and pulse echo testing techniques. (S14g; Al, Cu, Pb, ST, NM-f42, NM-d30)

171-S. (German.) Photometric Determination of Traces of Lead in Iron and Steel. Siegfried Meyer and Othmar G. Koch. Archiv fur das Eisenhuttenwesen, v. 31, Dec. 1960, p. 711-715.

Separation of 0.0001-0.05% Pb from iron and steel by first extracting Fe with diethyl or di-isopropyl ether, adding ammoniacal KCN and citrate to the remaining solution and extracting Pb with dithizon and chloroform. Pb is then determined by photometry. (S11a; Fe, ST, Pb)

172-S. (German.) Investigation on the Significance of Sulphur Analysis of Iron Works Products for Various Combustion Methods. Dagmar Blazejak-Ditges. Archiv fur das Eisenhuttenwesen, v. 31, Dec. 1960, p. 717-722.

Combination of combustion methods of Pontet and Boulin and of Schmidts and Baasch to a simple combustion method in which reaction gases are obtained by suction and titrated NaOH to determine absolute sulphur content. Application to pure chemicals, steels, ores, slags, pig and cast iron. (S11g; Fe, ST, S)

173-S. (French.) Determination of Oxygen in Liquid Basic Bessemer Steels. Techniques for Taking Liquid Specimens and Gas

Analysis. J. Marot and I. Harveng. Revue de Metallurgie, v. 57, Nov. 1960, p. 991-997.

Comparison of ladle, bomb and mold methods for sampling melts and of chemical methods for the determination of oxygen in the samples. 8 ref. (S11r, D9; ST-g, O)

174-S. (German.) Measurements on Metal Surfaces by Electrochemical Probes and Applications to the Detection of Structural Inhomogeneities. Ch. Ilschner-Gensch. Technische Mitteilungen Krupp, v. 18, Aug. 1960, p. 29-36.

Electrolytic potential distribution measurements of inhomogeneities in the surface of Cu-Zn and Ni/Ni-Cr alloy inclusion specimens and welded seams in ferritic Cr steels. Comparison of results obtained in stabilized, unstabilized and heat treated, desensitized steel. 20 ref. (S13a, 9-69; Cu-b, Zn, Ni-b, Cr, ST, 7-51)

175-S. Ultrasonic Inspection of Submarine Steel Weldments. N. A. Sinclair and M. M. Nanda. Nondestructive Testing, v. 19, Jan-Feb. 1961, p. 58-64.

Inspection procedures on prepared defective test steel weldments are contrasted with radiographic inspection methods. Techniques and acceptance-rejection standards are established for longitudinal crack detection only. (S13g; ST, 7-51)

176-S. Magnetic Particle Inspection at Regular Intervals Can Prevent Major Trouble. Sam Vance. Pipe Line Industry, v. 14, Feb. 1961, p. 30-32.

Magnetizable castings such as turbine blades and valve bodies are inspected for flaws using Fe magnetic particles, dry powder being recommended for welds, castings and fittings and fluorescent magnetic particles for small defects. (S13j, T7h; SGA-n, 5)

177-S. Neutron Activation Methods for the Study of Multicomponent Diffusion and for the Determination of Thermodynamic Activities of Alloys. J. S. Kirkaldy, G. R. Mason and W. J. Slater. Canadian Mining and Metallurgical Bulletin, v. 54, Jan. 1961, p. 59-66.

Activation analysis techniques for determining Cu and Mn in 10 mg. samples machined from Al-base diffusion in the Al-Cu-Mn system. Thermodynamic activity of Al-Zn alloys is determined at 550° C. by neutron irradiation and analysis of the resulting gamma ray spectrum. (S11q, N1a, P12; Al-b, Cu, Mn, Zn)

178-S. Investigational Techniques. D. A. Ryder. Metal Industry, v. 98, Jan. 21, 1961, p. 66-68.

Application of fractography and electron micrography to the investigation of metallurgical failure in aircraft. Fatigue fracture, ductile tensile fracture and geometry of fracture for DTD683 Al-Zn-Mg alloy and cast Al-Si-Cu alloy. 12 ref. (S13b, Q26r, M21e, T24; Al-b)

179-S. Spectrophotometric Determination of Trace Amounts of Copper in Tungsten Metal Powder. A. S. Prokopovitsh. and T. E. Green. U. S. Bureau of Mines, Report of Investigations 5720, 1960, p. 7.

Outline of a method based on solvent extraction in which Cu is dissolved in H_2O_2, complexed with neocuproine and extracted into chloroform. Absorbance of the separated $CHCl_3$ layer is measured on a spectrophotometer. 5 ref. (S11a; W, Cu, 6-68)

180-S. Future Requirements of the Tinplate Industry. C. E. Sutton. Paper from "Production of Wide Steel Strip". Iron and Steel Institute, London England. May 1960, p. 3-8.

Required mechanical properties, uniformity of surface behavior and corrosion resistance of electrolytic and hot dipped tinplate. Comparison with Al, plastic, cardboard and glass in canning applications. (S22, Q-general, R7; ST, Sn, 4-53, 8)

181-S. Future Requirements of the Motor-Car Body Industry. W. E. Lambourn. Paper from "Production of Wide Steel Strip". Iron and Steel Institute, London, England, May 1960, p. 9-17.

Quality, ductility, surface structure, mechanical properties and weldability requirements for sheet, strip and coil steel for production of automobile bodies. (S22, Q-general, K9s, T21a; ST, 4-53)

182-S. (French.) Roughness Produced During Finishing. Cayere. Machine Moderne, v. 54, Dec. 1960, p. 25-34.

Microsurface roughness produced on test plates and diesel engine pistons

of hard quenched steel by polishing and wear by commercial beads. Effect of filtering the wetting liquid during finishing on surface properties. (S15, L10, T7; ST)

183-S. Spectrographic Method for the Quantitative Determination of Low Concentration Impurities in High-Purity Fine Silver. A. J. Lincoln and J. Kohler. Engelhard Industries, Inc., Technical Bulletin, v. 1, Dec. 1960, p. 103-105.

Application of the Stallwood jet technique with an argon atmosphere to the spectrographic determination of Cu, Pb, Sn, Ni, Cr, Mn, Pd, Bi, Ca, Mg, Al, Cd, Fe, Sn, Sb, Ir, Av, Rh, Pt, Ru, Si and B in the concentration range of 0.1-100 ppm. (S11k; Ag)

184-S. (Japanese.) Determination of Alloying Elements in Special Steels by X-Ray Fluorescent Spectroscopy. Pt. 1. X-Ray Fluorescent Analysis of Nickel and Chromium in Nickel-Chromium Steel and Tungsten in Tungsten Steel. Kichinosuke Hirokawa. Japan Institute of Metals, Journal, v. 24, Nov. 1960, p. 692-696.

Calibration curves are determined for standard samples in the binary systems Fe-W containing 0.46-28.38% W, FeCr containing 0.35-99.9% Cr and Fe-Ni containing 10.97-99.9% Ni using the metals of the sample holder as the compensative reference. Comparative data with chemical analysis are presented, with effects of interference elements on the analytical result. 12 ref. (S11p, 2-60; ST, Cr-b, Ni-b, W)

185-S. (Japanese.) Determination of Alloying Elements in Special Steels by X-Ray Fluorescent Spectroscopy. Pt. 2. An Attempt to Estimate the Influence of Coexisting Elements in X-Ray Fluorescent Spectroscopy. Kichinosuke Hirokawa. Japan Institute of Metals, Journal, v. 24, Nov. 1960, p. 696-699.

Calibration curves are calculated for Ni and Cr in 20-25 stainless steels and for Cu in 75% Cu-Zn alloy. Approximate equations are derived for Fe and Zn influence on the analytical result. 6 ref. (S11p, 2-60; SS, Ni, Cr, Cu-b, Zn)

186-S. (Japanese.) Eddy-Current Testing of Tensile Deformed Thin Tube of Some Austenitic Stainless Steels. Tatsuo Maekawa, Michio Mizuto and Katsumi Ishihara. Japan Institute of Metals, Journal, v. 24, Nov. 1960, p. 714-718.

Changes and recovery in the current flowing in an annular coil (7 kc.) on 304 stainless specimens after annealing and solution treatment at 300-1050° and after elongation. Austenite phase instability and ferrite phase precipitation, with consequent electrical resistivity and magnetic property change as a result of annealing and deformation, are governing factors in the process. 4 ref. (S13h, P15g, P16, N8, 2-64, 3-68; SS-e, 4-60)

187-S. (Japanese.) Spectrographic Determination of Impurities in Crude Copper. Kamihiko Itsuki, Fukunosuki Suzuki and Kazuo Nishimo. Japan Institute of Metals, Journal, v. 24, Nov. 1960, p. 718-722.

Determination of Al, As, Bi, Fe, Ni, Pb, Sb, Sn and Te in acid dissolved specimens converted to cupric oxide, powdered and mixed with graphite into a graphite electrode with excitation by d-c. arc and uniarc methods. Calibration curves are compared with analytical results using a-c. polarography. 18 ref. (S11c, 3-69; Cu)

188-S. Effect of Take-Off Angle on Electron Probe Calibration. L. S. Birks and R. E. Seebold. Report of NRL (Naval Research Laboratory) Progress, Jan. 1961, p. 16-20.

Calibration curves are prepared for specimens in the Ni-Fe and Ni-Cr at 6, 20 and 90° take-off angle (the angle between the emerging X-rays and the specimen surface) using a calculation method and 100% standards. Measured X-ray intensity is influenced by matrix absorption as a function of the take-off angle leading to deviation in the X-ray intensity versus composition curve. 3 ref. (S11e; Ni-b, Cr, Fe)

189-S. (Book.) Determination of Sub-Microgram Amounts of Cadmium in Super-Pure Zinc by Neutron Activation Analysis. D. Gibbons. International Symposium on Microchemistry, Proceedings, Symposium Publications Div., Pergamon Press, London, 1960, p. 332-335.

Method is developed for radiochemical purification of Cd in irradiated Zn and applied to determination of Cd in high purity zone-refined Zn by activation analysis. 5 ref. (S11q; Zn, Cd)

190-S. Electron Accelerators for Site Radiography. Sidney Hollands. Nuclear Power, Feb. 1961, p. 69-71.

Radiographic inspection of butt welds in nuclear reactor pressure vessels built of steel plates 2-4 1/2 in. thick. High energy radiation either from Co^{60} or from special X-ray machines (linear accelerator or betatron) is necessary to inspect plates thicker than 3 in. 4 ref. (S13e, X8, 1-52, T26q; ST, 7-51)

191-S. Mobile Linear Accelerator Probes Big Welds. Metalworking Production, v. 105, Feb. 1, 1961, p. 63-64.

High intensity X-ray examination of welded steel pressure vessels for reactor cores using a 4.3 Mev linear accelerator with the vacuum and cooling systems incorporated in the acceleration unit. (S13e, T26q; ST, 7-51)

192-S. Nondestructive Testing of Pressure Vessels. John Battema. Canadian Welder, v. 52, Feb. 1961, p. 10-16.

A survey of nondestructive inspection procedures for welded pressure vessels which includes the functional applications of air and water testing; magnetic particle, X-ray and isotope radiation; dye and fluorescent penetrant; and ultrasonic methods. (S13, T26q, 10-54; 7-51)

193-S. (Japanese.) Determination of Hydrogen in Cast Iron. Pt. 2. Extraction Temperature of Hydrogen From White and High-Silicon Cast Iron. Eiichi Kato. Japan Institute of Metals, Journal, v. 24, Dec. 1960, p. 794-797.

Hydrogen volume and evolution rate as a function of temperature at 1000-1650° C. and time are measured for a white iron and for cast iron specimens containing up to 14% Si using a Pd tube apparatus with vacuum heating. 5 ref. (S11r, 1-73; CI, H)

194-S. (Japanese.) Spectrographic Determination of Microamount of Calcium and Magnesium in Cast Iron With a Porous-Cup Electrode. Yu Yokoyama. Japan Institute of Metals, Journal, v. 24, Dec. 1960, p. 802-805.

Specimens containing 0.006-0.15% Ca and 0.004-0.025% Mg are dissolved in HCl and HNO_3, with Fe extraction by methyl-isobutyl-ketone. A condensed spark is used to excite the Ca and Mg containing solution in a porous cup electrode, using Sr and Be as internal standards for Ca and Mg, respectively. Calibration curves are compared with flame photometry and Ti yellow analysis. 3 ref. (S11c; CI, Ca, Mg)

195-S. (Japanese.) Electrolytic Isolation of Sulphides From Iron and Steel. Hideo Kaneko, Taiji Nishizawa and Koreaki Tamaki. Japan Institute of Metals, Journal, v. 24, Dec. 1960, p. 837-841.

Investigation of process variables for electrolytic isolation of sulphide from low carbon alloy steels using sodium citrate and hydrochloric acid cells. Application to isolation of MnS, FeS, ZrS, Vs, TiS, CbS, CrS and Al_2S_3. Microphotographic examination of the steel and the extracted sulphides. 9 ref. (S11f, M-general; ST, 14-68)

196-S. Welding Aluminum. Pt. 10. Quality Control. Modern Metals, v. 17, Feb. 1961, p. 58, 60, 62-63.

Destructive and nondestructive testing and inspection methods for the detection and control of weld defects in Al. (S13; Al, 7-51)

197-S. (Japanese.) Ultrasonic Inspection in Steel Industries. Ryoh Takaoki. Ohm, v. 47, Nov. 1960, p. 167-173.

Ni-Mo-V steel or Cr-Mo-V steel rotor, high carbon Cr-steel roll, cast iron roll and steel bloom are subjected to ultrasonic flaw detection to determine amount of segregation, slag inclusion, impurities, cracking, shrinkage, shrinkage cavity, lattice defect and flake and residual stress. (S13g; CI, CN, ST)

198-S. Inspecting Jet Engine Parts With Eddy Currents. R. L. Lipe. Metal Progress, v. 79, Mar. 1961, p. 129-131.

Periodically, turbine wheels in jet engines have broken, resulting in accidents costly in both aircraft and lives. The need for a test which can detect defects at the operating base level before they cause such failures has been met by the portable eddy current tester. (S13h, Q3q, T7h)

199-S. Immersion Ultrasonic Inspection Used to Check Steel Plant Products. Iron and Steel Engineer, v. 38, Feb. 1961, p. 141-142.

Comparison of immersion technique and contact method for ultrasonic inspection of forging squares, round bars

and seamless stainless steel tubing. (S13g; SS, 4-51, 4-55, 4-60)

200-S. (Translation-Brutcher no. 4936.) Extraction of Nonmetallic Inclusions From Rimmed-Steel Ingots. Y. Shimokawa. Tetsu-to-Hagane, v. 46, Mar. 1960, p. 153-155.

Study of three procedures for the extraction of nonmetallic inclusions from rimmed-steel ingots. Electrolysis and elutriation method; outward appearance of inclusions extracted; their distribution throughout the ingot; relationship between amount of spherical inclusions and quantity of Al added for deoxidation; minimum size; components. (S11; ST, 9-69)

201-S. (Translation-Brutcher no. 5021.) Sampling and Determination of Hydrogen in Steel. A. Stettner. Stahl und Eisen, v. 79, no. 15, 1959, p. 1087-1090.

The taking of samples for hydrogen determination by suction--with or without collection of the gases evolving during the process and by casting the metal into test molds. (S11; ST, H)

202-S. (Book.) Ferrous Metals (Specifications), Pt. 1. 1960 Supplement. 444 p. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa.

Revised standards and specifications for steel piping materials, steel flats and structurals; bars, bolts, forgings, rails, castings and other steel products; metallic coated steel products and wrought and cast iron. (S22; Fe, ST)

203-S. The Determination of Gases in Metals. G. A. Picklo, Jr. Report of NRL (Naval Research Laboratory) Progress, Feb. 1961, p. 1-13. (Available as PB171315 from U. S. Office of Technical Services, Washington 25, D. C.)

Survey of developments in wet chemical, hot extraction, vacuum fusion and spectrographic methods for determining gas content and nature of reaction with metals, with attention to release of entrapped gases without contamination. Influence of traces of gaseous impurities such as O, N and H on physical and mechanical properties of alloys. Application to carbon and stainless steels and light, refractory and rare earth metals and alloys. 15 ref. (S11r, 1-73, N15, Q-general; ST, EG-a38, EG-d37)

204-S. Corrosion Mechanisms (Effect of Interference Elements on the Determination of Ferrous Iron in Iron Compounds). L. J. Clark. Report of NRL (Naval Research Laboratory) Progress, Feb. 1961, p. 35-36. (Available as PB171315 from U. S. Office of Technical Services, Washington 25, D. C.)

Varying amounts of Cr, Mn, Ni, Co, Mo, Cu, Ti, V and Zr ions are added to solutions containing high proportions of a ferric iron, maghemite, which contains in turn 2.12% ferrous iron, to determine the interference of the metallic ions on the colorimetric determination of ferrous iron, both as a function of chemical similarity and effect on the oxidation-reduction equilibrium of the solution. (S11a, R-general; Fe)

205-S. Design Guides for Pressure Tight Gray Iron Castings. Charles F. Walton. Machine Design, v. 33, Mar. 16, 1961, p. 162-164.

Design considerations for factors such as nonporosity, soundness, strength, machinability and rigidity which make gray iron suitable for pressure tight applications. Minimum tensile strength, Bhn hardness and typical applications of A48-60T, A159-58 and A278-59T gray irons. (S22, E25, G17k, Q-general; CI-n, 5)

206-S. (Russian.) Analysis of Pure Metals and Determination of Vanadium Admixture in Titanium. M. B. Shustova and V. A. Nararenko. Zavodskaya Laboratoriya, Dec. 1960, p. 1339-1341.

Spectrophotometric determination of micro-inclusions of V in purified Ti and in titanium-dioxide. Data for solvents, reaction intensifiers, heating and evaporation techniques and sensitivity of the method. 7 ref. (S11a; Ti, V)

207-S. (Russian.) Potentiometric Determination of Boron in Steels and Alloys. P. Ya. Yakovlev and H. V. Kozina. Zavodskaya Laboratoriya, Dec. 1960, p. 1342-1343.

Method comprising dissolution of steel or alloy in HCl, addition of H_2O_2 and NaOH, boiling, neutralization of Al inclusions by citric acid, titration of the obtained solution with invert sugar by NaOH, determination of the boron content by potentiometry and by reference standards. 4 ref. (S11m; ST, B)

208-S. (French.) Determination of Carbon in Steels and Ferro-Alloys With Low Carbon Content. R. Dezirat. Revue de Metallurgie, v. 57, Dec. 1960, p. 1125-1132.

Review of the volumetric, gravimetric, titrimetric, conductometric, voltametric, nephelopmetric methods and of the method of combustion and measurement at low pressure for the determination of carbon. 25 ref. (S11, 10-54; Fe-b, ST, C)

209-S. (French.) Determination of Oxygen in Steels by Melting in Reducing Conditions Under Argon. M. Hanin. Revue de Metallurgy, v. 57, Dec. 1960, p. 1133-1141.

Method and apparatus for the rapid determination of oxygen in steels using bomb samples, killed with Al and reduced to shavings. The method is developed for studying degree of oxidation of the metal during processing. 9 ref. (S11, D11s, 1-54; ST)

210-S. Nondestructive Testing Is Key to Future of Welding Quality Control. Glenn G. Gibson. Welding Journal, v. 40, Mar. 1961, p. 225-228.

Review of nondestructive testing methods including leak, liquid penetrant, radiographic, ultrasonics, eddy current and magnetic particle tests, their use in welded joint inspection and general application to quality control. 6 ref. (S13, 10-54; 7-51)

211-S. Ultrasonic Flaw Detection in Metals. G. Bradfield. Paper from "The Physical Examination of Metals". Edward Arnold Ltd., London, England, 1960, p. 605-693.

Fundamentals of ultrasonic flaw detection by immersion, shadow and imaging methods. Design of equipment. Application to flaw detection in cast iron, cast steel and nonferrous metals. 135 ref. (S13g; CI, ST, EG-a38)

212-S. Ferrographic Method of Flaw Detection. A. G. Warren. Paper from "The Physical Examination of Metals". Edward Arnold Ltd., London, England, 1960, p. 695-711.

Detection of flaws in steel or other ferromagnetic materials by magnetizing the specimen and applying finely divided Fe, magnetic iron oxide or forming magnetic ink. Flaws which emerge to the surface are clearly visible and under favorable conditions, indications may be given of flaws lying below the surface. (S13j; ST)

213-S. Magnetic Induction Methods of Nondestructive Testing. A. P. Greenough. Paper from "The Physical Examination of Metals". Edward Arnold Ltd., London, England, 1960, p. 713-726.

Nondestructive testing of ferromagnetic specimens to measure the magnetic properties and obtain information concerning composition or physical condition. Cracks, ferromagnetic inclusions, anisotropy, thickness of a nonferromagnetic material and flaws can be detected using magnetic induction. 7 ref. (S13h, P16)

214-S. Measurement of Coating Thickness by Magnetic Methods. A. G. Warren. Paper from "The Physical Examination of Metals". Edward Arnold Ltd., London, England, 1960, p. 727-735.

Permeability and thickness of nonmagnetic coatings on steel are determined by a magnetic method based on the tractive force. 6 ref. (S14h; ST, 8)

215-S. A Spark Spectrographic Procedure for the Determination of Boron in Sheet Steel. E. F. Runge and F. R. Bryan. Applied Spectroscopy, v. 15, Jan. 1961, p. 13-15.

Spark spectrographic analysis of a rotating sample of sheet steel 0.050 in. thick containing 0.009-0.0043% B. (S11k; ST, B, 4-53)

216-S. (German.) Magnetostrictive Ultrasonic Material Testing Process. W. Kaule. Elektrie, v. 14, Oct. 1960, p. 76-80.

Review of manual and automatic ultrasonic testing of ferromagnetic steel wire, rods and tubes up to 50 mm. diameter. Physics of ultrasonic testing. Testing apparatus. Applicability. (S13g; ST, 4-60, 4-61, SGA-n)

217-S. X-Ray Measurement of Plating Thickness. R. H. Zimmerman. American Jewelry Manufacturer, v. 6, Mar. 1961, p. 10-11, 17-18.

Rapid and nondestructive process for measuring plating thickness of small, odd shaped Cu electrical components plated with Au. Standards and calibration. Application in the jewelry industry. (S14e, T1; Cu, Au, 8-62)

218-S. (German.) Spectrum Analysis of High Alloy Steel. Walter Diehl. Archiv fur das Eisenhuttenwesen, v. 32, Jan. 1961, p. 11-18.

Calibration curves for cast Cr steel (0.1-20% Cr), CrNi steel (0-15% Ni), CrNiMo steel (0-3% Mo), Mn steel (0-20% Mn), W steel (0-20% W), and V steel (0-4% V). Evaluation of proper analysis conditions including selection of reference lines (Fe line or reflected beam). (S11k; SS)

219-S. (German.) Use of X-Ray Fluorescence Spectrum Analysis in Iron Works. Hermann-Josef Kopineck and Peter Schmitt. Archiv fur das Eisenhuttenwesen, v. 32, Jan. 1961, p. 19-29.

Review of applicability and analyzing techniques for X-ray fluorescence spectrum analysis of ores, slags, refractories and steel, with particular reference to short time analysis of openhearth slag. Investigation of binary systems Fe-Mo and Fe-Mn to evaluate mutual influences of elements in analysis. (S11p; Fe, ST)

220-S. (German.) Neutron Activation Analysis and Its Usefulness in Analysis of Steel. Wilfried Reiser and Hans Schneider. Archiv fur das Eisenhuttenwesen, v. 32, Jan. 1961, p. 31-38.

Quantitative determination of Mn, Cu, Cr and Mo in steel directly without chemical separation, and of C, Si, P, S, Ni and Ti after separation from other elements by neutron activation techniques. Course of analysis; design of measuring devices. Comparison of neutron activation analysis with conventional methods. (S11q; ST)

221-S. Electromagnetic Determination of Nickel Thickness for Re-Entry Vehicle Heat Sinks. S. A. LoPilato and C. H. Hastings. Materials Research & Standards, v. 1, Mar. 1961, p. 188-191.

Nondestructive testing of the thickness of electrodeposited Ni on Cu heat sinks for ICBM re-entry vehicles. (S14h, T24e; Cu, Ni, 8-62)

222-S. Measurement of the Thickness of Electroplates by the Electrolytic Stripping Method: Nickel Over Copper Base. Prem Behari Mathur and A. S. Lakshmanan. Journal of Scientific & Industrial Research (India), v. 20D, Jan. 1961, p. 16-18.

Anodic stripping of electrodeposited Ni on Cu using a stripping bath composed of NaCl and H_2SO_4 in a modified stripping cell to determine the thickness of the Ni plating. The results are compared with metallographic tests and the BNF jet test. 5 ref. (S14c; Cu, Ni, 8-62)

223-S. (French.) Systematic Analysis of the Melting Zone of Aluminum and Iron After Irradiation by Means of an Atomic Pile. Ph. Albert. Pure and Applied Chemistry, v. 1, Jan. 1960, p. 111-119.

A radioactivation process for the analysis of minute impurities in metals of high purity. By separating a large number of radioisotopes from the specimen, full utilization of the small quantities of material available is achieved. Data are presented for application of both processes to samples of Fe and Al. 4 ref. (S11q; Al, Fe)

224-S. (German.) Testing of Defects in Lacquered Wire. Draht, v. 12, Feb. 1961, p. 52-53.

Method and apparatus for electrical testing of prestressed (5-4000 g. depending upon wire diameter) insulated Cu round wire in a water or Hg bath at a measuring voltage of 100 v. (d-c.) (S13c; Cu, 4-61, 8-70)

225-S. (French.) Gravimetric Determination of Silicon in Cast Iron and Steel. D. Chr. Filipov. Comptes Rendus de l'Academie Bulgare des Sciences, v. 13, Oct. 1960, p. 543-546.

The Si content of alloy, carbon, Ni, Cr and W steels containing 0.16-0.31% Si and cast irons containing 1.65-2.45% Si is determined by precipitation with quinoline from an acid solution. (S11b; ST, CI, Si)

226-S. (French.) Determination of Oxygen and Hydrogen in Steel by the Inert Gas Method. C. E. A. Shanahan. Revue de Metallurgie, v. 58, Jan. 1961, p. 55-64.

Analytical method in which oxygen is determined gravimetrically after melting of the specimen in carbon crucible, the CO formed being extracted in an inert gas and oxidized in CO_2. Free hydrogen is determined by absorptimetry and titration as the water formed by oxidizing in a mixture of Cu oxide and ferric oxide. (S11a, S11j; ST, H, O)

227-S. (Japanese.) Rapid Separation and Spectrophotometric Determination of Titanium in High Alloy Steels. Masao

Kawahata, Heiichi Mochizaki and Takeshi Misaki. Japan Analyst, v. 9, Dec. 1960, p. 1019-1022.

Co-precipitation of Ti with magnesium hydroxide in the presence of W, Cb, V and Cr, with Ti determination by measurement of the light absorbency after masking with EDTA and dissolution in dilute solutions containing sulphuric acid, hydrogen peroxide, perchloric acid and ammonium chloride. 8 ref. (S11a; AY, Ti)

228-S. (Japanese.) Spectrochemical Determination of Small Amounts of Aluminum in Steel. Zenichiro Takao and Satosi Miyosi. Tetsu-to-Hagane (Iron & Steel Institute of Japan, Journal), v. 47, Feb. 1961, p. 145-152.

Spectrographic analysis of various alloy steels containing 0.01-0.100% Al with a quartz spectrograph and a grating spectrograph using an a-c. intermittent arc source. Comparative data are given for total Al content and austenitic grain size. 8 ref. (S11k; ST, Al)

229-S. (Slovenian.) Addition to the Phase Analysis of Steels. Otmar Gautsch and Janez Korosin. Nova Proizvodnja, v. 40, 1960, p. 315-317.

Separation of nonmetallic phases SiO_2, Al_2O_3, FeO, MgO, CaO from alloy steels by electrolytic methods and by chlorination for phase composition studies. 19 ref. (S11f, AY)

230-S. Automatic Ultrasonic Weld-Testing. Metalworking Production, v. 105, Mar. 1, 1961, p. 62-65.

Ultrasonic apparatus applied in detecting and identifying flaws in welded pipe seams at speeds equal to welding speed during automatic welding of large diameter pipe. (S13g; 4-60, 7-51)

231-S. (Japanese.) Influence of Melting Conditions on the Oxygen Content of White Iron. Taira Okamoto and Masao Ibaraki. Japan Institute of Metals, Journal, v. 25, Jan. 1961, p. 19-23.

Determination of oxygen in white iron specimens as a function of holding time (5-40 min.) after addition of ferro-silicon to the melt at 1300-1600° C. using a modified chlorination apparatus. 10 ref. (S11g, D11r; CI-p, O)

232-S. (Japanese.) Spectrographic Determination of Micro Amounts of Acid-Soluble Aluminum in Iron and Steel With the Transient Discharge Source Unit. Yu Yokoyama. Japan Institute of Metals, Journal, v. 25, Jan. 1961, p. 48-52.

Development of a source unit producing different discharges by varying the circuit constants with the spectra emitted at any stage of the discharge cycle being photographed. Determination of discharge stability and excitation condition, using a porous cup-graphite electrode and Ca and K radiation, for optimum sensitivity and reproducibility in application to spectrochemical analysis of Fe and steel. 8 ref. (S11k, 1-52; ST, Fe-b, Al)

233-S. (Japanese.) Quantitative Spectrographic Determination of Impurities in Tantalum and Its Compounds by Intermittent AC-Arc Method. Nakaaki Oda and Mitsuru Idohara. Japan Institute of Metals, Journal, v. 25, Jan. 1961, p. 52-56.

Selection of optimum excitation conditions, mixing ratio of carbon added as buffer, formulas for relative intensity and analytical line pairs and determination of sources of error, in determining concentrations of W, Ti, Mo, V, Cr, Fe, Nb, Ni, Si, Mn and Mg. (S11k; Ta)

234-S. (Czech.) Magnetic Separation of Electrolytically Isolated Phases. Jaroslav Tykva and Jaroslav Jezek. Hutnicke Listy, v. 16, Jan. 1961, p. 53-56.

By subjecting isolated particles obtained from a weldable steel, a Cr steel and the toolsteel CSN19436 to magnetic separation in methanol and subsequent X-ray testing, it is shown that precipitated phases, isolated from their surrounding phases by standard method, always contain impurities of these phases. (S11f, M-general, N7, 3-69; ST)

235-S. (Czech.) Determination of Oxygen by Vacuum Melting. Miloslav Kase and Miroslav Mandl. Hutnicke Listy, v. 16, Jan. 1961, p. 56-59.

Vacuum melting of specimens of low carbon steel containing 0.009% oxygen in a special apparatus, the central part of which is a resistance heated laboratory furnace with oxygen determination from the measured CO_2 pressure. 16 ref. (S11g, D8m; CN, O)

236-S. Determination of Minor Constituents in Low-Alloy Steels by X-Ray Spectroscopy. Robert E. Michaelis, Robert

Alvarez and Betty Ann Kilday. Journal of Research, National Bureau of Standards, Engineering and Instrumentation, v. 65C, Jan-Mar. 1961, p. 71-76.

Analysis of low-alloy steel by X-ray spectroscopy to determine detection limits and interferences for Ag, As, Co, Cr, Cu, Ge, Mn, Mo, Cb, Ni, Pb, S, Se, Si, Sn, Ta, Ti, V, W and Zr. For most elements the detection limit is below 0.01% and interference effects are not considered serious. 5 ref. (S11c; AY)

237-S. Which Non-Destructive Test Do You Use? Harry Thomasson. Canadian Metalworking, v. 24, Mar. 1961, p. 40-43.

Use of X and gamma rays for radiographic testing and fluorescent penetrant dies for inspection of welded structures. (S13; 7-51)

238-S. The Carbon Content of Low Carbon Martensite. M. L. Verneijke. Philips Research Reports, v. 15, Dec. 1960, p. 437-444.

Determination of carbon content in low carbon martensite by dilatometric experiments and resistivity measurements on the assumption that decreases in specimen resistivity and length, caused by first stage tempering, are linear functions of carbon content. 12 ref. (S11, M23b, N7d, P15g; CN-g, C)

239-S. Immersion Tests Reduce Waste. Iron Age, v. 187, Apr. 6, 1961, p. 112.

Stainless steel bar products are tested by ultrasonic immersion technique to determine internal flaws before machining. (S13g; SS, 4-55)

240-S. The Determination of Trace Impurities in High-Purity Selenium. A. I. Williams. Analyst, v. 86, Mar. 1961, p. 172-177.

Neutron activation determination of trace amounts of Cd, Cu, Ni, Te and Zn in high purity Se used for transistors, crystal rectifiers, thermistors, phosphors and photoconductors with Cd-115, Cu-64, Ni-65, Te-127 and Zn-69 isotopes. (S11q; Se, Cd, Cu, Ni, Te, Zn)

241-S. Cost Cutting Ideas. Welding Design & Fabrication, v. 34, Mar. 1961, p. 54-69.

Applications, advantages and limitations of nondestructive metal testing by ultrasonic, radiographic, penetrant, magnetic particle, eddy current, thermographic, magnetographic, thermal and tensile techniques. (S13)

242-S. Steel Is Magnetic...or Is it? Western Machinery and Steel World, v. 52, Mar. 1961, p. 58.

Determination of general stainless or carbon steel grades by comparing magnetic properties in drawn and annealed condition and using nitric acid dip and quenching and tempering tests. (S10r; CN, SS)

243-S. The Radiographic Examination of a Thin Object. C. Casswell and E. Eisner. Nondestructive Testing, v. 19, Mar-Apr. 1961, p. 108-109.

Measurement of variation of wall thickness in a small metal cylinder of precipitation hardened DTD683A Al alloy by X-radiography. (S14e; Al-b)

244-S. (Russian.) Determination of Copper and Manganese Content in Ores by Neutron Radioactivation Analysis. E. M. Lobanov, O. M. Romanov, M. M. Romanov and A. A. Khaidarov. Zhurnal Analiticheskoi Khimii, v. 16, Jan. 1961, p. 25-28.

The direct determination of 0.03-0.9% of Cu and 0.028-0.3% of Mn with a gamma ray scintillation spectrometer of activated rock samples at neutron flux or about 10^{-7} neutron per sq. cm. sec^{-1}. 10 ref. (S11q; RM-n, Cu, Mn)

245-S. (Translation-Brutcher no. 5031.) Nonmetallic Inclusions in Aluminum-Killed Steels in Relation to Steel Composition. F. Kubik. Radex Rundschau, Feb. 1960, p. 86-99.

Study of the existence of a relationship between the chemical composition of steels and the amount and composition of the nonmetallic inclusions present in them, based on mathematical-statistical procedures. (S12, 9-69; ST-c)

246-S. (Russian.) Determination of Beryllium in Uranium by a Spectrographic Method. P. N. Palei and E. V. Bezrogova. Zhurnal Analiticheskoi Khimii, v. 16, Jan. 1961, p. 57-59.

A combined method for determination of 10-6% Be in uranium by chromatographic adsorbtion and spectrographic analysis with experimental error of up to ±20%. 17 ref. (S11k; U, Be)

247-S. (French.) Determination of Scandium in Tungsten Ores by Neutron Activation. L. van Wambeke and G. Pinte. Societe Chimique de France. Bulletin, Nov-Dec. 1960, p. 1901-1902.

Ore samples are irradiated at a neutron flow of 0.3×10^{12} n per sq. cm. per sec. After extraction in mineral-free water, precipitation of $WO_3 + SiO_2$ by the addition of diluted HCl, neutralization, precipitation of Fe and Mn hydroxides and re-dissolving of WO_3--by NH_4OH addition--filtration and treatments with HCl, the activated Sc in solution is determined by a gamma spectrometer. 3 ref. (S11q; W, Sc, RM-n)

248-S. (German.) Ultrasonic Testing of Deep Drawing Sheet. W. Lehfeld. Feingerate-Technik, v. 9, Dec. 1960, p. 556-559.

Reaction mechanism, method and automatic apparatus for ultrasonic testing of steel sheet and continuous strip by the "expansion wave" technique to detect laminations and inclusions. Design of apparatus and interpretation of ultrasonic images. (S13g; ST, 4-53)

249-S. Standards in the Nonferrous Foundry. William A. Mader. Standards Engineers Society, Proceedings, Sept. 1960, p. 83-86.

Production of Al and Al castings from the standpoint of applied standards and specifications with a review of various production methods and the effects of Cu, Si, Zn and Mn alloy additions on strength and castability. (S22, E25, 2-60; Al-b, Cu, Si, Zn, Mn)

250-S. (English.) Optimum Fault Detection in Radiographic Weld Examination. Geert Jan Janssen. Materialprufung, v. 3, Feb. 1961, p. 63-66.

Investigation of optimum testing conditions in terms of radiation source, film type, source-to-film distance and film length during X-ray examination of welds. (S13e; 7-51)

251-S. (German.) Flame Photometric Examination of Aluminum Plates Containing Blisters. E. Pungor and E. E. Zapp. Zeitschrift fur Metallkunde, v. 52, Feb. 1961, p. 107-111.

Analysis of Na and potassium content in rolled Al plates containing blow holes by a flame photometer. Influence of Na and potassium concentration on blister formation. (S11a; Al, 4-53)

252-S. Importance of Ultrasonics in the Inspection of the Convair 880 and 600 Jet Liners. A. N. Hammer. Nondestructive Testing, v. 18, Nov-Dec. 1960, p. 400-402.

Use of ultrasonic inspection to locate flaws in forgings, plates and extrusions before machining and to predict fatigue life. (S13g, T24; 4)

253-S. Measuring Corrosion With Ultrasonic Gages. Corrosion Technology, v. 8, Mar. 1961, p. 81-82.

Instruments operating on ultrasonic resonance principle measure thickness of materials such as walls of tanks and vessels, pipes and boilers. Ultrasonic signal is fed into the material by a probe. (S14g, T26)

254-S. Improved Ultrasonic "Detective" Hunts Voids and Inclusions. Machinery, v. 67, Apr. 1961, p. 138.

Ultrasonic equipment used to detect defects in steel shapes. (S13g; ST)

255-S. Emission Spectrometric Determination of Gaseous Elements in Metals. Pt. 7. Nitrogen in Steels. Hitoshi Kamada and Velmer A. Fassel. Spectrochemica Acta, v. 17, Feb. 1961, p. 121-122.

Determination of nitrogen in cast iron, 18-8 stainless steel and low alloy steel using the d-c. carbon arc extraction technique. 4 ref. (S11k; AY, CI, SS, N)

256-S. (Japanese.) Photometric Determination of Trace Cobalt in Aluminum. Tanaka Reizi. Light Metals, v. 11, Jan. 1961, p. 52-58.

Absorbancy measurement on 99.99% Al and 2S, 24S and 52S alloy specimens containing 0-10 ppm. additions of Co, using an NaOH solution with pH adjusted by HCl and citric acid addition and alpha nitrose-beta napthol or beta nitroso-alpha napthol for photometric determination of Co. 9 ref. (S11a; Al-b, Co)

257-S. Gases in Enameled Steel From Moisture in the Furnace Atmosphere. B. Sweo. Paper from "Porcelain Enamel Institute Forum, Proceedings". v. 21. Porcelain Enamel Institute, Inc., Washington, D. C., 1959, p. 99-101.

Qualitative and quantitative evaluation of the gases present in enameled steel after firing in a furnace having

varying concentrations of water vapor in the furnace atmosphere. Sheet steel specimens are coated with ground coat enamel and fired in a continuous electric furnace at a moisture content from a dewpoint of 10-70° F. and in a temperature range 1220-1600° F. Method of gas extraction and analysis. (S11r; ST, 8-71)

258-S. How to Use Magnetic-Particle Methods. L. B. Strader and D. W. Collins. Metal Progress, v. 79, Apr. 1961, p. 88.

Though useful only for detecting defects at and near the surfaces of ferromagnetic materials (iron, nickel, cobalt and their alloys), this method of nondestructive testing is widely used. There are various types of equipment and techniques with which parts of almost any shape and size can be tested rapidly and accurately. (S13j)

259-S. (German.) Microanalysis of Iron and Steel. Pt. 1. Silicon. S. Meyer and O. G. Koch. Mikrochimica Acta, Jan. 1961, p. 82-87.

Quantitative chemical microanalysis of Si in small amount (10-100 mg.) of pig iron and steel by photometry as silicomolybdic acid. Course of analysis. Establishment of calibration curve. Color stability of silicomolybdic acid. Accuracy of method. (S11a; Fe, ST, Si)

260-S. Customized "Black Light" Inspection of Valve Castings Slices Time, Labor. William Gates. Western Metalworking, v. 19, Apr. 1961, p. 32-33.

Magnetic particle testing for flaws and discontinuities in carbon and alloy steel pressure valve castings. (S13j, T7b; ST, 5, 17-57)

261-S. (German.) Microanalysis of Iron and Steel. Pt. 1. Silicon. S. Meyer and O. G. Koch. Mikrochimica Acta, Jan. 1961, p. 134-139.

Microanalysis of 0.004-0.4% Si in Fe and steel by photometric determination as silicomolybdate blue using a spectrophotometer. Course of analysis. Establishment of standardization curve. Accuracy of analysis. (S11a; Fe, ST, Si)

262-S. (German.) Can Flakes As Such Be Identified in Forgings by the Pulse Echo Method? Gunter Beckmann. Neue Hutte, v. 6, Feb. 1961, p. 99-106.

Ultrasonic detection of flakes in 36 NiCr 2 steel turbine wheel disks; an inductor shaft of 1.3% Cr, 2.87% Ni, 0.45% Mo steel and a 19 Mn 5 Al boiler steel specimen. Evaluation of testing technology and interpretation of ultrasonic images. (S13g, 9-70; ST, 5)

263-S. (German.) Analysis of Hydrogen in Steel by Vacuum Extraction of Solid Steel at 600-650° C. G. Haust. Neue Hutte, v. 6, Feb. 1961, p. 111-114.

Method and apparatus for approximate determination of hydrogen content in steel by vacuum extraction at 600-650° C. Comparison of results with analysis obtained by the conventional Sn fusion method in analyzing 0.15-0.65 unalloyed carbon steel and Cr, CrMn, CrMo, CrNi and CrNiMoV steel. (S11r, 2-61; ST, H)

264-S. (German.) Technique for Determining Oxidic Inclusions in Steel. H. W. Fenzke. Neue Hutte, v. 6, Feb. 1961, p. 119-121.

Analytical method and apparatus for isolation of oxidic inclusions in steel by the Klinger-Koch technique comprising separation of metallic from nonmetallic constituents by electrolysis and isolation of oxidic from other nonmetallic constituents by chlorination. Application to analysis of 16 Mn Cr 5 steel and unalloyed steel. (S11g, 9-69; ST)

265-S. An Evaluation of Procedures in Quantitative Metallography for Volume-Fraction Analysis. John E. Hilliard and John W. Cahn. Metallurgical Society of AIME, Transactions, v. 221, Apr. 1961, p. 344-352.

Calculation of the standard deviation to be expected in the measurement of volume fractions by areal analysis, lineal analysis and four point-counting procedures. Application of a point count method to determine the volume fraction of cementite in equilibrated austenite-cementite steels. 15 ref. (S11j, N8k; ST)

266-S. Research Instrument Solves Variety of Metallurgical Problems. Inco, v. 28, no. 1, p. 22-23.

Spectrographic analysis of 20% Ni stainless steel and Ni base superalloys using an electron probe microanalyzer to determine composition, grain boundary sensitivity, microstructure, crystal growth and carbide precipitation. (S11k; SS, SGA-h)

267-S. (Italian.) Metallurgical Production: Common and Special Steels. Pt. 4. Classification of Steel. Angelo Bellini. Rivista di Meccanica, v. 11, Nov. 7, 1960, p. 31-34.

Data are given for composition, heat treatment and mechanical properties such as hardness, resistance to rotating bend and shear stress, elongation of spring steels. (S22, J-general, Q-general, 2-60; SGA-b, ST)

268-S. (Translation-Brutcher no. 5073.) The Importance of Microanalysis for Researches Into Metallic Materials. Stahl und Eisen, v. 81, Jan. 1961, p. 54-57.

Principal classes of methods of trace analysis: direct; negatively selective; positively selective. (S11e)

269-S. Major Gains in Ultrasonic Testing Make it Tops. Harry Thomasson. Canadian Metalworking, v. 24, Apr. 1961, p. 26-28.

Comparison of magnetic particle and ultrasonic methods for flaw detection in welds. (S13g, S13j; 7-51)

270-S. Autrometer Improves Quality of Steel. Ron Kenyon. Canadian Metalworking, v. 24, Apr. 1961, p. 40-41.

Design of an automatic indexing X-ray spectrograph which can make accurate analyses of materials still in the melting furnaces. (S11k, 1-53; ST)

271-S. Determination and Automatic Control of Eccentricity in Plastic and Rubber Insulated Cables. F. E. Planer. Wire Industry, v. 28, Apr. 1961, p. 365-366.

Nondestructive testing by inductive or capacitive method of the eccentricity of insulated cable during extrusion. (S14h, F28, T1b)

272-S. Analytical Chemistry of Beryllium. L. E. Smythe and R. N. Whittem. Analyst, v. 86, Feb. 1961, p. 83-94.

Review of the analysis of ores, compounds and alloys containing Be by gravimetric, volumetric, colorimetric and fluorimetric, ion exchange, solvent extraction, chromatographic, polarographic, radiochemical and spectrometric methods. 159 ref. (S11; Be)

273-S. An Evaluation of the Formate Method for the Simultaneous Polarographic Determination of Copper and Lead in Steel. P. H. Scholes. Analyst, v. 86, Feb. 1961, p. 116-124.

Application of the formate method for the simultaneous polarographic determination of Cu and Pb in mild steel, alloy steel, Matthey iron, stainless steel and pure Fe, a linear-sweep cathode-ray polarograph being used. Interference effects of Sn, As, Ti, Mo, Bi and Sb on the reduction Cu and Pb. 13 ref. (S11m, 2-60; ST, Cu, Pb)

274-S. (German.) Spectrochemical Analysis of Pilot Samples of Stainless Steels by the Quantometer. Herbert de Laffolie. Archiv fur das Eisenhuttenwesen, v. 32, Mar. 1961, p. 145-152.

Development of a spectrographic analyzing technique which requires only one calibration curve for each spectrum line, independent of composition of steel. Demonstration of established technique in analyzing a 17% Cr-containing stainless heat resistant steel. (S11k; SS, SGA-h)

275-S. Ultrasonic Testing. J. F. Hinsley. Edgar Allen News, v. 40, Apr. 1961, p. 76-77.

Nondestructive testing of solids for flaws and other defects by shadowing or reflecting ultrasonic rays. (S13g)

276-S. Nondestructive Testing and Quality Control of Steel Castings. B. K. Gupta. Current Engineering Practice, v. 3, Feb. 1961, p. 17-26.

Outline of nondestructive testing procedures including visual, etching, dye, fluorescent, magnetic particle and flaw, ringing, ultrasonic and radiographic techniques. Testing applications and their use as inspection standards are listed with reference to specific discontinuities. (S13; ST, 5)

277-S. Inspecting Pipe Welds With Ultrasonics. Theodore Manis and Walter M. Smith. ISA Journal, v. 8, Mar. 1961, p. 56-59.

Nondestructive testing of longitudinal seams in electric welded carbon steel pipe while in production, using a cathode ray unit and recorder and an ultrasonic search unit. (S13g, F26p; CN, 4-60, 7-51)

278-S. (Norwegian.) Gases in Metals. Arne Hoy. Teknisk Ukeblad, v. 108, Jan. 26, 1961, p. 87-89.

Sampling methods and apparatus for the determination of hydrogen in steel

melts. Determination of nitrogen and its effect on internal friction and electrical resistivity. (S11r, N15, 2-60; ST)

279-S. Ultrasonic Methods for Near-Surface Flaw Detection. O. Gericke. Watertown Arsenal Laboratories. U. S. Office of Technical Services, Nov. 1959, 15 p. $.50.

Three procedures show promise. Method one is sensitive to defects located at a minimum depth of 0.015 in., provided these defects scatter the ultrasonic energy. Method two will detect flaws that have a distance of 0.020 in. or more from the test surface, including defects or boundaries (other than the test surface) that are plane parallel to the test surface and scatter a specular reflection rather than scatter the sound beam. Method three can be used if the surface of the test piece is at least 2 x 2 in. large. (S13g)

280-S. Detection by Nondestructive Tests of Overheating in 2014-T6 Aluminum Alloy. P. McEleney and E. Reed. Watertown Arsenal Laboratories. U. S. Office of Technical Services, May 1960, 45 p. $1.25.

Ultrasonic attenuation tests proved successful in the detection of "overheating" or "burning" in 2014-T6 aluminum alloy. Previously overheating has been detected only by metallographic examination. Supporting correlation between ultrasonic attenuation tests and metallographic studies of overheated and non-overheated Al alloy samples. (S18, 1-74, 9-73; Al-b)

281-S. Complexometric Method for Determining Thickness of Chromium Plate on Steel. M. R. Verma, K. C. Agrawal and J. S. Bahl. Electroplating and Metal Finishing, v. 14, Apr. 1961, p. 119-122.

A method of determining the thickness of Cr plating on steel by first stripping the plate with a sulphuric acid, potassium persulphate mixture, then measuring the amount of dissolved Cr and Fe by use of an absorptiometer. 17 ref. (S14; ST, Cr, 8-62)

282-S. Measuring Plating Thickness: Industrial Applications of X-Ray Methods. R. H. Zimmerman. Metal Finishing, v. 59, May 1961, p. 67-73.

Plating substrate K-alpha absorption and plated coating K-alpha emission techniques are used to measure thickness of Sn, Au, Ag and Ni platings. 12 ref. (S14e; Ag, Au, Ni, Sn, 8-62)

283-S. Use of Radioactive Iodine Vapor for Determining Surface Roughness. M. K. Testerman. University of Arkansas (Wright Air Development Division). U. S. Office of Technical Services, PB 161844, Dec. 1959, 48 p. $1.25.

Several relative roughness factors of Au, brass and Al surfaces exhibiting varying degrees of surface roughness are determined using radioactive iodine vapor as an adsorbate. Polished Au foil, having a high degree of purity, is used as a reference surface. (S15; Al, Au, Cu-n)

284-S. Polarization of Capacitance Determinations of Surface Roughness. M. K. Lesterman. University of Arkansas (Wright Air Development Division). U. S. Office of Technical Services, PB 161847, Apr. 1960, 30 p. $1.

Polarization capacitances of metallic surfaces are investigated in both aqueous and nonaqueous electrolytic systems. Systems are evaluated according to their general applicability for the determination of surface roughnesses. (S15)

285-S. Continuous Measurement of Tin-Plate Thickness. Tin and Its Uses, no. 51, 1961, p. 3-4.

Measurement of thickness of tin-plate during continuous strip tin-plating by X-ray absorption and secondary radiation of X-rays. (S14e; ST, Sn, 8-62)

286-S. Determination of the Interelement Effect in the X-Ray Fluorescence Analysis of Cr in Steels. W. Marti. Spectrochimica Acta, v. 17, Apr. 1961, p. 379-383.

Numerical determination of the influences of other element on the X-ray fluorescence analysis of Cr in steel. 4 ref. (S11p; ST, Cr)

287-S. (Czech.) Ultrasonic Testing of Heavy Forgings. Vladimir Koblovsky. Hutnicke Listy, v. 16, Mar. 1961, p. 174-185.

Testing of heavy shafts of the composition 0.32-0.40% C, 0.46-1.36% Mn, 0.28-0.88% Si, 0.026-0.038% P, 0.015-0.024% S, 0.13-0.18% Cu, 0.20-1.26% Ni, 1.05-1.28% Cr, 0.21-0.29% Mo and 0-0.20% V. Comparison of results with those obtained from tensile, impact and bend fatigue testing. Microstructures. 3 ref. (S13g, Q27, Q6, Q5; ST)

288-S. Machining Aluminium and Its Alloys. G. Fitzgerald-Lee. Mechanical World and Engineering Record, v. 141, May 1961, p. 176-180.

Specification compositions and minimum mechanical properties are given for wrought and cast Al alloys after various heat treatments. Data are related to ease and speed of cutting, quality of finish and tool life. (S22, G17k; Al-b)

289-S. A Brief Survey of Wire Rod Defects--Their Occurrence and Detection. G. Earnshaw. Wire and Wire Products, v. 36, May 1961, p. 591-592, 594-596, 654-656.

Methods of inspecting, testing, sampling, etching and cropping steel wire rod to analyze defects. Steelmaking, surface and structural defects considered. (S13; 4-61)

290-S. The Acoustics of Straining and Fracture in the Notched Sheet Specimen. H. E. Romine. Paper from "Symposium on the Testing and Evaluation of Materials for Solid Propellant Rocket Motor Casings". Report no. MAB-156-M. National Academy of Sciences, Washington 25, D. C., 1959, p. 10-12.

Use of contact microphone and tape recorder for recording sound waves omitted during fracture test on high-strength steel and Ti alloy rocket casing materials. Possibilities of use of sound wave characteristics to locate and identify flaws. 3 ref. (S13g, T2p; SGB-a, ST, Ti-b, 17-57)

291-S. Internal Defects in Steel--Some Service Experience and Inspection Considerations. G. P. Smedley. Paper from "Conference on Internal Steel Quality and Methods of Its Assessment". West of Scotland Iron and Steel Institute, Journal, v. 68, 1960-1961, p. 3-24.

Study of internal defects in steel and steel weldments including cracks, blowholes, impurities, laminations, sulphide segregation, decarbonization, siliceous inclusions and residual tensile stress and types of operational failures resulting. Destructive and nondestructive inspection techniques and acceptance standards. (S-general, 9; ST, 7-51)

292-S. Method of Assessing Internal Quality of Steel Tubes and Welds. J. S. Blair. Paper from "Conference on Internal Steel Quality and Methods of Its Assessment". West of Scotland Iron and Steel Institute, Journal, v. 68, 1960-1961, p. 25-40.

Review and comparison of nondestructive testing techniques for steel tubes and welds including radiography, ultrasonic, eddy current and diverted magnetic flux. (S13; ST, 4-60, 7-51)

293-S. The Significance of Defects in Relation to the User With Particular Reference to Castings and Forgings. F. Buckley. Paper from "Conference on Internal Steel Quality and Methods of Its Assessment". West of Scotland Iron and Steel Institute, Journal, v. 68, 1960-1961, p. 61-77.

Report on steel casting and forging defects including voids and inclusions as related to machine service and longevity, acceptance standards and inspection technique. (S-general, 9; 4-51, 5)

294-S. Internal Defects in Steel Plates. J. E. Roberts and I. M. Caskie. Paper from "Conference on Internal Steel Quality and Methods of Its Assessment". West of Scotland Iron and Steel Institute, Journal, v. 68, 1960-1961, p. 78-97.

Review of steel plate internal defects including laminations, inclusions and cracks; visual, magnetic and ultrasonic inspection techniques. Quality standards and plate examination methods. (S-general, 9; ST, 4-53)

295-S. Internal Defects in Steel Castings. J. Cameron and J. Courtney. Paper from "Conference on Internal Steel Quality and Methods of Its Assessment". West of Scotland Iron and Steel Institute, Journal, v. 68, 1960-1961, p. 98-108.

Review of causes of steel casting internal defects including solidification mechanism, gas inclusions and variations in deoxidation practices. Detection methods including radiography, magnetic crack and ultrasonic. (S-general, 9; ST, 5)

296-S. Internal Defects in Large Forgings and Large Castings. J. M. Mowat and P. Packham. Paper from "Conference on Internal Steel Quality and Methods of Its Assessment". West of Scotland Iron and Steel Institute, Journal, v. 68, 1960-1961, p. 109-120.

Review of internal defects in large forgings and castings occurring during fabrication including skulls, inclusions, cavities, cracks, porosity and shrinkage. (S-general, 9; 4-51, 5)

297-S. (Japanese.) Spectrophotometric Determination of Zirconium in Uranium. Masayoshi Kanno and S. Kokubo. Japan Institute of Metals, Journal, v. 25, Feb. 1961, p. 128-131.

Absorption spectra of Zr-alizarin sulphonate is used to determine the Zr content of vacuum melted and cast 0.127-1.24% Zr-U alloys. 6 ref. (S11a; U, Zr)

298-S. Quality Control of Sheared Strip. Sheet Metal Industries, v. 38, May 1961, p. 356-357.

Inspection of sheared steel and tinplate strip by photocells which transmit information concerning faults such as pinholes, off-gage and poor-surface finish to standard transistorized logical elements. (S13g, F2, 9-71; ST, 4-53)

299-S. Ultrasonic Weld Inspection. Jan van den Andel. Canadian Welder, v. 52, May 1961, p. 10-12.

Review of principles of ultrasonic testing with attention to pulse echo, through transmission and resonance methods. Application in straight and angle beam and immersion tests for detection of voids, cracks, porosity, inclusions, lack of bonding and other inhomogeneities in welds. (S13g; 7-51)

300-S. New Developments in Nondestructive Testing of Precision Steel Tubes. Instrument Practice, v. 15, May 1961, p. 553-556.

Testing mild steel, Zr, Zr alloy and stainless steel tubes, including eddy current testing, D. C. saturation technique, internal and surface probes. (S13; CN, SS, Zr-b, 4-60)

301-S. Radiographic Testing Methods. P. W. Sherwood. British Steelmaker, v. 27, May 1961, p. 158, 163.

Use of X-rays and gamma rays in nondestructive testing, testing of steel castings and weldments. The design and operation of the gamma-radiator apparatus. Properties of Ir^{192} and Co^{60} isotopes as the sources of gamma rays. 4 ref. (S13e; ST, 5, 7-51)

302-S. (German.) Ultrasonic Testing of Sintered Bars of High-Melting Metals. H. Stollner. Planseeberichte fur Pulvermetallurgie, v. 9, Apr. 1961, p. 47-50.

Ultrasonic testing (echo-technique) with photographic registration of sintered tungsten bars of 20 x 40 mm. cross section. Interpretation of echo oscillograms for locating and assessment of size and kind (recrystallized area or hollow section) of defect. (S13g; W, 6-72)

303-S. Ultrasonics Solve Testing Problems. T. A. LaRoe and E. T. Hughes. Metal Progress, v. 79, June 1961, p. 86-92, 118, 120, 122, 124.

Through the use of sound waves with frequencies ranging from 200 kc. to 25 mc., engineers can detect a wide variety of surface and subsurface defects in metallic and nonmetallic parts of virtually any size and shape, measure thicknesses from one side of the part and detect lack of bonding in soldered, brazed and, in some instances, adhesively bonded parts. (S13g, S14g)

304-S. (French.) Gas-Phase Chromatography for Determination of Hydrogen, Nitrogen and Oxygen in Steels and Cast Iron. P. Tyou and A. Hans. Revue de Metallurgie, v. 58, Feb. 1961, p. 187-193.

Principles and techniques for determination of gases in metals by melting in a vacuum under argon flux with the advantage of eliminating readsorption on the sublimates deposited on the inner furnace walls. (S11r; CI, ST)

305-S. (French.) Comparison of X-Ray and Optical Spectrometry for the Analysis of Ordinary and Special Steels. Rene Loude and Rene Billet. Revue Universelle des Mines, de la Metallurgie, de la Mecanique, v. 17, Apr. 1961, p. 190-195.

Evaluation of reproducibility and accuracy in composition analysis of low and medium-alloy steels. Corrections necessary because of absorption and interference effects. Use of X-ray spectrometry to complement analysis by optical methods. (S11k, S11p; AY)

306-S. (French.) Applications and Analytical Results With A. R. L. X-Ray Instruments. R. H. Tyas. Revue Universelle des Mines, de la Metallurgie, de la Mecanique, v. 17, Apr. 1961, p. 195-203.

Use of X-ray fluorescence spectroscopy in the analysis of ferrous and nonferrous metals, glass, slags and Fe ores. Interelement correction factors and use of scattered radiation as an internal standard. 13 ref. (S11p, X3)

307-S. (French.) Application of X-Ray Fluorescence Spectroscopy to the Analysis of Light Metals. H. Pfundt. Revue Universelle des Mines, de la Metallurgie, de la Mecanique, v. 17, Apr. 1961, p. 203-207.

Composition analysis of Al and Al alloys, pure Mg, ferrosilicon and quartz. Apparatus and methods for the preparation of powder and metal specimens. (S11p; Al-b, Mg, EG-a39, NM)

308-S. (French.) Application of X-Ray Fluorescence Spectroscopy to the Analytical Control of Cast Steel. R. Berger and P. Deceuleneer. Revue Universelle des Mines, de la Metallurgie, de la Mecanique, v. 17, Apr. 1961, p. 207-214.

Composition analysis of the Fe-Mn-Ni-Cr-Mo-Cu and Fe-W-Cr-V alloys with standard curves constructed for experimental melts. Experimental techniques and results. (S11p; AY)

309-S. (French.) Application of X-Ray Fluorescence Spectroscopy in Ferrous Metallurgy. Hermann-Josef Kopineck. Revue Universelle des Mines, de la Metallurgie, de la Mecanique, v. 17, Apr. 1961, p. 214-223.

Analysis of crude Fe and steel to determine the distribution of alloying elements, composition of the surface film and presence of nonmetallic inclusions and trace elements. Analysis of openhearth and basic Bessemer slag using La^{140} as a radioactive tracer. 8 ref. (S11p, 1-59; Fe-b, RM-q)

310-S. (French.) X-Ray Fluorescence Spectroscopy in Metallurgical Research. T. A. Davies. Revue Universelle des Mines, de la Metallurgie, de la Mecanique, v. 17, Apr. 1961, p. 228-239.

Analysis of Ni-Cu and Ni-Fe alloys, low alloy and stainless steel and Ni-base high-temperature alloys by a manual sequential recording spectrometer and an automatic twin-path spectrometer. Solution techniques enable the identification of minute elemental inclusions. 4 ref. (S11p, 1-52, 9-69; ST, Ni-b, SGA-h)

311-S. (French.) Metallurgical Applications of the X-Ray Scanning Microanalyzer in an Industrial Laboratory. D. A. Melford. Revue Universelle des Mines, de la Metallurgie, de la Mecanique, v. 17, Apr. 1961, p. 247-252.

Analysis of complex nonmetallic inclusions of surface segregation of residual elements in mild steel and of growth material on a tungsten electrode. 4 ref. (S11p, 1-52, 9-69; W)

312-S. (French.) Metallurgical Applications of the Castaing Microscanner. J. Philibert. Revue Universelle des Mines, de la Metallurgie, de la Mecanique, v. 17, Apr. 1961, p. 252-257.

X-ray spectroscopic analysis of the dendritic growth of Al-Cu alloys in relation to solidification phenomena of microstructure of solid solutions after carbide precipitation and of carbides in stainless steel. 13 ref. (S11p, 9-69; Al-b, SS, 14-67)

313-S. The Identification of Pollucite. K. F. G. Hosking. Mining Magazine, v. 104, May 1961, p. 280-282.

Spectroscopic and chemical analysis and microscopic examination of Cs-bearing pollucite. Data on crystal structure, hardness, specific gravity, fusibility and optical properties to facilitate its identification. (S11; Cs, RM-n)

314-S. Initial Bubble Test for Determination of Hydrogen Content in Molten Aluminum. D. J. Neil and A. C. Burr. Modern Castings, v. 39, June 1961, p. 86-89.

Al alloys 2S, 3S, 57S and 75S are maintained under known temperature (up to 1400°F.) and reduced pressure until bubbles of gas nucleate and break through the surface. The pressure and temperature at which this occurs are related to actual hydrogen content as determined by vacuum subfusion. (S11r; Al-b, H)

315-S. (German.) Testing Sintered Metals by Eddy Current Methods. Albert Keil. Zeitschrift fur Metallkunde, v. 52, Apr. 1961, p. 215-218.

Use of eddy current methods in conductivity measurements on sintered Ag-Ag_2O (10% Ag_2O) specimens from 0-600° C. to detect decomposition temperature of Ag_2O and in detection of cracks

in 2-8 mm. diameter tungsten rods. (S13h; Ag, W, 6-72)

316-S. Titanium-Base Alloys (Gas Analysis System Calibration Check). G.A. Picklo, Jr. Report of NRL (Naval Research Laboratory) Progress, May 1961, p. 19-21. (Available as PB 171318 from U.S. Office of Technical Services, Washington 25, D.C.) $1.25.

Hot extraction and vacuum fusion techniques are used with subsequent weight measurements on selected portions of a powdered 1.5% H-Zr alloy to calibrate gas analysis systems for metals, such as Ti containing high hydrogen content. (S11r, S11f; Ti, Zr, H)

317-S. (German.) Special Methods of Nondestructive Material Testing. H. J. Rodewald and C. Studer. Metall, v. 15, May 1961, p. 410-414.

Review of current status of ultrasonic, ultrasonic immersion, penetration, foil replica for detection of micro-holes and X-ray and microhardness test methods. Techniques studied include determination of modulus of elasticity and torsion and use of foil replica for detection of microcracks. (S-general)

318-S. (French.) Nondestructive Testing of Spot Welds. M. Evrard and J. Dubresson. Soudage et Techniques Connexes, v. 15, Mar-Apr. 1961, p. 149-152.

Spot welded 15 CDVG steel sheet of 1-1.5 mm. thickness is ultrasonically tested with longitudinal or transverse wave propagation. Properties and flaws tested include soundness of fused zone, flaws parallel to the joint and vertical cracks. (S13g; AY, 7-51)

319-S. Inspecting Uranium Slugs at Hanford Ultrasonically. Daniel C. Worlton. Nucleonics, v. 19, June 1961, p. 80-81, 82.

Ultrasonic testing for grain size, grain orientation and defects during various stages of manufacturing is integrated into automated production lines. Resonant-frequency method compared with X-ray diffraction data. (S13g, T11g; U)

320-S. (Japanese.) Photometric Determination of Micro-Amounts of Co in Iron and Steel. Pt. 5. Extraction and Determination of Metal Salts With Methyl Isobutyl Ketone. Hidehiro Goto, Yachiyo Kakita and Michiko Namiki. Japan Institute of Metals, Journal, v. 25, Mar. 1961, p. 178-181.

Analysis of specimens of electrolytic Fe and carbon, alloy and stainless steel containing 0.0117-0.490% Co using MIBK for separation of the ferric ions in HCl and extraction of Co as the thiocyanate complex. 18 ref. (S11a; Fe-a, ST, Co)

321-S. (Japanese.) Photometric Determination of Micro-Amounts of Co and Fe in Metallic Ni. Pt. 6. Extraction and Determination of Metal Salts With Methyl Isobutyl Ketone. Hidehiro Goto, Yachiyo Kakita and Michiko Namiki. Japan Institute of Metals, Journal, v. 25, Mar. 1961, p. 181-184.

Simultaneous determination of Fe and Co in electrolytic Ni after extraction with MIBK as the thiocyanate complex. 6 ref. (S11a; Ni, Fe, Co)

322-S. (Japanese.) Photometric Determination of Tungsten in Iron and Steel. Pt. 7. Extraction and Determination of Metal Salt With Methyl Isobutyl Ketone. Hidehiro Goto and Yachiyo Kakita. Japan Institute of Metals, Journal, v. 25, Mar. 1961. p. 184-188.

Analysis of tungsten content in electrolytic Fe and special steels using MIBK for extraction of tungsten as the thiocyanate complex. 14 ref. (S11a; Fe-a, ST, W)

323-S. (Japanese.) Polarographic Determination of Vanadium in High-Speed Steel. Hiroshi Asaoka. Japan Analyst, v. 10, Mar. 1961, p. 255-259.

Analysis of specimens containing 0.64-1.94% V with 3.83-4.21% Cr, 6.21-19.33% W and 0.37-4.51% Mo by polarography after precipitation and reduction of vanadium in HCl solution. 14 ref. (S11m; TS-m, V)

324-S. Continuous Fluoroscopic Inspection of Submerged-Arc-Welded Line Pipe. Pipes and Pipelines, v. 6, June 1961, p. 49-53.

Application of fluoroscopy with image intensification to continuous inspection of longitudinal welds in large diameter submerged-arc-welded pipe. Operating characteristics including sensitivity and operation speed. (S13e, T26r; 7-51)

325-S. (German.) Direct Determination of Niobium and Tantalum by the Ion-Exchanger "Wofatit SBW". S. Spauszus and M. Heimer. Chemische Technik, v. 13, Feb. 1961, p. 96-99.

Quantitative chemical analysis of Cb and Ta in alloyed steels (example: X 10 CrNiWVTa 18.9 steel) by separation of Cb and Ta in the form of Cb_2O_5 and

Ta_2O_5 from other elements (except Ti) and subsequent determination of the mixed oxides by the ion-exchange agent "Wofatit SBW". Examination of the completeness of separation by radioactive W-185, Cb-95 and Ta-182. (S11f; AY, Ta, Cb)

326-S. Electron Beam Micro-Analysis of Some Plutonium-Iron Alloys. V. D. Scott. Journal of Nuclear Materials, v. 3, Mar-Apr. 1961, p. 284-293.

Use of combined replica technique and microanalyzer methods to determine phase compositions and microstructures in specimens over the range of the system. The examination is facilitated by coating the specimen with a thin cellulose acetate film. 11 ref. (S11e, M20r, M-general; Pu-b, Fe-b)

327-S. Making Efficient Use of Magnetic Particle Inspection. Paul E. Eubanks. Foundry, v. 89, July 1961, p. 106, 108, 110.

Description of a new method for inspection of castings using magnetic particles coated with a fluorescent dye and applied with a spray gun. The casting is magnetized in all directions by a specially developed unit. (S13e; 5)

328-S. How Republic Steel Rates Nondestructive Tests. W. A. Black. Welding Design & Fabrication, v. 33, Dec. 1960, p. 42-44.

Evaluation of hydrostatic, radiographic, magnetic particle, ultrasonic and electromagnetic induction testing of resistance welded tubing. The latter testing method together with an automatic spray marking machine is judged best. (S13; 4-60)

329-S. Inspecting Fuel-Slug Cladding at Hanford Automatically. Daniel C. Worlton. Nucleonics, v. 19, July 1961, p. 92, 94, 96, 98.

Lamb wave and eddy current tests are made on Al clad fuel rods to detect bonding layer defects such as voids, nonwets and brittle bonds. (S13g, S13h, T11g; Al, 8-66)

330-S. (French.) X-Ray Fluorescence Applied in Metallurgy. G. Pomey. Mechanique Electricite, v. 45, Apr. 1961, p. 50-53.

Determination of elements in vanadium steel, an alloy steel containing W, Co and Ni, a chromium nickel steel and an oxide film obtained from the surface of a stainless steel by X-ray fluorescence. Effect of structure on results. 14 ref. (S11p; ST)

331-S. (German.) Classification of Metallic Materials by Thermoelectric Effects. B. Weindler. Harterei-Technische Mitteilungen, v. 16, Apr. 1961, p. 23-31.

Method and apparatus for identification of metals with emphasis on 18/8 and 18/8/2 austenitic stainless and unalloyed low-carbon steel by measurement of thermoelectric potential differences. (S11g, P15j; ST)

332-S. Bi-Axial Stress Criteria for Large Low-Pressure Tanks. J. J. Dvorak and R. V. McGrath. Welding Research Council Bulletin Series, no. 69, June 1961, p. 14-24.

Revision of A. P. I. standard 620 to take into account presence of a second stress, compressive or tensile, acting at right angles, on the allowable compressive stress. 5 ref. (S22, Q25, T26q)

333-S. (Russian.) Surface Temperature Measurement During Sliding Friction. A. G. Nikonov and G. N. Klebanov. Izvestiya VUZ--Chernaya Metallurgiya, Feb. 1961, p. 122-127.

Temperature measurements of locomotive and wagon wheel rim surfaces to determine the cause of hardened and brittle layers on the rims under braking action. 4 ref. (S16b, T23p)

334-S. (German.) Evaluation of Oxygen Contents in Aluminum Killed Steels. Walter Koch and Karl Abresch. Stahl und Eisen, v. 81, June 8, 1961, p. 795-800.

Comparative oxygen analysis by hot extraction in vacuum or under Ar and by extraction residues analysis of 0.08-0.09% C steel with 0.045-0.085% Al. Data are given for cross section and structure and chemical composition of inclusions. (S11f, 9-69; ST-c, O)

335-S. Vectors Define Casting Flaws. Iron Age, v. 187, June 29, 1961, p. 70-71.

Nondestructive magnetic particle testing of large low-alloy steel castings is accomplished by cycling three-way magnetization through separate circuits in three planes, setting up vector-magnetization fields. A black-light fluorescent

wet-inspection medium probes defects in internal fillets and small cored openings during a continuous-magnetization period. (S13j, 1-53; ST)

336-S. Standard Designations of Alloys for Aircraft and Missiles. J. J. Vagi and A. F. Haskins. Defense Metals Information Center, Battelle Memorial Institute, DMIC Memo. 42R, May 24, 1961, 77 p. (Available as PB 161192R from U. S. Office of Technical Services, Washington 25, D. C.)

Aeronautical specifications, SAE, AISI, AMS, ASTM and ACI designations, compositions and sources are given for heat and corrosion resistant stainless steels, alloy steels and toolsteels. (S22, T24; ST, 17-57)

337-S. Forgings: 'It's What's Inside That Counts'. Nat Wood. Western Metalworking, v. 19, June 1961, p. 28-29.

Inspection techniques and equipment to insure internal quality in smooth hammered forgings of stainless steel, toolsteel, high-speed steel, high-temperature alloys or SAE steels having uniformity of size and structure. Ultrasonic flaw detection, hardness testers, temperature control devices in annealing and heat treating furnaces. (S13g, Q29, S16, J-general, F22; ST, SGA-h, 4-51)

338-S. (Russian.) Quality of the Outer Surface of Cast Iron Water Pipes. B. D. Khakhalin and A. N. Smolyakov. Liteinoe Proizvodstvo, Mar. 1961, p. 6-7.

Investigation of reasons for the rough appearance of the outer side of cast iron pipeline. It is suggested that during centrifugal casting of the pipe, the velocity of the pattern tube be held below 200-300 rpm. when filled with pitch and sand and its temperature held between 180-220° C. 4 ref. (S15d, E14, 2-61, T26r; CI, 17-57)

339-S. (Book.) Spectrochemical Analysis. 2nd Edition. L. H. Ahrens and S. R. Taylor. Jan. 18, 1961. 453 p. Addison-Wesley Publishing Co., Inc., Reading, Mass. $15.

Review of general principles, techniques and equipment including quantatative and qualitative analysis using the d-c. arc. Sample preparation, selective volatilization, use of internal standards, enrichment techniques and methods of determining a number of elements. Wavelength tables of various elements. 950 ref. (S11k, 10-54)

340-S. (Translation-Brutcher no. 5189.) Rapid Method for Determination of Aluminum in Steel Without Separation of the Iron. H. H. Doleschel. Stahl und Eisen, v. 81, July 1961, p. 448-449.

Reagents required; preparation of sample solutions; determination of acid-soluble Al and total Al. (S11; ST, Al)

341-S. (Translation-Brutcher no. 5129.) Determination of Columbium in (Pig and Cast) Irons. A. I. Ponomarev and A. Ya. Sheskol'skaya. Trudy Inst. Met., v. 4, 1960, p. 240-242.

Procedure for the quantitative determination of Cb in the presence of Fe and Ti without preliminary separation of the latter elements. Results of a series of tests on the precipitation of Cb with tannin in the presence of ascorbic acid. (S11; ST, Cb)

342-S. Industrial Applications of X-Ray Methods for Measuring Plating Thickness. R. H. Zimmerman. Paper from "Advances in X-Ray Analysis", v. 4. Plenum Press, New York, 1961, p. 335-350.

Calibration procedures and data are presented for plating thickness measurements of Au, Ag, Sn and Ni on Cu, brass and steel base metals. Both emission and absorption techniques are described and examples are given of measurements on thicknesses from 10-600 millionths of an inch. 12 ref. (S14e, M22g; Cu-b, ST, Au, Ag, Sn, Ni, 8-62)

343-S. X-Ray Spectrometric Determination of Copper, Tin, and Uranium in Bronze Heat-Treating Material. G. R. Blank and H. A. Heller. Paper from "Advances in X-Ray Analysis", v. 4. Plenum Press, New York, 1961, p. 457-473.

Method is based on the irradiation of an acid solution of the sample, to which In and Zn have been added as internal standards. The over-all limits of error for single determinations at the 95% confidence level are 0.48% Cu, 0.56% Sn and 0.31% U. (S11p; Cu-s, Sn, U)

344-S. X-Ray Fluorescence Analysis of Tungsten-Molybdenum Metals and Electrolytes. K. R. Stever, J. L. Johnson and H. H. Heady. Paper from

"Advances in X-Ray Analysis", v. 4. Plenum Press, New York, 1961, p. 474-487.

W and Mo metal powders, produced by a fused-salt electrolysis procedure, are dissolved and analyzed for W and Mo. The platinum spectral line from the X-ray tube target serves as a self-internal standard. The sensitivity limit is about 0.05% and in the concentration range of 0.5 to 100% the accuracy of analysis is within about 2% standard deviation. (S11p; W, Mo, 6)

345-S. Fluorescence Analysis of Trace Amounts of Hafnium in Zirconium Using a Silicon Crystal. J. C. Parks, Jr., D. C. Plackmann and G. H. Beyer. Paper from "Advances in X-Ray Analysis", v. 4. Plenum Press, New York, 1961, p. 488-494.

Use of analyzing crystals cut parallel to a plane which substantially eliminates second-order reflections. Both Ge and Si have been used with Si reported to give finer resolution and a lower background at the expense of a somewhat lower intensity. (S11p; Zr, Hf)

346-S. An Application of X-Ray Fluorescent Spectrography to Columbium Alloy Melting Practices. D. Moroz, D. E. Fornwalt, S. Aconsky, J. Doyle and W. R. Clough. Paper from "Advances in X-Ray Analysis", v. 4. Plenum Press, New York, 1961, p. 495-513.

Techniques for the determination of both the homogeneity and the elemental compositions of columbium alloy ingots. X-ray fluorescent spectrography and automatic data handling systems are utilized. The method has been applied to specific cases with, for example, a correlation of the degree of variation of homogeneity of columbium alloy ingots with remelting practice. (S11p, C-general; Cb)

347-S. Nonferrous Metals Research. Metallurgia, v. 63, June 1961, p. 279-282.

Review of research into analytical methods, manufacturing processes, corrosion and protection and mechanical properties. (S-general, R-general, Q-general; EG-a38)

348-S. Radiographic Examination of Reactor Pressure Vessels. Metal Treatment and Drop Forging, v. 28, June 1961, p. 220.

A 4.3 million volt linear accelerator radiographs the welds in the thick steel walls of pressure vessels containing the reactor cores. The accelerator uses a high-power radio frequency power generator to launch an electromagnetic wave into an accelerating waveguide. (S13e, 1-52, T26q, T11; ST, 7-51, 17-57)

349-S. Nondestructive Testing of Welded Tubing. Metal Treatment and Drop Forging, v. 28, June 1961, p. 249-250, 252.

Survey of hydrostatic, radiographic, magnetic particle, ultrasonic and electromagnetic induction nondestructive tests for welded steel tubing. (S13; ST, 4-60, 7-51)

350-S. (Translation-Brutcher no. 5113.) Analytical Chemistry of Arsenic, Antimony and Copper in Steels and Iron Ores. S. Gomiscek. Rudarsko-Metall, Zbornik, v. 1, 1959, p. 51-62.

Previously abstracted from original. See item 371-S, 1959. (S11; ST, Fe, RM-n, As, Sb, Cu)

351-S. The Determination of Tin in Pure Iron, Mild Steel and Certain Low-Alloy Steels by Cathode-Ray Polarography. P. H. Scholes. Analyst, v. 86, June 1961, p. 392-399.

Sn is separated by co-precipitation with MnO_2 and determined in a base electrolyte containing peptone and ascorbic acid in HCl with Mo content held to 0.5%. The same method of analysis is used on low-alloy steel. Method is suitable with Sn contents down to 0.001%. 14 ref. (S11m; Fe, ST, Sn)

352-S. Missile Parts Get Fast Check. Iron Age, v. 187, July 13, 1961, p. 87-89.

Magnetic particle testing of alloy and die steel rocket chambers using a central conductor which can reach areas that are otherwise magnetically shielded. (S13j, T24e)

353-S. (German.) Ultrasonic Testing of Rolling Blanks for Wide Strip by the Ultrasonic Echo Method. Christian Strassburger. Stahl und Eisen, v. 81, June 22, 1961, p. 885-893.

Ultrasonic testing of steel models, blanks and cold rolled strip of unalloyed Al killed steel for locating shrink holes,

measuring size of pipes and detection of rolling defects. Comparison of ultrasonic results with those of microscopic and macroscopic investigations. (S13g; ST, 4-53)

354-S. (German.) Magnetostrictive Ultrasonic Material Testing Method. Kaule. Technik, v. 16, May 1961, p. 385-389.

Mechanism, apparatus and application of a dynamic testing method with increased defect detectability, time efficiency and a wider range of application than static methods for ultrasonic testing of metal rods and wire from 20-600° C. (S13g, 1-54, 1-69, 2-61)

355-S. Some Experiences in the Use of the "Quantovac" in a Steelworks Laboratory. S. Muir. Paper from "West of Scotland Iron and Steel Institute, Journal", v. 67, 1959-1960, p. 45-60.

Description of a spectrographic instrument for analyzing metals with spark excitation in an oxygen-free atmosphere. Tabulation of data from tests on an experimental installation showing optimum operating conditions and degree of reproducibility of readings. (S11a, 1-52; ST)

356-S. (German.) Distribution of Copper Between Lead and Carbon-Saturated Iron Melts. Georges Urbain. Archiv fur das Eisenhuttenwesen, v. 32, May 1961, p. 303-304.

Chemical, electrolytic and colorimetric measurement of distribution coefficient of Cu between liquid Pb and C-saturated Fe at 1415° C. at various Cu concentrations up to 1%. (S11, P12, 2-61; Fe-b, Pb-b, Cu, 14-60)

357-S. Effect of Specifications of Gray Iron Castings. L. J. Woehlke. Foundry, v. 89, Aug. 1961, p. 80, 82-83.

Specifications of surface finishes, dimensional tolerances, inspection requirements and hardness tests to meet new demands and requirements of industry. (S22; CI-n, 5)

358-S. The Platinum Metals in Temperature Measurement. Platinum Metals Review, v. 5, July 1961, p. 89-91.

Review of several papers presented at the Fourth Symposium on "Temperature, Its Measurement and Control in Science and Industry" at Columbus, Ohio, Mar. 27-31, 1961, on the role of Pt metals in temperature measuring instruments. Properties of Pt and Pt alloys in resistance and thermocouple thermometry at high and low temperatures are considered. 13 ref. (S16, X9; Pt, 17-57)

359-S. A Simplified Hot-Extraction Apparatus for the Determination of Hydrogen in Steel. C. E. A. Shanahan and F. Cooke. Iron and Steel Institute, Journal, v. 198, July 1961, p. 257-262.

Evacuation by Hg displacement at 650° C. Performance is compared to that of vacuum heating. 6 ref. (S11r; ST, H)

360-S. (German.) Detection of Nonmetallic Inclusions in Rolled Material by Ultrasonics. G. Beckmann and K. Spiegelberg. Neue Hutte, v. 6, May 1961, p. 316-321.

Ultrasonic testing of CK 22 steel billets with subsequent machining of billets, magnetic testing and metallographic identification of slag inclusions to establish the reliability of ultrasonic testing as influenced by the chemical composition of the inclusions. 10 ref. (S13g, S11, 9-69; ST)

361-S. (Czech.) Spectral Analysis of Sponge Iron. Miroslav Malinek and Mojmir Soudny. Hutnicke Listy, v. 16, May 1961, p. 358-361.

Spectrographic determination of Al_2O_3, CaO, MgO, MnO, SiO_2 and TiO_2. Line intensity as a function of concentration. 13 ref. (S11k; Fe, 2-64)

362-S. (German.) Ultrasonic Testing of Cast Iron. Richard Gerstner. Materialprufung, v. 3, June 1961, p. 213-217.

Ultrasonic testing of material defects and investigation of graphite structures (nodular or lamellar), degree of saturation and tensile strength by sound velocity measurement. 9 ref. (S13g, S11, Q-general, 1-74; CI)

363-S. (German.) Means for Precise Crack Depth Measurement. Alexander Matting and Volker Deutsch. Materialprufung, v. 3, June 1961, p. 218-224.

Nondestructive measurement of crack depth by direct or alternating current methods. Investigation of factors controlling accuracy of

measurements such as contact resistance, shape and composition of specimen and shape and location of crack. 5 ref. (S13c)

364-S. (German.) X-Ray Determination of Retained Austenite in Case-Hardened Steels. Gunter Bierwirth. Materialprufung, v. 3, June 1961, p. 228-233.

X-ray analysis of retained austenite in case hardened steel using Cr, Fe, Co or Mo k-alpha radiation and a counter-diffractometer, is discussed and demonstrated for the case of a failed case-hardened 25 MoCr 4 steel gear wheel. 9 ref. (S11p, N8n; ST)

365-S. Grading Transformer Sheets Continuously. F. H. Baer. Control Engineering, v. 8, Aug. 1961, p. 107-109.

New equipment measures both thickness and core loss for transformer steels on the production line. Sheets can be 750-1000 mm. wide, 0.35-0.5 mm. thick and any length. Core loss is indicated directly in Watts/kilogram with an accuracy better than ±5%. (S14c, P16s, 1-52, 1-54; SGA-n, ST)

366-S. Magnetic Particle Testing of Brazed Joints in Nonmagnetic Stainless. Maxwell Pevar. Welding Design & Fabrication, v. 34, July 1961, p. 62-63.

Inspection system depends on brazing alloys becoming magnetic when alloyed to nonmagnetic stainless steels. A solution consisting of magnetic particles suspended in plastic is applied to the joint as an aerosol spray. A magnetic field is applied and the solution allowed to dry as a film. (S13j; SS, 7-52)

367-S. Sound Gages Chem-Milled Tube. Iron Age, v. 188, July 27, 1961, p. 120.

Ultrasonic resonance measurement of the thickness of tubing, large sections, sheet metal and hollow-cylindrical parts during chemical milling. (S14g, G24; 4-53, 4-60)

368-S. The Expanding Revolution in Steel Mill Testing. Magnafacts, v. 9, Summer 1961, p. 6-7.

Nondestructive testing, including eddy current, black light and fluorescent penetrant flaw detection systems for billets, continuous weld pipe, seamless tube and other mill products. (S13; ST, 4-52, 4-60)

369-S. The Ultrasonic Detection of Defects in Cast Steel. A. H. Sully and F. D. Lavender. British Foundryman, v. 54, July 1961, p. 293-302.

Effect of the nature of the cast structure and the relatively rough surface of unmachined castings on the transmission of the ultrasonic beam and the sensitivity of defect detection in cast steels. 8 ref. (S13g, 3-71; ST, 5)

370-S. (Pamphlet.) British and Foreign Specifications for Steel Castings. Pt. 2. 1961. 41 p. British Steel Castings Research Assoc., 5 East Bank Rd., Sheffield 2, England. $7.50.

Comparison of mechanical and chemical specifications for Australia, Canada, India, New Zealand, South Africa, Denmark, Japan and Russia with British standards. Castings include carbon, alloy and stainless steels. (S22; ST, 5)

371-S. The Determination of Gases in Metals. C. J. Smithells. Iron and Steel Institute, Journal, v. 198, June 1961, p. 124-125.

Symposium on analytical methods for gases in metals. H_2, N_2 and O_2 are determined in Fe, Ti, Zr, Mo, Be and steel. Methods of analysis include vacuum extraction, spectroscopy, radioactivation, isotope dilution, carrier gas, X-ray diffraction, X-ray fluoresence, X-ray emission and damping capacity measurements. (S11, 10-54; Fe-b, Ti, Zr, Mo, Be, H, N, O)

372-S. The Examination of Oxide Scales on Iron-Chromium Alloys by X-Ray Scanning Microanalysis. G. C. Wood and D. A. Melford. Iron and Steel Institute, Journal, v. 198, June 1961, p. 142-148.

Oxide scales produced on Fe-Cr (14.4-13.66%) alloys in steam at 950-1000° C. are examined qualitatively and quantitatively by X-ray scanning microanalysis. Optical examination reveals an outer layer containing FeO, Fe_2O_3, Fe_3O_4 and Cr and an inner layer consisting of Cr_2O_3, Cr_3O_4, Fe_2O_3 and a Fe-Cr-O spinel. 25 ref. (S11e, M-general, R1h, 2-60, 2-62; Fe-b, Cr, 9-52)

373-S. In-Motion Radiography of Sergeant Missile Motor Casing. Ernest H. Rodgers. Materials Research & Standards, v. 1, July 1961, p. 537-539.

Problems involved in the application of a rod-anode tube, strip film and in-motion technique to longitudinal and circumferential weld radiography. (S13e, T24e)

374-S. (German.) Mass Spectrographic Investigation of Degassing Products of Magnesium Containing Hydrogen and Silicon. K. Bornkessel and J. Pilot. Zeitschrift fur Naturforschung, v. 16a, Apr. 1961, p. 432-434.

Degassing of Mg specimens from 440-520° C., followed by spectrographic determination of SiH_2 component. (S11c, C5m; Mg, Si, Mn)

375-S. The Heat Treatment of Steel. Pt. 12. Pyrometers. Edwin Gregory. Edgar Allen News, v. 40, July 1961, p. 158-159.

Method of evaluating suitability of thermocouples of various metal combinations for measurement of temperatures within a particular range. Calculation of emf.-temperature relation curves, allotropic change point, thermoelectric inversion point and thermoelectric power. (S16b, J-general, X9q; ST)

376-S. Optical Spectroscopy. A. C. Menzies. Research Applied in Industry, v. 14, July 1961, p. 285-292.

Review of principles, techniques and equipment of optical spectroscopy including ultraviolet and infrared absorption; methods of specimen preparation; and application to metallographic and composition analysis of metals, alloys and inorganic and organic materials. 4 ref. (S11k, M-general)

377-S. (Japanese.) Statistical Study on the Quality of KS-50 Commercially Pure Titanium Forgings. Masayoshi Inoue, Haruo Okamoto, Hidetake Kusamichi and Kazuo Miyamoto. Light Metals, v. 11, May 1961, p. 182-195.

Correlation of data for ultimate tensile strength, elongation, reduction of area, Brinell hardness and O and Fe contents to establish metallurgical uniformity. Comparison is made with K50 Ti sheet. (S22, S11, Q-general, 2-60; Ti-a, 4-51)

378-S. Testing Irradiated Fuel at Hanford. J. M. Fouts. Nucleonics, v. 19, Aug. 1961, p. 64-65.

Radiographic, weighing and ultrasonic procedures and equipment for testing natural-U, Al-clad irradiation fuel for corrosion, dimensional stability and bond integrity between U core and Al cladding after irradiation. (S13, P10, R-general, T11g, 2-67; U-b, Al, 8-66)

379-S. Instrumental Neutron Activation for Rapid Economical Analysis. Vincent P. Guinn. Nucleonics, v. 19, Aug. 1961, p. 81-84.

Activation analysis, using a 3-Mev. Van de Graaf accelerator, involving photo-excitation of metal elements and their isotopes by irradiation with thermal neutrons and observation of energies and half-lives of decay gamma rays. Major benefit is speed of analysis as compared with chemical and spectroscopic methods. 20 ref. (S11q, 1-52)

380-S. (Russian.) Ultrasound Testing of Circumferential Flash Welds on Thin-Walled Tubing. F. I. Kislyuk and V. S. Pavlichenko. Avtomaticheskaya Svarka, Apr. 1961, p. 40-46.

Detection of flaws caused by oxidation, craters or nonfusion in the weld seam of steel tubing with a diameter of 300-500 mm. and wall thickness of 8-10 mm. 8 ref. (S13g, K3r, 9-71, 9-72; ST, 4-60)

381-S. (German.) Ultrasonic Testing of Steel and Cast Iron. Evaluation of Material Characteristics and Microstructure. Technica, v. 10, June 23, 1961, p. 842-844.

Principles of ultrasonic testing and evaluation of test results for modulus of elasticity, modulus of torsion and Poisson's coefficient by measurement of velocity of sound. Correlation between microstructure, tensile strength and velocity of sound. (S13g, Q21, Q27, M27; ST)

382-S. (Italian.) Refractories, Radioisotopes and Nonmetallic Inclusions in Steel. Refrattari, no. 11, Apr. 1961, p. 367-369.

Radioisotope tracer technique used in tracing nonmetallic inclusions (refractories) in steel by treating refractories with radioisotopes. The radioisotopes in steel are identified by Geiger counter, by spectrometer or by a film

which localizes the radioactive inclusion. (S11, 1-59, 9-69; ST)

383-S. Gas Determination in Vacuum Tube Materials. B. J. Bliss. Paper from "Seventh National Symposium on Vacuum Technology Transactions". Pergamon Press, Inc., New York 22, 1960, p. 145-148.

Detecting gas levels in carbonized Ni, Al-clad, Ni, Ni-clad steel, Al-clad steel and alloys of Fe, Al, Cu and Ni with a high vacuum bulb heated between 30 and 1300° C. with a photoprojection bulb. (S11r, 1-53; ST, Ni, Al, Fe, 8-66)

384-S. An X-Ray Spectroscopic Study of Titanium Beryllides. E. E. Vainshtein, E. A. Zhurakovskii and I. B. Staryi. Academy of Sciences of the USSR, Proceedings, Physical Chemistry Section, v. 135, Nov. 1960, p. 1077-1079.

Investigation of the fine structure in the X-ray spectra of two well established phases with compositions close to the intermetallic compounds of the TiBe and $TiBe_2$ type, made by sintering a mixture of Ti metal and Be. Controlled chemical analysis indicates an actual concentration of Be in good agreement with the theoretical values. The structure of both alloys is checked by comparing X-ray diffraction patterns with established theoretical data. (S11n, M27; Ti, Be)

385-S. Radioisotopes in Production Engineering. W. G. Busbridge. Production Engineer, v. 40, July 1961, p. 468-473.

Applications include determination of wear rate of neutron-irradiated steel piston ring; gaging thickness of sheet steel and brass with nuclear radiation; detection of flaws in steel, Fe and Al castings by radiography using Co^{60} or Tm^{170} as gamma ray source. (S13e, S14e, 1-59; ST, Cu-b, 4-53, Fe, Al)

386-S. A Comparison of United States, European and British Commonwealth Codes for the Construction of Welded Boilers and Pressure Vessels. J. F. Lancaster. American Society of Mechanical Engineers, Paper no. 61-SA-40, 1961, 19 p. $1.

Tabulations include specifications for materials (particularly carbon steel boiler plate), permissible stress/temperature relationships, low temperature applications, welding requirements, design formulas, permissible stresses and joint efficiency factors. 22 ref. (S22, T26q; CN, 7-51, 11-62)

387-S. Isotopes as an Aid to Inspection. J. F. Hinsley. Metallurgist, v. 1, July 1961, p. 319-321.

Radioactive isotope theory and metallurgical applications including use in tracing the source of inclusions in ingots and castings, to study wear in blast furnace linings and in bearings to study diffusion rates in melts and to measure coating or strip thicknesses and weld defects. 4 ref. (S13e, S14e, N1a, Q9, 1-59, 17-57)

388-S. Semi-Automatic Crack Detection Line. Instrument Practice, v. 15, July 1961, p. 872-873.

Design and operation of a semi-automatic process line consisting of a series of tanks for dye penetrant detection of cracks and flaws in aircraft components. (S13k, 1-52, T24)

389-S. Factors to Consider in Selecting Ultrasonic Testing Equipment. R. A. Seidel. Metal Progress, v. 80, Aug. 1961, p. 83-87.

In choosing an ultrasonic instrument for flaw detection, ruggedness, degree of accuracy needed, ambient illumination conditions, instrument stability, dependability, simplicity of operation, size, weight and portability are important factors to consider. (S13g, 1-53)

390-S. Temperature Indicating Paints and Compounds. Gerard T. O'Brien. Machine Production, v. 20, July 1961, p. 23-27.

Use of crayons, lacquer, pellets and paints to measure temperature of the workpiece in welding and preheating of ferrous and nonferrous metals. Accuracy, temperature range, indicating speed and applications of each type of indicator. (S16, K-general, K9p)

391-S. Magnetic Method Reduces Inspection Time Over 90%. Steel, v. 149, Aug. 7, 1961, p. 77.

Development of a unit which produces magnetization in three planes for

inspection of ferromagnetic castings weighing up to 25 tons. (S13h, 1-52; 5)

392-S. Quality Standards Are Met by Rebuilt Hot Strip Mill. Steel, v. 149, July 24, 1961, p. 96, 99.

An automatic gage control is installed on a continuous hot strip mill to eliminate fluctuations in thickness of hot rolled steel strip and coils. Other techniques to improve sheet shape, surface quality and physical properties are outlined. (S14c, F23, 1-66, P-general, X20c; ST, 4-53)

393-S. (Italian.) Radiographic Examination of Fillet Welds. Decio Stellato. Rivista Italiana della Saldatura, v. 13, Mar. 1961, p. 130-136.

The X-ray examination of fillet welds by a special technique which removes difficulties arising from the considerable variation in thickness of the metal being observed. (S13e, W9r)

394-S. Spectrochemical Analysis of High-Purity Tungsten. R. W. Lewis, C. F. Earl, J. L. Potter and J. R. Wells. U. S. Bureau of Mines, Report of Investigations 5814, 1961, 12 p.

Determination of 19 impurities in an experimental procedure in which samples are thermally converted to the oxide, mixed with graphite and an internal standard element (Ge, La, NaCl) and excited in a d-c. arc. 10 ref. (S11k, 1-53; W)

395-S. (German.) Operational Experiences With a New Vacuum Spectrometer. Peter Dickens, Paul Konig and Theodor Dippel. Archiv fur das Eisenhuttenwesen, v. 32, June 1961, p. 369-373.

Chemical analysis of C, Si, Mn, P, S, Cu, Cr, Ni, Al, As and Sn in basic Bessemer steel specimens by a vacuum spectrometer using two fluorspar prisms for analysis of light. Design of spectrometer and applicability (spectrum range 1770-3000 AE). (S11a, 1-52; ST)

396-S. (German.) Apparatus-Induced Difficulties in Vacuum Spectrometer Operation. Erich Piper and Horst Kern. Archiv fur das Eisenhuttenwesen, v. 32, June 1961, p. 375-377.

Effect of residual oxygen contained in argon atmosphere in an excitation chamber on analysis of Si-and Al-alloyed stainless steel and scale resistant steels with particular reference to X 10 CrAl 24 steel. 4 ref. (S11a, 1-52, 3-69; SS, Si, Al)

397-S. (Translation-Brutcher no. 5118.) Investigations on the Spectrographic Analysis of High Alloy Steels. N. Diehl. Archiv fur das Eisenhuttenwesen, v. 32, Jan. 1961, p. 11-18.

Previously abstracted. See item 218-S, 1961. (S11k; SS)

398-S. Improving Thickness Control in Hot Strip Mills. R. G. Beadle and W. E. Miller. Control Engineering, v. 8, July 1961, p. 94-99.

Control of variations in steel strip thickness caused by thermal rundown, cold spots and loss of tension at the end of the strip by using load and X-ray gages for inspection. The system design is based on digital computer analysis of steady state performance and analog computer analysis of transient performance. (S14, 1-53; ST, 4-53)

399-S. (German.) Use of Regression Analysis in Low Shaft Furnace Smelting Control. Karl-Friedrich Ludemann, Rolf Ebert and Rolf Kastner. Neue Hutte, v. 6, June 1961, p. 325-333.

Evaluation of production data by statistical analysis with particular reference to coke consumption as influenced by coke composition and distribution of Si and S between metal and slag as influenced by pig iron and slag composition. (S12, D8n; CI-a)

400-S. (German.) Possibility of Contact-Free and Automatic Temperature Measurement During Hot Rolling of Steel. Rudolf Schulze and Fred Esser. Neue Hutte, v. 6, June 1961, p. 343-349.

Surface temperature measurement techniques and applications of equipment such as optical (total radiation) photocell and photoelectric pyrometers and of reference measurements. Use in measurements at 900-1100° C. in hot rolling of ingots of St. 52 steel, 100 Cr 6, 40 NiCr 5 and 45 W Cr V 7 steel. (S16b, 1-52, F23, 1-66; ST)

401-S. Determination of the Iron Content of Thomas Slag. H. J. Kopineck. Philips--Serving Science and Industry, v. 8, Feb. 1961, p. 38-39.

The slag is poured onto a plate, drawn off while still hot and broken with a compressed-air hammer. After cooling, sieving (400 mesh per cm. 2) and pressing, Fe content is measured by X-ray spectral analysis using a fixed crystal and detector. (S11p; RM-q, Fe)

402-S. Properties of Iron Alloys (Analysis of Complex Alloys). O. R. Gates and Ove Mylting. Report of NRL (Naval Research Laboratory) Progress, July 1961, p. 18-19. (Available as PB 171320 from U. S. Office of Technical Services, Washington 25, D. C.)

The separation of Fe-base alloys containing Cb, Ti, Ni, Li and Al for analytical purposes is given. A sequence is developed for determining various elements in one sample weight. (S11f, 1-54; Fe, Cb, Ti, Ni, Li, Al)

403-S. Fluoroscopic Methods of Weld Evaluation. Otto Renius and D. W. Bowman. Welding and Metal Fabrication, v. 29, Aug. 1961, p. 341-343.

Comparison of the sensitivity of direct fluorescent screen viewing, electronic image intensifier viewing and closed-link television viewing of a fluorescent screen. Design, intensity and safety of the systems. (S13e; 7-51)

404-S. Ultrasonic Methods of Continuous Measurement. B. L. Davies. Research Applied in Industry, v. 14, Aug. 1961, p. 302-308.

Review of transmission, resonance and pulse echo methods and their application in industry for continuous measurement and standardization. (S14g)

405-S. An Introduction to Statistical Techniques for Foundry Experiments. C. A. Rowe. Journal of Steel Castings Research, July 1961, p. 1-13, 18.

Illustrations and sample problems of the "t" test, used for verifying experimental data, the "F" test, used for testing the significance of three or more groups of data and the Analysis of Variance, used for determining the statistical significance of the value of "F". 17 ref. (S12, E-general)

406-S. A Statistical Analysis of Calcium Deoxidation Data. C. A. Rowe. Journal of the Steel Castings Research, v. 20, Jan. 1961, p. 7-10.

Statistical analysis of ductility and impact properties of sand cast steels killed with Al only and with Al and Ca. Ca does not affect the elongation, reduction of area and impact properties of acid electric steel and elongation and reduction of area of basic electric steel but does affect the impact properties of basic electric steel. (S12, D5c, Q23p, Q6, 2-60; AY, Al, Ca, 5-60)

407-S. Quality Control Governs Razor Blade Manufacture. Australasian Manufacturer, v. 46, July 15, 1961, p. 44-47, 49.

Slitting, welding, perforating hardening, tempering and sharpening operations on high-tensile steel strip. Mechanical and physical property testing, strip thickness measurements, Vickers hardness testing and visual and microscopic examinations. (S14, M21, Q29, T6q, 18-74; ST, 4-53)

408-S. (German.) Survey of Investigations on Dressing of Lead-Copper Mattes. H. Hadamovsky. Monastsberichte der Deutschen Akademie der Wissenschaften zu Berlin, v. 1, Dec. 1959, p. 779-780.

Separation of Pb from Cu by grain coarsening of PbS by heat treating. Determination of phase equilibria in the quaternary system Cu-Fe-Pb-S. (S11f, N3, 2-64, M24d; Cu, Pb, Fe, S)

409-S. Sonic Contour Follower Cuts Time, Costs on Curved Honeycomb. Western Metalworking, v. 19, Aug. 1961, p. 35.

Ultrasonic inspection of brazed honeycomb panels 10 by 20 ft. by (up to) 20 in. (radius). Sound is transmitted into the panels through a water feed mechanism by a focused-beam lithium sulphate transducer. (S13g; 7-52, 7-59)

410-S. The Determination of Organic Carbon on the Surface of Steel Sheets. W. E. Boggs and G. E. Pellissier. Materials Research & Standards, v. 1, Aug. 1961, p. 627-630.

Organic contamination introduced during processing and remaining after mill cleaning is measured by surface oxidation of carbonaceous contaminants, followed by microscopic examination of

the carbon oxides involved. Method and apparatus for vacuum combustion techniques. (S-general)

411-S. Spotwelding Control for Reliability. Frank J. Dietrich. Assembly and Fastener Engineering, v. 4, Sept. 1961, p. 39-42.

X-ray and macrographic techniques and equipment are used in testing specimens for defects and machines for reliability. Bend and shear strength tests and examination for penetration, inclusions, nugget size and configuration are conducted on random samples. (S13; 7-51)

412-S. (German.) Anodic Oxidation of Aluminum and Aluminum Alloys. Schweizer Archiv, v. 27, June 1961, p. 274-278.

Suggestions for standardizing methods for measuring thickness of Al or Al alloy coatings including microscopy and eddy-current techniques and measurement of breakdown voltage and resistance. (S14, L19; Al-b)

413-S. Quantitative Extraction of Nonmetallic Inclusions From Steel. H. Walz and R. A. Bloom. American Institute of Mining, Metallurgical and Petroleum Engineers, Preprint, Nov. 30-Dec. 2, 1960, 11 p.

Review of the acid, halogen and electrolytic residue methods of extraction and design and operation of electrolytic and chlorination apparatus. Development of an extraction procedure consisting of electrolytic separation and treatment of the residue by chlorination and vacuum sublimation. Application to extraction of nonmetallic inclusions from Al-killed 1040 and 4340 steels and from ingot scums. 27 ref. (S11f, 9-69, ST)

414-S. (Italian.) Department of Nondestructive Testing. Istituto Sperimentale dei Metalli Leggeri--Rapporto Annuale 1960, 1961, p. 41-46.

Flaw detection and thickness and corrosion measurements in steel, bronze and light alloy tanks, autoclaves, castings, welds, bolts, pipes and turbines by X-ray and gamma ray radioagraphy and ultrasonic testing techniques. (S13, S14, R11a, T26, X1a; ST, Cu-s, EG-a39, 5, 7-51)

415-S. Calorimetric Thickness Measurements. Metal Industry, v. 99, Aug. 18, 1961, p. 127-128.

Method for measuring thickness of Ni on stainless steel, Zn and Cd on steel and Ag on phosphor bronze. A simplified calorimeter measures heat generated when coating is dissolved by a chemical reagent. The heat generated is directly proportional to the weight of the dissolved metal. (S14; Ni, Zn, Cd, Ag, SS, ST, Cu-s)

416-S. A Nondestructive Method to Detect Pipes and Cavities in Hot Steel Blooms During the Rolling-Process by Means of Betratron, X-Ray Image Intensifier and Television-Setup. W. Lueckerath, K. Flink and R. Flossmann. Philips--Serving Science and Industry, v. 8, Jan. 1961, p. 7-12.

A betatron X-ray testing assembly is used in a rolling mill to study macroscopic solidification structures and defects by shooting hard X-rays into the steel. The resulting penetration pattern is transmitted by X-ray image intensifier tube and television unit to a screen for observation. (S13e, 1-52, 9-67, F23; ST, 4-52)

417-S. Nondestructive Test Methods. F. W. Wood. Product Engineering (Design Digest Issue), v. 32, Sept. 4, 1961, p. 28-30.

Survey of X-ray, magnetic particle, electrostatic particle, ultrasonic and penetrant methods for detection of flaws in structural material. (S13; SGB-s)

418-S. (German.) Ultrasonic Testing of Heavy Plates During Their Fabrication. Walter Dick, Paul Holler and Erich Lechky. Stahl und Eisen, v. 81, Aug. 17, 1961, p. 1116-1122.

Automatic ultrasonic flaw detection employing through radiation by longitudinal waves for testing cold and straightened heavy steel plates without interruption of production flow. Design and operation of testing plant; evaluation of test results. (S13g, 1-52; ST, 4-53)

419-S. (Spanish.) Rapid Determination of Silicon in Steels. Maria del Carmen Consuegra Ferrer and Ricardo de la Cierva. Instituto del Hierro y del Acero, v. 14, Apr. 1961, p. 392-396.

Shavings of carbon steel, electric steel or high-elasticity silicon-manganese steel containing 0-3% Si are dissolved and boiled in diluted HNO_3 to which water and ammonium molybdate are added. The precipate is dissolved by adding 12N H_2SO_4 and the resulting

silicomolybdic acid is subjected to photometric analysis. 21 ref. (S11a, 1-53; ST, Si)

420-S. Minimizing Matrix Effects in Stainless Steel, Type 422, Using Oxygen in the Analytical Gap. Robert S. Hullings. Applied Spectroscopy, v. 15, 1961, p. 99-101.

Emission spectrographic procedure for the analysis of stainless steel using a point-to-plane technique. Oxygen is directed onto the sample face for improved accuracy and reproducibility over that obtained in air atmosphere. 4 ref. (S11k; SS)

421-S. The Spectrographic Determination of Molybdenum in Uranium-Molybdenum Alloys. Douglas H. Purcell. Applied Spectroscopy, v. 15, 1961, p. 101-103.

Determination of Mo as an alloying constituent in U-Mo alloys by the point-to-plane spark method of spectrographic analysis. A concentration range of 1-5% Mo is covered with ±7% precision at the 95% confidence level. (S11k; U-b, Mo)

422-S. (French.) Metallurgical Analysis by X-Ray Fluorescence. G. Pomey. Mechanique Electricite, v. 45, Mar. 1961, p. 36-40.

Analysis of metal samples, Fe ores and metallurgical slags. Effect of grain size on the intensity of refracted X-rays. Preparation of ore samples, including grinding, pressing of compacts or making a "glass" by melting the ore powder with borax or potassium pyrosulphate. (S11p, 2-59, M20; Fe, RM-n, RM-q)

423-S. (Russian.) Determination of Beryllium in Bronze by Fluorescence. A. I. Cherkesov and T. S. Zhigalkina. Zavodskaya Laboratoriya, v. 27, June 1961, p. 658-659.

Use of 3-oxy-2-naphthoic acid as a fluorescent reagent for quantitative determination of Be without separating out Al, Fe and Cu. 4 ref. (S11g, P17f; Be, Cu-s)

424-S. (Russian.) Complexometric Method for Determination of Zinc in Aluminum Alloys. L. M. Budanova and T. V. Matrosova. Zavodskaya Laboratoriya, v. 27, June 1961, p. 661-662.

A mixture of ammonium-fluoride and tartaric acid is used to form complexes for determination of Zn by titration using the volume-trilonometric method. 5 ref. (S11j, Zn, Al-b)

425-S. (Russian.) Photocolorimetric Determination of Columbium in Titanium and Aluminum Alloys With the Reagent Arsenazo. E. I. Nikitina. Zavodskaya Laboratoriya, v. 27, June 1961, p. 663-666.

Method for forming a quantitative colored Cb complex with the reagent arsenazo in the presence of H_2SO_4 and tartaric acids. Optical density of the photographs. 4 ref. (S11a; Cb, Ti-b, Al-b)

426-S. (Russian.) X-Ray Analysis of Tempered Heavy Machine Parts. B. A. Brusilovskii. Zavodskaya Laboratoriya, v. 27, June 1961, p. 699-701.

Development of an X-ray camera for determining the quantity of retained austenite in the outer layer of a heavy machine part. Simultaneous photographic comparison with the standard. (S11p, 1-52, N8n, T7; ST)

427-S. Iron Ore Analysis Utilizing Neutron Capture Gamma-Rays. R. C. Greenwood, J. Reed and C. A. Stone. American Nuclear Society, Transactions, v. 4, June 1961, p. 127.

Use of scintillation detector with a coincidence circuit to determine percentages of Si, Al, Mg, Mn, Ca and Fe indicates that the technique is not practicable. (S11, S19, 1-54; Fe)

428-S. The Electromagnetic Inspection of Production Quantities of Tubing Used in Some Reactor Applications. C. J. Renken. American Nuclear Society, Transactions, v. 4, June 1961, p. 137.

Electromagnetic and ultrasonic testing of Zircaloy-2, stainless steel and Croloy steel tubing to locate such defects as radial cracks, inclusions, thickness variation, poor welding and laps. (S13, S14, T11; 4-60, 9-69, 9-71)

429-S. The Non-Destructive Testing of Zircaloy Reactor Process Tubes for High Pressure, High Temperature Service. R. B. Socky. American Nuclear Society, Transactions, v. 4, June 1961, p. 137-138.

Extruded tubing tested by ultrasonic flaw detection, fluorescent penetrant, radiography and autoclaving to insure structural integrity and corrosion resistance. (S13g, S13k, R11, 1-54, T11; Zr-b, 4-60)

430-S. Development of Ultrasonic Techniques for the Remote Measuring of the Homogenous Reactor Test Core Vessel Wall Thickness. R. W. McClung and K. V. Cook. American Nuclear Society, Transactions, v. 4, June 1961, p. 140.

Both resonance and pulse reflection methods are evaluated for determining wall thinning due to corrosion and erosion of a Zircaloy-2 vessel. (S13, S14, R11, T11, 2-67; Zr-b)

431-S. Chemical Stability of UO_2 in Reactor Water. C. N. Spalaris. American Nuclear Society, Transactions, v. 4, June 1961, p. 146-148.

Nuclear reactor fuel checked by chemical analysis, X-ray diffraction and metallography for erosion and oxidation. (S13, R11, T11, 2-67; U)

432-S. Further Studies on the Deformation of Thin Cladding by UO_2 Thermal Expansion. M. F. Lyons. American Nuclear Society, Transactions, v. 4, June 1961, p. 148-149.

Al and stainless steel cladding are studied to correlate data relating the observed capsule outside diameter growth to operating heat flux and the observed UO_2 growth to the clad restraining force. (S14, T11, 2-67; Al, SS)

433-S. Dimensional Studies of Stimulated Experimental Gas-Cooled Reactor Fuel Elements at Elevated Temperatures. W. R. Martin. American Nuclear Society, Transactions, v. 4, June 1961, p. 149-150.

X-ray and isotope radiography study of expansion, plastic strain and fracture of UO_2 encapsulated in type 304 stainless steel while subjected to cyclic heating to 4000° F. 5 ref. (S13, T11, 1-54, 2-62)

434-S. Polarographic Methods for the Analysis of Acid Gold Alloy Plating Solutions. Arnold H. Craft and Karl Schumpelt. Plating, Mar. 1961, p. 277-279.

Methods for separating Au from Ni, Co and In. Comparison of results by polarographic and standard analytical methods. (S11f, S11m, L17a; Au, Ni, Co, In)

435-S. Vacuum Analysis of Certain Metals. Wild Barfield Heat-Treatment, Journal, v. 8, Mar. 1961, p. 11-14.

The N, O and H gas content of brass, Al and Ti are analyzed by a vacuum fusion gas analyzer at high temperatures (1100-1800° C.) Results are more regular and can be evaluated accurately to finer limits than chemical analytic methods. (S13, 1-66, 1-73, 9-51; Cu-n, Al, Ti)

436-S. (German.) Radiation Defects on Alpha-Irradiated Copper Surfaces. W. Marth. Kerntechnik, v. 3, July 1961, p. 318-323.

Surface irradiation of Cu bars (99.98% Cu) by alpha particles and subsequent investigation of surface structure by electron microscopic and X-ray diffraction techniques, using a new replica method, which furnishes several replicas from the same specimen. (S19, 2-67; Cu)

437-S. (German.) New Ways of Nondestructive Testing in Metallurgy. Ernst Schiebold. Neue Hutte, v. 6, July 1961, p. 416-430.

Examination of metal parts by X-ray and gamma radiation using Co^{60}, Ir^{192}, Cs^{137} and Tm^{170} as radiation source. Testing technology including design of equipment and interpretation of results. (S13e, 1-53)

438-S. (Russian.) Temperature Measurement During Growth of Metal Crystals in the Melt. V. T. Borisov and A. I. Dukhin. Fizika Metallov i Metallovedenie, v. 11, June 1961, p. 893-898.

Oscillographic and photographic measurement of temperature changes on the borderline of the division of phases during crystallization of Cd-Cu in Ar. Coefficient of thermal conductivity and specific heat. 5 ref. (S16a, N12, P11h, P12r, 2-66; Cd-b, Cu)

439-S. Rapid Analytical Methods for Determining Nonferrous Material in the Foundry. A. Bianchini and L. Alladio. Fonderia Italiana, v. 10, July 1961, p. 283-287.

Methods for rapid colorimetric and complexometric determination of Zn, Mg, Ca and Pb in limestones, bronzes, brasses, ZnS, slags, $(ZnOH)_2 SiO_3$ and Al-Mg alloys. Considerations of accuracy, safety and economy. (S11, E25, 1-53)

440-S. A Simple Interferometer for the Precise Measurement of the Straightness of Cylindrical Surfaces. R. G. H. Hall. Machinery (London), v. 99, Aug. 23, 1961, p. 444-448.

Technique is applied to brass cylinders with an accuracy of ± 5 microinches. Method of determining error and factors influencing the accuracy of the measurement. 4 ref. (S14d, 1-53)

441-S. (German.) Nitrogen Alloys of the T-Metals (Transition Metals) Mn, Fe, Co and Ni With Mg, Al, Zn and Cd. Hans Stadelmaier and Tong S. Yun. Zeitschrift fur Metallkunde, v. 52, July 1961, p. 477-480.

Analysis of nitrogen alloys, obtained by nitriding binary metal alloys in H_2/NH_3 atmosphere, for the presence of cubic nitrides using X-ray (Cu and Fe K-alpha radiation) and chemical methods. Measurement of lattice parameters of the identified phases. (S11, M26q, N15d; Mn-b, Fe-b, Co-b, Ni-b, Mg, Al, Zn, Cd, N)

442-S. Radiography--Bottleneck or Blessing. George O'Brien. Nondestructive Testing, v. 19, July-Aug. 1961, p. 265-266.

Use of a Kodak Industrial X-Omat Processor, an automatic film processing machine, to speed up X-ray inspection of nuclear reactor and missile components. (S13e, 1-52, T11, T24e; 7-51)

443-S. Detecting Service Failures in Power Plants. Helmut Thielsch. Nondestructive Testing, v. 19, July-Aug. 1961, p. 252-259.

Radiographic, ultrasonic, dye penetrant and magnetic particle inspection of boilers, turbines, piping, pipe supports and hangers, valves, fittings and shafts to prevent failures caused by thermal or mechanical shock or fatigue, corrosion, erosion, creep, cracking or rupture. 5 ref. (S13, T7, T26q, W11; 4-60)

444-S. Evaluating One-Half Million Pounds of Zirconium Sponge. M. D. Carver and H. Kato. U. S. Bureau of Mines, Report of Investigations 5696, 1960, 14 p.

Purity and metallurgical properties of test ingots from 259 lots of Kroll process Zr sponge, as determined by etching, Brinell hardness tests and spectrographic and chemical analyses. Review of methodology of analysis and effects of ingot production methods on impurity levels. (S11;Zr)

445-S. (Translation-ConBur.) Polarographic Determination of Zinc in Granulated Slags After Separation by Contact Reduction With Metallic Magnesium. P. N. Kovalenko and L. F. Bashkova. Journal of Applied Chemistry of the USSR, v. 33, Nov. 1960, p. 2437-2441.

Optimum conditions of temperature, pH and solution concentration for complete contact precipitation and subsequent determination of Zn in slags containing Fe ions. 20 ref. (S11m, C27, 1-52; Zn, RM-q)

446-S. (Translation-ConBur.) Densitometric Method for Determining the Thickness of Protective Films on Metals. I. V. Krotov and V. V. Grinina. Journal of Applied Chemistry of the USSR, v. 33, Nov. 1960, p. 2569-2571.

Thickness and density of films on Cu, phosphatized Al, phosphatized Zn and anodized Al are determined by making measurements with a pycnometer and using a simple formula which does not require knowledge of the film's composition. 22 ref. (S14j, 1-54; 14-62)

447-S. Wire Rod Defects--Their Occurrence and Detection. G. Earnshaw. Wire World International, v. 2, Oct. 1960, p. 233-238.

Importance of detecting defects in steel rod before feeding into high-speed wiredrawing machinery. Methods of testing for a variety of surface and structural defects occurring during steelmaking such as pipe, inclusions and segregated impurities. (S13; ST, 4-55)

448-S. (French.) Disadvantages to the Steel Producer of Restrictive Specifications. F. Pichon and F. Bourdillon. Revue de Metallurgie, v. 58, June 1961, p. 523-526.

Problems arising from the specification of a certain composition such as low C, high Mn, or specified quantities of Si, noble elements, S or P, or of a certain process such as killing with Al, as they affect economic production. (S22, 2-60)

449-S. (Spanish.) Determination of Antimony in Technical Alloys. M. E.

Garate and F. Burriel-Marti. Revista de la Universidad Industrial de Santander, v. 3, Jan. 1961, p. 13-16.

Dissolving of Sb alloys containing Cu, Fe, Sn, Pb, Zn and As in a mixture of HNO_3 and hydrofluoric acid. Determination of Sb by electrometric titration after addition of $KBrO_3$ and HCl indicating that only As has an interferring effect. 4 ref. (S11j; Sb-b)

450-S. Radiographic Examination of Steel Welds--New Mobile Linear Accelerator. Australasian Engineer, v. 52, July 1961, p. 57, 73.

X-ray examination of pressure vessels for nuclear power stations during construction using a mobile 4, 300, 000-v. linear accelerator which can be rotated about both horizontal and vertical axes. (S13e, T11, T26q; ST, 7-51)

451-S. Separation of Hafnium From Zirconium. Technical News Bulletin (National Bureau of Standards), v. 45, Aug. 1961, p. 137.

Separation for analysis obtained by using a strong quaternary-amine anion-exchange resin column with diluted sulphuric acid as eluting solution. (S11f, 1-54; Hf, Zr)

452-S. Analytical Chemistry of the Rare Earths. Charles V. Banks and Donn W. Klingman. Chapter 23 from "The Rare Earths". John Wiley & Sons, Inc., New York 16, 1961, p. 570-593.

Review of literature and techniques including analysis of ores and minerals, separation and the determination and analysis of the rare earths, their oxides, their fluorides and their alloys. 250 ref. (S11, 10-54; EG-g45)

453-S. Analytical Spectroscopy of the Rare-Earth Elements. Velmer A. Fassel. Chapter 24 from "The Rare Earths". John Wiley & Sons, Inc., New York 16, 1961, p. 594-613.

Optical absorption, optical fluorescence, optical emission and X-ray fluorescent spectra are discussed as they apply to the analysis of rare-earth mixtures, to the appraisal of rare-earth purities and to the determination of rare earths in other matrices. 33 ref. (S11, P17e, 1-53; EG-g45)

454-S. (German.) Investigation of Silicate Inclusions in Cast Iron. Gyula Nandori. Freiberger Forschungshefte, no. B 59, 1961, p. 122-131.

Microscopic investigation of cast iron with high Si (2.27-2.76%) and Mn (0.36-3.5%) content sampled during test refining in an acid induction furnace at 1480° C. (S11e; CI, Mn, Si)

455-S. (German.) Microchemical Determination of Carbon in Isolated Microstructure Components. Hans Malissa, Marta Storck and Reinhold Gattringer. Archiv fur das Eisenhuttenwesen, v. 32, Aug. 1961, p. 525-528.

Microanalysis of carbon steel and 90 Mn V 8, 115 CrV 3 and X 40 MnCr 18 steel by volumetric and conductometric techniques. (S11j, S11m, 1-54; CN, SS)

456-S. Non-Destructive Method of Gauging Electrodeposited Nickel Layers. P. M. Reynolds. Journal of Scientific Instruments, v. 38, Aug. 1961, p. 313-317.

Gaging thickness of industrial coatings of Ni on steel or Cu-coated Zn or steel within close tolerances by a thermoelectric instrument. (S14c, 1-52; Ni, 8-62)

457-S. Report of the Working Group "R" (Roughness) of the International Institution for Production Engineering Research (C.I.R.P.). Ing. E. Bickel and Ing H. V. Weingraber. Microtechnic, v. 15, July 1961, p. 79-84.

Review of standards and methods of measuring surface roughness and standards of evaluating commercial roughness measuring instruments. 16 ref. (S15, 1-53)

458-S. (French.) Nondestructive Testing of Iron and Steel. L. Beaujard. Industrie Nationale, no. 2, 1961, p. 25-34.

Flaw detection methods including electromagnetic testing of billets used in the manufacture of rolled wire and ultrasonic testing of mild steel billets and thin sheets. (S13g, S13h; ST)

459-S. Eddy Currents Check Tubing On-Line. H. N. Nerwin. Control Engineering, v. 8, Oct. 1961, p. 119, 121.

Equipment design and operating principles of an inspection apparatus which continually inspects and automatically cuts off welded steel tubing with oxidized or chipped weld zones using induced eddy currents. (S13h, 1-52; ST, 4-60, 7-51)

460-S. (German.) Chemical Analysis of Nickel in Copper Alloys. W. Thaler. Metall, v. 15, Sept. 1961, p. 880.

Dissolution of sample in HNO_3, filtration of Sn and Sb precipitates, electrolytic separation of Cu and Pb, precipitation of Ni by dimethylglyoxim and titration in ammoniac solution by Titriplex III using Murexid as indicator. (S11; Cu-b, Ni)

461-S. Investigation of Refractory Metals Processing (Problems in Refinement of High Vacuum Analytical Techniques). G. A. Picklo, Jr., and D. I. Walter. Report of NRL (Naval Research Laboratory) Progress, Sept. 1961, p. 45-46. (Available as PB 171322 from U. S. Office of Technical Services, Washington 25, D. C.) $1.25.

Vacuum fusion, using high-purity Ni as flux, hot extraction at 1900° C. and chemical analysis methods are compared for determining oxygen pick up and oxygen level of specimen pellets of Mo exposed to high temperature atmospheres for various time. Effect of specimen geometry on surface oxidation measurements. (S11f, R1h, 1-73, 3-73; Mo, EG-d37)

462-S. Cast Nuclear Components Radiography by Means of Kilocurie Cobalt Sources. Richard Lent. Modern Castings, v. 40, Oct. 1961, p. 118.

Heavy section radiography of steel sections up to 12 in. thick using newly developed Co isotopes enriched to a high specific activity in high neutron flux reactors. (S13e, 1-59, T11; ST, Co)

463-S. Use of Blast Furnace Probes. J. C. Agarwal, H. R. Pratt and R. H. White. U. S. Steel Corp. Technical Paper, Science and Technology, no. 32, 1961, 12 p.

Sampling blast furnace gases and temperature and pressure measurement using a probe at various points across the diameter of the stack. Data are presented indicating gas burden and path in the stack with analysis in relation to reduction reactions. (S12h, D1, D11, 1-52)

464-S. The Determination of Metallic Zinc by Measurement of Hydrogen Evolution. G. Lindley. Laboratory Practice, v. 10, Sept. 1961, p. 628-629.

Determination of the metallic Zn content of Zn-ZnO oxide mixtures by measuring the volume of H_2 evolved from a dilute acidic solution containing 15% H_2SO_4 and 0.2% $NiSO_4$ as catalyst, at 298° K. and 1 atm. of pressure. Details of construction of the specially designed reaction vessel-gas burette unit are given. (S11, 1-54; Zn)

465-S. A New Technique Using a Transmission Interferometer. D. A. Parker and C. K. V. Owen. Machinery Lloyd (Overseas Edition), v. 33, Sept. 30, 1961, p. 42-43.

Surface roughness of gear cutters, gear teeth, steel disks and inaccessible areas is measured by use of a transparent replica. (S15j, 1-54)

466-S. Some Experiences in the Use of a Wild Barfield NRC Model 912 Vacuum Fusion Analyser. G. L. Miller and J. A. Caldwell. Wild Barfield Heat-Treatment Journal, v. 8, Sept. 1961, p. 2-6.

Determination of O and H content in Ta, Cb, Mo, W, tungsten-carbide, titanium-carbide, Cr, ferrotungsten, ferrocolumbium, Fe and Ni using vacuum fusion analysis at 1650-1850° C. (S11r; Ta, Cb, Mo, W, Ti, Cr, Fe, Ni, O, H)

467-S. Colorimetric Determination of Trace Amounts of Aluminium in Steel. D. Blair, K. Power, D. L. Griffiths and J. H. Wood. Talanta (International Journal of Analytical Chemistry), v. 7, Nov-Dec. 1961, p. 80-89.

Process includes preliminary separation of Fe, Ni, Cu and Mo by Hg cathode electrolysis. Residual Fe is then removed by extraction of cupferrate with chloroform; excess cupferron is then destroyed, the solution is neutralized, acid is added and the aluminum-nitrated Solochrome Cyanine R complex is formed. 68 ref. (S11, 1-54; ST, Al)

468-S. The Determination of Oxygen, Hydrogen, Nitrogen and Carbon in Metals. W. G. Guldner. Talanta (International Journal of Analytical Chemistry), v. 8, Apr. 1961, p. 191-202.

Procedures include solution, evolution, bromination, emission spectrometric, isotope dilution, activation, infrared absorption, inert gas and vacuum fusion, hot extraction and carbon determination methods. Review of platinum bath and flux and intermittent bath injection alloying processes. 22 ref. (S11, 1-54, 10-54)

469-S. Activation Analysis of Manganese in Cast Iron and High-Alloy Steels. P. Bouten and J. Hoste. Talanta (International Journal of Analytical Chemistry), v. 8, May 1961, p. 322-329.

Irradiated samples are analyzed by integral counting and pulse height discrimination. 9 ref. (S11, 1-54; CI, SS, 14-70)

470-S. (Japanese.) Methods for Analysis of Traces of Elements in Aluminum. Pt. 2. Determinations of Lithium, Boron and Gallium. Shikao Hashimoto, Akinari Ichiryu and Sakae Kato. Sumitomo Light Metals Technical Reports, v. 2, July 1961, p. 36-46.

Analytical procedures are given for flame photometric determination of Li, absorbance measurement of B and fluorimetric determination of Ga, Al being separated from B and Ga by anion exchange and requiring no separation for analyzing Li. 38 ref. (S11; Al, Li, B, Ga)

471-S. Neutron Activation Analyzes Beryllium. Chemical & Engineering News, v. 39, Oct. 23, 1961, p. 52, 54.

Determination of micro and submicrogram metallic impurities in ultrapure Be by irradiation. Comparison of radioactivity of test sample and standard sample to calculate amount of Mn, B and Cd impurities. (S11q, 9-51; Be, 14-70)

472-S. Tinplate Thickness Measured at High Speed. Industrial Finishing (London), v. 13, Oct. 1961, p. 38.

Continuous gaging of coating thickness using fluorescent radiation emitted by the tinplate strip while traveling under a beam of X-rays. Process parameters and apparatus design incorporating two spectrometers within the analyzer head, ratio amplifier and recorder, lithium fluoride diffracting crystal and a Geiger counter. (S14e; ST, 4-53, Sn)

473-S. (Russian.) Application of Radioactive Isotopes for Fluorescence Analysis and Automatic Control of Ore-Dressing Products. N. N. Shumilovskii, L. V. Meltzer, A. A. Kalmakov and V. H. Teniaev. Izvestiya VUZ--Tsvetnaya Metallurgiya, Mar. 1961, p. 140-147.

Use of gamma radiation emitted by tritium, Sr and Y isotopes to determine the content of Fe and W in sintered ore concentrates. Granular size, humidity and inclusions are considered as they affect the precision of this method. 9 ref. (S11q, 1-54; RM-n, Fe, W)

474-S. Non-Destructive Testing Using X-Ray Radiation. R. S. Forbes. Instrument Practice, v. 15, Oct. 1961, p. 1249-1253.

Inspection of cans, alloy cylinders and welds to determine fluid level and structural and weld faults. (S13e, K9r, 1-53)

475-S. Electron Probe X-Ray Microanalysis. R. Kiessling and S. Baekstrom. Metal Treatment and Drop Forging, v. 28, Oct. 1961, p. 388-392.

Determination of segragation of small cementite grains and carbide and MnS particles in ball bearing steel etched in alkaline picrate. Influence of cooling speed from the austenitic range, annealing and Cr content. Determination of grain boundary phases and distribution of alloying elements in Al-Zn(5%)-Mg(1.2%) alloys containing Mn, Cr, Fe and Si. 12 ref. (S11e, M27f; ST, Al-b)

476-S. "Plate Waves" Simplify Continuous Ultrasonic Tests. Steel, v. 149, Oct. 23, 1961, p. 79.

Plate, strip, rod, wire and tube are tested for core defects and surface and interior cracks using ultrasonic waves produced from a low sound velocity medium which propagates along the surface. (S13g, 1-52; 4-53, 4-55, 4-60, 4-61)

477-S. (French.) Magnetic Testing of Welded Seams. Pratique des Industries Mechaniques, v. 47, Sept. 1961, p. 238-240.

Flaw detection by the magnetic powder method; "magnetography" combining a continuous magnetic test of the whole seam length with a recording oscillograph; or electromagnetic measuring of currents excited in a coil when the field of a magnet passed along the seam is disturbed by a flaw. (S13h, S13c; 7-51)

478-S. A Survey of Methods Used for the Inspection of Sheet Metal. R. F. Lumb. Sheet Metal Industries, v. 38, Oct. 1961, p. 743-748, 760.

Inspection of silicon steel sheet using electrical, ultrasonic and magnetic test methods. Evaluation of each method for hot and cold rolled specimens. 6 ref. (S14; ST, Si, 4-53)

479-S. (German.) Production Control in Manufacture of Metallic Fuel Elements. G. Matz and G. Schneider. Atomwirtschaft, v. 6, July-Aug. 1961, p. 377-381.

Control of raw materials by chemical analysis and of uranium rods and canning material after various production steps by ultrasonic testing, thermal cycling, density measurements and high-pressure testing for vacuum leaks in fabrication of Al-canned uranium fuel elements. (S13, S11, L22, T11g; U, Al)

480-S. Temperature Effects in Alternating Current Polarography. H. H. Bauer and P. B. Goodwin. Australian Journal of Chemistry, v. 14, Aug. 1961, p. 460-462.

Determination of the temperature coefficients of the heights of a-c. polarographic waves and d-c. steps in the presence of Cd, Tl, Sb, Cu, In, Pb, Sn and Zn. 7 ref. (S11m, 2-61)

SECTION T

APPLICATIONS of METALS in EQUIPMENT and INDUSTRY

1-T. Automobiles/What Materials Are Next? Pt. 2. Piston Engine Materials: The Trend Is to Aluminum. Robert J. Fabian. Materials in Design Engineering, v. 52, Nov. 1960, p. 147-148.

Comparison of Al to cast iron for applications in engine blocks, cylinder heads and crankcases. (T21; Al, CI, 17-57)

2-T. Automobiles/What Materials Are Next? Pt. 4. The Gas Turbine Engine: Still a Hot Materials Problem. Robert J. Fabian. Materials in Design Engineering, v. 52, Nov. 1960, p. 153-154.

Application of stainless steel, aluminized steel, Ni alloys and nodular cast iron in gas turbine engines. (T21b; CI-r, Ni-b, SS, ST, 17-57)

3-T. (Italian.) Use of Aluminum Alloys in the S. S. Leonardo da Vinci. Alluminio, v. 29, Sept. 1960, p. 410-414.

Application of Al alloys in ocean liner structures requiring high corrosion resistance. (T22; Al, 17-57)

4-T. (Italian.) Structural and Architectural Uses of Stainless Steel. Pt. 2. Alessandro G. Amoroso. Acciaio Inossidabile, v. 27, July-Aug. 1960, p. 466-480.

Use of stainless steel in prefabricated structural elements. (T26n; SS, 17-57)

5-T. (Italian.) Use of Stainless Steel in Nuclear Power Plants. Acciaio Inossidabile, v. 27, July-Aug. 1960, p. 484-485.

Use of stainless components in a system for decontamination of radioactive liquid waste from a Swedish reactor and in the reactor of the first nuclear-powered transatlantic vessel. (T11; SS, 17-57)

6-T. (German.) Zirconium and Zirconium Alloys as Construction and Canning Materials in Ship Reactor Construction. L. Rangert. Atomwirtschaft, v. 5, Sept. 1960, p. 408-411.

Properties of Zr and Zr alloys containing Sn, Cb and Mo or Cu, with emphasis on corrosion resistance and neutron absorption. Chipless shaping and machining; welding and soldering of Zr alloys. 8 ref. (T11, R-general, G17, K-general; Zr-b, Cb, Cu, Mo, Sn, 17-57)

7-T. "Pyrotenax"--a Cable With Many Points of Interest. Australasian Manufacturer, v. 45, Oct. 22, 1960, p. 76-78.

Mechanical properties and corrosion resistance at 1000° C. of Cu electric cable insulated with MgO and sheathed in seamless Cu. (T1b; Cu)

8-T. Alloy Wire Improves Brake Power. Iron Age, v. 186, Dec. 1, 1960, p. 132-133.

Use of precipitation heat treated A-286 superalloy wire in the return springs of jet aircraft brakes to obtain stress-temperature stability up to 1000° F. (T7c, T24; SGA-h, 4-61, 17-57)

9-T. Optimum Tolerances of Sheet Materials for Flight Vehicles. George A. Hoffman. Journal of Engineering for Industry, Series B (American Society of Mechanical Engineers, Transactions), v. 82, Nov. 1960, p. 363-368.

Method is derived for economically specifying optimum tolerances for Ti, Al, Be and steel sheet. 8 ref. (T24; Ti, Al, Be, ST, 4-53, 17-55, 17-57)

10-T. Production of Frame Grid Valves. Wire Industry, v. 27, Oct. 1960, p. 999, 1002.

Welding, winding and painting of electronic tube grids composed of Mo support rods and W wire. (T1j; Mo, W, 17-57)

11-T. (French.) Use of Aluminum in the Automobile Industry. Jacques Verne. Revue de l'Aluminium, v. 37, July-Aug. 1960, p. 869-878.

Use of Al and Al alloy castings, rolled stock, sheet and strip in cylinder heads and other automotive applications. (T21; Al-b, 17-57)

12-T. Good Design Pays Off in Zinc and Gray Iron Castings. Metal Progress, v. 78, Dec. 1960, p. 122-123.

Emphasis on good design and careful selection of the method by which parts are made can lead to economies in production and a more useful product. (T-general, 17-57; CI-n, Zn, 5-60, 5-61)

13-T. 1250 Tons A-7 Structural Steel Fabricated. Canadian Metalworking, v. 23, Nov. 1960, p. 40-41.

Use of medium structural (ASTM A-7) and high strength low alloy (ASTM A-242) steels in the fabrication and erection of a Canadian missile base. (T26; AY, SGB-a, 17-57)

14-T. New Trends in the Use of Steel. H. Odenhausen. Acier-Stahl-Steel, v. 25, Oct. 1960, p. 399-400.

Use of rolled steel in light weight building construction. Importance of the modulus of elasticity in calculating collapse loading conditions, buckling and torsional failure. Surface protection of structural steel. 3 ref. (T26n, Q21, L-general; ST, 4-57, 17-57)

15-T. The All-Aluminum Engine. Light Metals, v. 23, Nov. 1960, p. 298-301.

Use of pressure cast Al cylinder blocks with cast iron linings in automobile engines. (T21b; Al, CI, 5, 17-57)

16-T. Materials in Atomic Energy. J. G. Ball. Nuclear Power, v. 5, Dec. 1960, p. 79-90.

Metallurgical characteristics and physical properties of steels, reactive and light metals and organic and inorganic compounds with attention to irradiation behavior. Applications as fuels, cladding, moderators and coolants, absorbers, shielding and other components of atomic reactors. (T11, P-general, Q-general, 2-67; ST, EG, 17-57)

17-T. Solving Refinery Corrosion Problems With Aluminum. Corrosion, v. 16, Dec. 1960, p. 16-17.

Various applications of Al in the refining industries to control corrosion. These include offshore and marine applications, heat exchangers, piping and tubing, tank and transportation uses, tower internals and cryogenic equipment. (T29n; Al-b, 17-57)

18-T. (Italian.) New Superalloys for Spiral Springs. Alberto Oreffice. Macchine, v. 15, Sept. 1960, p. 831-833.

Mechanical properties of heat and corrosion resistant Rene 41 Ni alloy, L 605 Co alloy and 318 A Ti alloy wire. Recommended heat treatments; applications in aircraft engines. (T7c, T24b, Q-general; Ni-b, Co-b, Ti-b, 17-57, SGA-b)

19-T. Brazed Carbides Are Not Passe. C. R. Christen. Carbide Engineering, v. 12, Dec. 1960, p. 16-19.

Use of brazed carbide tips in machining operations such as roll turning and tool grinding. Comparative operation costs for throwaway carbide tip, large brazed tip and new small brazed tip. (T6n, G17; 4-69)

20-T. Metallurgy in Nuclear Power Technology. Fuel Element Canning Materials. Pt. 1. J. C. Wright. Metal Treatment and Drop Forging, v. 27, Nov. 1960, p. 449-454.

Investigation of various metals, especially Zr, as fuel element canning materials. Extraction and fabrication procedures, with emphasis on separation of Hf. (T11g; Zr, 17-57)

21-T. Ni-Resist Ductile Iron Rotary Tables for Missile Guidance. Inco Nickel Topics, v. 13, no. 8, 1960, p. 4-5.

Rotary tables of D-3 Ni-Resist iron with 28% Ni content used as azimuth indicators in missile aiming systems. The alloy is selected on the basis of controlled expansion, resistance to corrosion and toughness. (T24e; CI-r, Ni, 17-57)

22-T. Stainless Ribbon Wraps Rocket Thrust Chambers. Inco Nickel Topics, v. 13, no. 8, 1960, p. 11.

AM-350 stainless steel strips and ribbon used to fabricate thrust chambers for testing high-energy liquid propellents. (T24e; SS, 4-53, 17-57)

23-T. A Study of Ceramic Cutting Tools. H. D. Moore and D. B. Kibbey. News in Engineering, v. 32, Nov. 1960, p. 13-18.

Testing of ceramic cutting tools for tool wear and fracture failure by cutting C1405 steel logs at varying speeds, feed rates and tool geometry. Method of analyzing test variables to determine the effects of use conditions on tool life. (T6n, G17; NM-f, ST)

24-T. Aluminium in Railway Rolling Stock. Aluminium Courier, Sept. 1960, p. 4-15.

Applications of Al-Zn, Al-Mg-Si, Al-Cu and Al-Zn-Mg alloys in railroad cars and components. (T23; Al-b, Cu, Mg, Si, Zn, 17-57)

25-T. Materials of Construction for Chemical Plant--Copper. S. Baker. Chemical & Process Engineering, v. 41, Nov. 1960, p. 513-518.

Typical mechanical properties and corrosion resistance of a number of Cu alloys, brasses, tin bronzes and gunmetals, Al bronzes, Cu-Ni alloys, Cu-Si alloys and Be-Cu. (T24; Cu, 17-57)

26-T. Transition From Boundary to Mixed Friction. R. L. Lenning. Lubrication Engineering, v. 16, Dec. 1960, p. 575-582.

Influence of base oil viscosity, surface finish, load and polar additives on the surface velocity at which the transition from sliding to mixed friction occurs in flat sliding bearings composed of SAE 52100 steel and cast iron. (T7d, 18-73; CI, ST)

27-T. Today's Ball Bearings. Nicholas P. Chironis. Product Engineering, v. 31, Dec. 12, 1960, p. 63-78.

Design and performance characteristics of ball bearings. Bearing life and load capacities, speed and temperature limitations of ball bearings. Evaluation of bearing materials including Cu-Be alloys, superalloys and stainless, tool and bearing steels. (T7d, 17-51, 17-52; SGA-c, Cu, Be, ST, SGA-h, 17-57)

28-T. Bright Future Forecast for Aluminum Castings. Jack H. Schaum. Modern Castings, v. 39, Jan. 1961, p. 48-50.

Technological and statistical growth. Applications, with emphasis on automobile parts. (T21; Al, 5, 17-57)

29-T. (Japanese.) Precipitation Hardening Stainless Steel for Springs. University of Tokyo, Engineering Research Institute, Annual Report, v. 19, Sept. 1960, p. 92-95.

17-7 pH is considered to be superior to 15Cr-7Ni with Mo and Al additions. Steels containing Ti or W are not suitable for springs since their hardness cannot be reduced by any tempering treatment considered. (T7c, J27; SS)

30-T. Sintered Tungsten Carbide Dies in the Wire Industry. E. T. Miller. Wire and Wire Products, v. 35, Dec. 1960, p. 1668-1670.

Application in drawing wire of stainless steel, high carbon steel, low carbon steel, Cu, Al and galvanized iron. Method for polishing dies using a mixture of silicon carbide and kerosene. Prevention of scoring by die rotation. (T6r, F28; 6-69, 17-57)

31-T. Multiple Function Fasteners. Machine Design, v. 32, Dec. 22, 1960, p. 118-119.

Use of fasteners composed of heat treated spring steel as electrical conductors and spacers and for clamping operations. All incorporate some form of screw-locking impression or retaining device which eliminates need for secondary fastening elements. (T7f; SGA-b, ST)

32-T. Gas-Cooled Reactors. Power Reactor Technology, v. 3, Sept. 1960, p. 58-65.

Principal characteristics of various gas-cooled reactors with emphasis on properties of fuel materials such as UO_2, UC, graphite and BeO and of cladding materials composed of stainless steel, Be, graphite and SiC. (T11; Be, NM-k36, SS, U, 17-57)

33-T. Organic-Moderated Reactors: Evaluation of Irradiated Experimental Fuel Elements. Power Reactor Technology, v. 3, Sept. 1960, p. 66-67.

The stability of experimental fuel elements of the plate type having finned Al cladding bonded to a uranium alloy

core is evaluated by irradiation testing in an organic moderated reactor. (T11g, 2-67; U-b)

34-T. GM Plunges Into Aluminum. Vearl A. Williams. Production, v. 47, Jan. 1961, p. 60-68, 70.

Production of engine and body parts by die casting and low pressure and semi-permanent molding of Al. (T21, E13, E19; Al, 17-57)

35-T. (English.) Stainless Steel for Cutlery. Masayoshi Togaya and Kozo Kishi. Osaka University, Technology Reports, v. 10, Mar. 1960, p. 481-487.

Investigation of optimum chemical compositions and heat treatment and hot working parameters for obtaining good cutting ability and durability. Comparison of high carbon stainless with low carbon ferritic stainless for machinability. (T6q, F-general, G17k, Q-general, 2-60, 2-64; SS, 17-57)

36-T. Frame Grid Valve Manufacture. J. M. Waldram. Engineer, v. 210, Nov. 28, 1960, p. 638-639.

Mo is used for the production of backbones in frame grid electron tubes. Each backbone is tested to withstand an exerted force of 4 lb. and processing temperatures to 900° C. The frames and the wires are Au plated to reduce grid emission. (T1; Mo, 17-57)

37-T. Magnesium Castings in Europe. E. Sayles. Metal Progress, v. 79, Jan. 1961, p. 97-100.

Pressure die casting in water cooled molds gives sound parts of excellent surface at high production rates. Other manufacturing advantages make them competitive with Al where weight or inertia are important considerations. (T-general, 17-57; Mg-b, 5)

38-T. Titan: Top in Aluminum. Aluminum Bulletin, Autumn 1960, p. 9-13.

Application of 2014 Al alloy in missile fuel tanks to provide high strength to weight ratio. Alloy is joined by a welding process employing an inert gas shielded tungsten arc with Al filler wire. Excess metal is removed by chemical milling processes controlled by magnetic tape. (T24e, K1d; Al, 17-57)

39-T. Light Metals Plus Careful Stress Analysis Reduce Weight of Missile Transporter. R. L. Candlish. Design News, v. 16, Jan. 2, 1961, p. 40-41.

Applications of steel, Al and Mg alloys and plastic materials in the powertrain, radiator, engine mounts, fly wheel housing, transmission cases, chassis and wheels. (T24e; Al-b, Mg-b, ST, 17-57)

40-T. American Automobile Developments and Their Implications to Founders. Foundry Trade Journal, v. 109, Dec. 22, 1960, p. 787-792.

Increasing use of Al in engine blocks, transmissions and crankcases; advantages and disadvantages over the use of cast iron; foundry techniques; comparison of the properties of cast iron and Al in automotive applications. (T21b; Al-b, 17-57)

41-T. Giant Pumps for Atomic Power Plant Use Nickel Alloys. Inco Nickel Topics, v. 14, Jan. 1961, p. 4.

Design of two vertical pumps having shaft and shaft coupling composed of Type 303 CrNi stainless steel, stationary impeller shroud of CF-20 (19-9) CrNi stainless steel castings, journal sleeves of "S" Monel NiCu alloy with hardness 275-350 Brinell as cast and impeller of cast Ni-Al bronze. Materials selection is based on greater resistance to corrosion. (T11p; Cu-b, SS-e, Ni, 17-57)

42-T. Uses of Double-Seal Stainless Valves Increasing. Inco Nickel Topics, v. 14, Jan. 1961, p. 10.

Application of 316 and 303 stainless and a 20% Ni-29% Cr-Mo alloy in corrosion, temperature, abrasion and pressure resistant ball valves. (T7b; SS-e, Ni, 17-57)

43-T. Aerojet-General Announces Successful Firing of Minuteman Engine With Titanium Alloy Case. Crucible Titanium Review, v. 8, Dec. 1960, p. 2-5.

Fabrication of light weight rocket engine casing from Ti alloy containing 6% Al and 4% V. (T24e, G-general; Ti-b, 17-57)

44-T. Red Metal Right for Modern Car Radiators. Copper & Brass Bulletin, Nov. 1960, p. 6-7.

Application of electrolytic Cu and cartridge brass strip in car radiators and heaters. (T21b; Cu, 17-57)

45-T. Platinum Alloys in the Production of Viscose Rayon. J. W. S. Hearle and A. Johnson. Platinum Metals Review, v. 5, Jan. 1961, p. 2-8.

Review of the production of rayon. Application of Pt alloys in the manufacture of the spinning jet. Chemical resistance, electrical properties and mechanical properties of the spinning jet. (T29q, Q-general, R-general; Pt-b, 17-57)

46-T. New Uses for Metal Honeycomb. K. W. Hards. Metalworking Production, v. 105, Jan. 4, 1961, p. 11-12.

Applications of honeycomb materials in boat structures, radar towers and aircraft. (T24a, T22, X15q; 4-57)

47-T. A New Communication System. T. L. Richards. Copper, no. 10, Winter 1960, p. 10-11.

Helical wave guides are manufactured by closely winding a helix of enamelled Cu wire onto a mandrel and applying an epoxy resin coating to the turns to bond them together. Guides are used to transmit communications signals at very high frequencies. (T1, L26p; Cu, 4-60, 17-57)

48-T. Stainless Steel Features Design of New Lightweight Engine. Nat Wood. Western Metalworking, v. 19, Jan. 1961, p. 37-38, 40.

Design and construction of a new 4-cylinder, lightweight, high power automotive or marine engine featuring a block assembly fabricated of welded and brazed thin gage 302 stainless steel sheet. (T21b, T24b; SS, 17-57)

49-T. Sintered Reactor Materials. Metal Industry, v. 98, Jan. 20, 1961, p. 49-50.

Description of Binal, a sintered and wrought homogenous ductile material consisting of boron uniformly dispersed in an Al matrix. Applications. (T11; Al-b, B, 6-72, 17-57)

50-T. When Designing Journal Bearings. Bruce M. Dunham. Product Engineering, v. 32, Jan. 30, 1961, p. 46-50.

Factors of speed, load, operating temperature and lubricant viscosity as they affect lubrication of journal bearings composed of Sn, Pb, soft steel, Al, Cd, Cu, Ag plate, tin bronze, phosphor bronze, lead bronze and cast iron by various oils. (T7d, 18-73; Al, Ag, Cd, CI, Cu-b, Pb, Sn, ST)

51-T. Metallic Gaskets. Heber H. Dunkle and R. L. Gastineau. Machine Design, Jan. 19, 1961, p. 103-114.

Construction materials, seating stresses and selection factors for metallic gaskets. Data are given for corrosion resistance and minimum seating stress of Al, Cu, Fe, Monel and stainless steel. (T7, R-general; Al, Cu, Fe, Ni-b, SS)

52-T. Encouraging the Use of Copper. Engineer and Foundryman, v. 26, Nov. 1960, p. 47-48.

Recommendations for diameter, temper and sheathing of Cu tubing for outside and underground pipelines. (T26r, 15-61; Cu, 17-57)

53-T. The Contribution of Metallurgy to Electric Power Generation. L. Rotherham. Engineer, v. 211, Jan. 13, 1961, p. 44-47.

Application of carbon and stainless steels in rotors for alternators. Testing boilers composed of 18/12/1 Cb steel, 17/10/2 Mo steel, CrMo steel, MoV steel and CrMoV steel to determine influence of heat and pressure on creep properties, stress rupture properties and microstructure. (T1, T26q, Q3, 2-61, 3-74; CN, SS, 17-57)

54-T. Broaching With Cemented Carbides. C. Edgar. Machinery, v. 67, Feb. 1961, p. 109-115.

Composite broaching tool design, material selection and fabrication, with attention to brazing and clamping of the cemented carbide tip to the tool body. Influence of temperature on hardness in the carbides and control of built-up edges during machining of materials of various hardnesses by proper use of coolants and controlled cutting speeds. (T6n, G17d, K8; 6-69, 17-57)

55-T. (Italian.) Applications of Stainless Steel. Fonderia, v. 9, Nov. 1960, p. 509, 511.

Review of properties of stainless steels, with emphasis on Rex 58, FV 520 and high-Cr steels and their application in the aircraft industry. (T24; SS, 17-57)

56-T. Fuel Element Fabrication. Journal of Scientific & Industrial Research, v. 19A, Nov. 1960, p. 535-538.

A review of papers dealing with fuel element fabrication practice, developmental research, general and specific problems of the production and properties of materials and alloys used for fuel element fabrication or cladding, testing techniques and the economics of nuclear power production. (T11g, L22, 10-54)

57-T. Production of Nuclear Components in Lead and Graphite. S. C. Poulsen. Machinery (London), v. 98, Jan. 4, 1961, p. 4-14.

Production of Pb bricks for radiation barriers, graphite blocks and Pb spheres for handling tong ball-joints. Description of casting, machining and finishing operations. (T11; Pb, 17-57)

58-T. Honeycomb Excells for Mach 3 Wing. Jack C. Joanides, Stanley C. Mellin and Leslie M. Lackman. SAE Journal, v. 69, Mar. 1961, p. 62-64.

Construction of an aircraft wing using brazed PH-15-7 Mo steel honeycomb structure results in higher strength at lighter weight than an integrally stiffened skin structure composed of AM 355 steel or beta Ti. (T24a; SS, 4-57)

59-T. Spring Design Data. Harold C. R. Carlson. Wire and Wire Products, v. 36, Jan. 1961, p. 76.

Load and deflection design data for compression, extension and torsion springs. Torsional stress, corrected moment, maximum working stress and temperature and comparative costs are given for wire composed of phosphor bronze, brass, Be-Cu, carbon and alloy steels, 302, 316 and 431 stainless steels, Monel, K-Monel, duranickel, Inconel, Inconel-X, Colenium and Elgiloy. (T7c, Q25, 17-51; SGA-b, Cu-b, Ni-b, SGA-g, ST, 4-61, 17-57)

60-T. Pipework Engineering. S. C. Poulsen. Machinery (London), v. 97, Dec. 28, 1960, p. 1461-1465.

Description of cleaning, protective coating, bending, stemming and grinding operations on seamless steel tubing. (T26r, G6, G18, L-general; ST)

61-T. Metals and Fabrication Methods for the B-70. Wayne A. Reinsch. Metal Progress, v. 79, Mar. 1961, p. 70-78.

The speed and altitude of the B-70 results in skin temperatures of 450 to 630° F., which means that steel and titanium alloys must be used as structural materials. An all-brazed hydraulic system for operation at 450° F. and 4000 psi. gives considerable weight savings. Details on types of metals and the precision techniques employed in fabrication of the B-70. (T24, G-general, K8, 17-57; SS, Ti-b, TS, SGA-h)

62-T. Materials for Uncooled Rocket Nozzles. A. V. Levy. Metal Progress, v. 79, Mar. 1961, p. 81-83.

Though molybdenum and tungsten are being used today for uncooled rocket nozzles, rising temperatures are expected to bring in more durable graphites, carbides and ceramics. (T2p, 17-57; SGA-h, Mo, W, NM-f, NM-k36, 6-69)

63-T. Fabricating the Titan Propulsion System. W. M. Boam. Metal Progress, v. 79, Mar. 1961, p. 83-88.

In designing the engine for the Titan ICBM, engineers have come up with a complex but reliable package which mates metals and nonmetals. (T2p, K-general, K8, SS, AY, SGA-h, Ni-b, Al-b)

64-T. Dyna-Soar... A New Technology. Metal Progress, v. 79, Mar. 1961, p. 90-93.

In the fabrication of winged re-entry vehicles, engineers must apply revolutionary concepts to meet severe material requirements. (T24e, L-general, 17-57; SGA-h, EG-d)

65-T. Design and Manufacture of Reactor Vessels. D. K. Davies. Metal Progress, v. 79, Mar. 1961, p. 101-105.

Difficulties arise from ignorance about radiation damage to steel and welds from laminations and inhomogeneities in the plate, from lack of standardized test and inspection methods and from limited experience with operating reactors. (T11, T26q)

66-T. Trends in Materials for Reactor Control Rods. J. B. Giacobbe. Metal Progress, v. 79, Mar. 1961, p. 105-107.

Rods made from a Cd-In-Ag alloy and a stainless steel containing boron are being investigated in commercial

reactors. Rare earths also look promising. (T11j, 17-57; Hf, Ag-b, Cd, In, SS, EG-g)

67-T. Materials and Fabrication Methods for the Bomarc. R. H. Nelson. Metal Progress, v. 79, Mar. 1961, p. 107-114.

Backbone of the Bomarc is a series of tanks made from stainless steel and Al alloys. Ti spars support the control surfaces and the tail assembly is covered with a Mg alloy skin. (T24e; SS, Al, Ti, Mg)

68-T. Thin-Race Bearings. H. Alan Duguid. Machine Design, v. 33, Mar. 2, 1961, p. 87-92.

High precision, low friction bearings produced from 52100 alloy steel and stainless steels. (T7d; AY, SS, 17-57)

69-T. Spiroid Gearing. Pt. 2. Durability, Strength and Efficiency. Woodrow D. Nelson. Machine Design, v. 33, Mar. 2, 1961, p. 93-100.

Calculation of failure criteria for steel, Al, bronze and nickel bronze spiroid gearing. (T7a; Al, Cu-b, Ni, 17-57)

70-T. Pearlitic Malleable Iron. Machinery (London), v. 98, Feb. 8, 1961, p. 315-318.

Production of various motor components such as gears, clutch hubs, rocker arms and crankshafts from pearlitic malleable iron. Selective hardening of these components by heat treatment and quenching. Hardness, wear and bearing properties of the hardened parts. (T7, Q29n, Q9; CI-s, 17-57)

71-T. Metallurgy in Nuclear Power Technology. J. C. Wright. Metal Treatment, v. 28, Feb. 1961, p. 77-82.

Comparison of Al, Be, stainless steel and Zr as matrix elements for reactors. Preparation of internally restrained fuel elements by fusion or powder methods. (T11g; Al, Be, SS, Zr, 17-57)

72-T. Special Metals and the Rare Earths. Stephen Yih. Mining Congress Journal, v. 47, Feb. 1961, p. 92-94, 97.

Applications of W, Mo, Ta, Ti, Cb, Zr, Hf, W, B, Be, Hf, Eu, Gd and Sn in the electronics industry, nuclear reactor technology, missiles and space vehicles. (T1, T11, T24; EG-d37, EG-g, 17-57)

73-T. The Aluminum Engine--U. S. Developments. Light Metals, v. 24, Mar. 1961, p. 82-83.

Use of 303 Al alloy in cylinder blocks, generators and oil and water pumps to reduce corrosion, weight and machining time and increase tool life. (T21b; Al, 17-57)

74-T. (German.) Materials Used in the Pilot Atomic Power Plant "Kahl". E. Zastrow. Atomwirtschaft, v. 6, Jan. 1961, p. 66-72.

Chemical analysis, chemical corrosion resistance, mechanical properties, susceptibility to radiation defects and heat treatment of materials such as alloyed carbon steels with controlled Co content (plated with austenitic and stainless steel by rolling or welding, and nonplated); electrode material for welding; Zircalloy for fuel element coatings; and austenitic boron steel for control rods. (T11, Q-general, R-general, 2-60; ST, Zr-b, 17-57)

75-T. Aerospace Fasteners Use New Metals. J. L. Chinn. Materials in Design Engineering, v. 53, Mar. 1961, p. 110-113.

Advantages and limitations of Ti, Zr, Be and the refractory metals and their alloys as fastener materials. Data are given for mechanical and physical properties. (T7d, P-general, Q-general; Ti-b, Zr-b, Be-b, EG-d37, 17-57)

76-T. (Japanese.) Ceramic Tools. Hidehiko Takeyama. Japan Society of Mechanical Engineers, Journal, v. 63, Nov. 1960, p. 1427-1433.

Cermet and alumina tools are tested under working conditions on SNCM-8 Ni-Cr-Mo, SUS-2 13Cr stainless, S55C and S40C carbon, AISIC-1015, 1050, 1045 and 4615, SAE-1050, 4340 and 5135 steel, FC-27 cast iron and Ti to determine chipping and abrasion characteristics and tool life. (T6n, G17; ST, CI, Ti, 6-70, 17-52)

77-T. Fastening Aluminum. Pt. 3. How to Specify and Use Threaded Fasteners. F. L. Church. Modern Metals, v. 17, Mar. 1961, p. 62-82.

Dimensions, tolerances, corrosion resistance and mechanical properties of 2024-T4 Al alloy fasteners. Specifications for drilling and tapping holes of proper size in Al plate and shapes. Calculation of proper torque for assembly with electric and pneumatic drivers. (T7f, S22; Al-b)

78-T. Flexible Metal Tapes for High-Speed Mechanisms. Charles B. Hebeler. Product Engineering, v. 32, Feb. 20, 1961, p. 65-69.

Metal tapes for operating precision drive mechanisms from a remote source offer high strength-weight ratio and good fatigue properties. Design curves are given for tapes made of a new Co-Ni-Cr-Mo steel alloy containing 42.5% Co. (T-general, P-general, Q-general; Fe-b, Co, 17-51, 17-57)

79-T. Which Hose for High-Pressure Systems? John Lozzi. Product Engineering, v. 32, Feb. 20, 1961, p. 70-71.

Design criteria for selection of metals such as brass and stainless steel, fluorocarbon plastics and rubber for high and low temperature application and compatibility with various fluids as hose materials in high pressure systems. (T26r, 3-74, 17-51; SS, Cu-n, NM-d, 17-57)

80-T. High-Strength Steels for the Missile Industry. H. T. Sumsion, Editor. 276 p. 1961. American Society for Metals, Metals Park, Novelty, Ohio. $12.

Proceedings of the Golden Gate Metals Conference sponsored by the Golden Gate Chapter of the ASM, Feb. 4-6, 1960, San Fransico, Calif. Papers abstracted separately. (T24e; ST)

81-T. Materials and Fabricating Problems Associated With High-Strength Lightweight Homogeneous Pressure Vessels. L. J. Gilbert and J. A. Brown. Paper from "High-Strength Steels for the Missile Industry". American Society for Metals, Novelty, Ohio, 1961, p. 3-39.

Problems of homogeneous pressure vessel fabrication utilizing high-strength steels are discussed relative to the basic materials and the sequence of manufacturing operations. The unacceptable notch sensitivity of available commercial steels when heat treated to 210 ksi. yield strength or higher is considered with reference to and coordinated with microstructure, composition, heat treatment and processing variables. (T26q; ST)

82-T. Fabrication Techniques Applicable to Rocket Motor Cases. John H. Peters. Paper from "High-Strength Steels for the Missile Industry". American Society for Metals, Novelty, Ohio, 1961, p. 185-200.

Experience in the manufacture of dependable efficient flight-propulsion devices and its application to rocket motor case fabrication. (T2p)

83-T. A New Ultra-High-Strength Steel for High Performance Rocket Motor Cases. G. K. Bhat. Paper from "High-Strength Steels for the Missile Industry". American Society for Metals, Novelty, Ohio, 1961, p. 153-253.

Development of a new steel, based on experience derived from testing AISI 4137 and medium alloy H-11 steels. The developed steel is suitable in terms of good fabrication qualities characteristic of AISI 4100 steels, improved weldability, necessary hardenability, good bi-axial strength capability, including relative insensitivity to notch brittleness, and good reproducibility of results on vessels of all sizes including a 4 1/2 ft. diameter flight design test chamber. (T2p; ST, 17-57)

84-T. Producing Powder Metallurgy Parts. P. V. Schneider. Tool and Manufacturing Engineer, v. 46, Apr. 1961, p. 81-86.

Design, production and tool and die application of metal parts fabricated by powder metallurgy techniques. Cost, tolerance and factors affecting physical properties are compared with parts made from wrought materials. (T6n; 6-72, 17-57)

85-T. Beryllium Bolts Gain Strength. Iron Age, v. 187, Apr. 6, 1961, p. 107.

Chemical finishes and rolled threads are used to improve transverse ductility, fatigue resistance and shear strength of light weight Be bolts used in aircraft structures. (T7f, Q-general, T21, 17-57; Be)

86-T. Sapphire Whiskers for Safer Re-Entry. Missiles and Rockets, v. 8, Apr. 10, 1961, p. 36.

Formation of a composite having a high strength-to-weight ratio at 2000° F.

by impregnating molten Al with pure sapphire whiskers in a vacuum as by bonding the whiskers with powder Al by heating. Application as heat protective material on missiles. (T24e, 17-57; Al-b, NM-e, 7-59)

87-T. Light Metals, Sometimes Exotic Ones, Send Man Way Out. Ralph Gillespie. Detroit Engineering, v. 25, Apr. 1961, p. 25-27.

Mo, Be, Zr, Ti, W, Ta, Cb, Rene 41, Astroloy, Mg alloys and Al alloys having good thermal resistivity and emissivity are used to produce structures with an excellant strength to weight ratio. Applications in missiles, rockets and other space craft. (T24e, Q-general; SGB-a, EGA-39, EG-d37, SGA-h, 17-57)

88-T. Republic Tests Seals for 1000° F. Hydraulics. Salvatore Cannizzaro. Space Aeronautics, v. 35, Apr. 1961, p. 103-104, 106, 108, 110.

Composite metallic seals for use in hydraulic systems having an ambient temperature of 1200° F. and a liquid temperature of 1000° F. are developed using Ag impregnated Mo, 430 stainless steel filled with 84Ag-16In brazing alloy, Nu Die V and Rex AAA toolsteels and Haynes Stellite. (T4c, Mo-b, SS, TS, 7-59, 17-57)

89-T. Boilers and Heat Exchanger. Pipes and Pipelines, v. 6, Mar. 1961, p. 37-44.

Fabrication, composition, corrosion properties and application of ferrous and nonferrous materials for use in condenser tubes of boilers and heat exchangers. Design of boilers and heat exchangers and heat transfer characteristics of condenser tubes. Fabrication, composition and corrosion properties of ferrous and nonferrous materials of construction. (T26q)

90-T. Definitely "In"--Magnesium Tooling Plate. Tooling & Production, v. 27, Apr. 1961, p. 51-53.

Mg tooling plate is fabricated into aircraft and missile parts, assembly jigs and fixtures, molds, layout tables and hydropress form blocks. Excellent dimensional stability, welding efficiency of 95%, light weight and the ability to dampen vibration are attributed to the material. (T-general, Q-general, 17-57; Mg-b, 4-53)

91-T. Design of Powder-Metal Bearings. E. T. Johnson. Machine Design Reference Manual (The Bearings Book), 1961, p. 119-124.

Dimensions, clearance, tolerance, chamfer, parallelism and density for sleeve, flange and thrust powder-metal bearings made from bronze, Al and Fe. Consideration of thermal expansion coefficient and elastic modulus. Principles of lubrication by oil impregnation. (T7d, P11k, Q21, 17-51, 18-73; Al-b, Fe-b, Cu-s, 6-72)

92-T. Design of Strip-Type Bearings. E. Crankshaw. Machine Design Reference Manual (The Bearings Book), 1961, p. 112-118.

Lining thickness, tolerance, chamfer, size, lubrication groove shape for strip-type, thrust, bushing and split bearings made from Al, bronze and steel. (T7d, 17-51; SGA-b, Al, Cu-s, ST, 17-57)

93-T. Design of Cast Bearings. W. F. Carenbauer. Machine Design Reference Manual (The Bearings Book), 1961, p. 105-111.

Consideration of size, shape, tolerance, concentricity, squareness, parallelism and pressure distribution in bearings cast from bronze, Al, babbitt, cast iron and steel. (T7d, 17-51; SGA-b, Al-b, Cu-s, CI, ST, 17-57)

94-T. Selection of Bearing Type. H. Belanger. Machine Design Reference Manual (The Bearings Book), 1961, p. 31-39.

Consideration of radial load, thrust load, rotational speed, environmental conditions, mechanical requirements and cost. Data are given for operating temperature limits in bearings of 52100 steel, M1 and M10 toolsteel, 4260 steel and 440 C stainless steel, with boundary dimensions and tolerances. (T7d, 17-51; SGA-c, ST, SS, TS, 17-57)

95-T. (Pamphlet.) Nuclear Fuel Element Development. R. Carson Dalzell. H. W. Gillett Memorial Lecture, American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. 1960, 14 p.

Review of materials problem in fuel element and nuclear design, including effect of irradiation on Be, Zr, Al, Cb, Yt, Cr and austenitic stainless steel when used as materials for fuel elements and cooling system; on H_2O, D_2O, Na,

NaK, Pb, Bi, Li-7, metal fluorides, metal hydroxides, terphenyl, fuel oil and other organic liquids used as coolants. (T11, 2-67, 17-51; ST, EG-a38, NM, 17-57)

96-T. High Temperature Materials for Rocket Reactors. Donald P. MacMillian. Nucleonics, v. 19, Apr. 1961, p. 85-88.

Neutron absorption, mechanical properties and compatibility of refractory metals, ceramics and graphite as affected by high stress, temperature and radiation conditions. 4 ref. (T2p; EG-d37, 17-57)

97-T. Stress-Relieved Aluminum Alloy Plate for Aircraft. A. J. Clark, A. R. Martin and L. E. Steele. Metallurgia, v. 63, Feb. 1961, p. 55-64.

Production of large thick plates in strong Al alloys for use in construction of integrally stiffened aircraft parts. Components are machined from solid plate rather than die forgings. (T24; Al-b, 4-53, 17-57)

98-T. One-Gage-Up Rule for Magnesium Saves Structural Weight. E. H. Schuette and R. B. Clapper, Space Aeronautics, v. 34, Dec. 1960, p. 61, 64, 66.

Optimum selection of sheet gage thickness for substitution of Mg for Al in aerospace vehicles to gain weight reduction without sacrifice of structural strength. Fatigue test comparison of 2024-T3 Al and AZ31B-H24Mg alloys. (T24e, Q7; Mg-b, Al-b, 17-51, 17-57)

99-T. How to Choose Lead Linings for Process Vessels. Robert L. Ziegfeld. Chemical Engineering, v. 68, Jan. 23, 1961, p. 164-169.

Selection of fabrication technique and materials for lining reaction and storage vessels containing corrosive materials with Pb. Data are given for reactivity of Pb with nitric, sulphuric and hydrochloric acid; resistance to thermal and physical shock, corrosion and erosion, pressure and temperature and fabrication by loose sheet, bonding to metal and brick and caging methods. (T29, F-general, P-general, Q-general; Pb, 17-57)

100-T. Stainless Foils Corrosion. Steel, v. 148, Apr. 24, 1961, p. 130-131.

Stainless foil is used to form molds for encapsulation of electric motors with epoxy resin. The foil remains in the resin to provide additional corrosion resistance. (T1; SS, 17-57)

101-T. Cast Stainless SO_2 Headers Hike Service Life Over Cast Iron Parts. Western Metalworking, v. 19, Apr. 1961, p. 29-30.

Utilization of HH stainless alloy, containing 25% Cr and 12% Ni, cast pipelines in header assemblies for transporting corrosive SO_2 at 1800-2280° F. in a sulphite pulping process. (T29r, R7k; SS, 5, 17-57)

102-T. Magnesium Alloy Cylinder Blocks. G. FitzGerald-Lee. Mechanical World and Engineering Record, Apr. 1961, p. 122-123.

Various Mg alloys are considered for use as castings in cylinder blocks. Alloys ZRE1 and MCZ (containing Zr and rare earth metals) show good retention of strength up to 200-250° C., alloy ZT1 (containing Zr and Th) up to 250-350° C. Other properties examined are thermal expansion, wear resistance, machinability, fluidity, fatigue and pressure die castability. (T21b; Mg-b, 17-57)

103-T. (Italian.) Industrial Furnaces. Pt. 5. Materials. Italo Montevecchi. Rivista di Meccanica, v. 11, Nov. 7, 1960, p. 41-49.

Electrical resistivity of Ni-Cr-Fe and Cr-Al-Fe alloys used as heating elements measured at 100-1300° C. Values are given for heat irradiated by surface unit for the same temperature range. (T1p, P15g, 2-61; SGA-q, Fe-b)

104-T. (Italian.) Spheroid Graphite Cast Iron in Equipment for Transporting Fluids. K. H. Kirgin. Nickel, Oct. 1960, p. 14-19.

Application of spheroid graphite cast iron in oil refineries, in gas and water handling, marine equipment and in the chemical industry. Specifications for pressure vessels and castings for low-temperature conditions. 12 ref. (T26s, T26q; CI-r, 17-57)

105-T. Thin Film Anodic Aluminum Oxide Insulation on Round and Flat Wire. Henry Walker. Wire and Wire Products, v. 36, Apr. 1961, p. 462, 514-515.

Characteristics of anodic Al oxide insulation. Advantages of anodic coated

Al wire for use in various electrical devices. (T1; Al, 4-61, 8-73, 17-57)

106-T. Stainless Steel for Motor Car Trim. Product Finishing, v. 14, Apr. 1961, p. 72-75.

Use of austenitic and ferritic stainless steel as decorative trim for automobiles. Fabrication, polishing and maintenance of trim. (T21a; SS, 17-57)

107-T. Integrally Cast Stainless Alloy Fittings for Furnace Tubes Resist Corrosion in Petroleum Processing. Industrial Heating, v. 28, Mar. 1961, p. 529, 532.

Header bodies of complex design serve as return bends of petroleum cracking furnaces to control oil flow at high temperatures and pressures. Both composition of the alloy and design of the header body contribute to total corrosion resistance. (T29n, R7a; SS, 5, 17-57)

108-T. Die-Casting the Aluminum Slant Six Engine. E. G. Moeller, W. L. Weertman and H. E. Eriksen. SAE Journal, v. 69, May 1961, p. 58-59.

SAE no. 303 die casting Al alloy containing Cu (3-4.5%) and Si (10.5-12%) is used in the production of automobile engine blocks. The casting provides low weight, high fatigue strength (10,000 psi.), good production quality and castability. (T21b; Al-b, 5-61)

109-T. Development in Aluminum Sheet Space Structures. Z. S. Makowski. Light Metals, v. 24, Apr. 1961, p. 110-113.

Stressed skin sheet space-grid technique is used to fabricate pyramids with square, pentagonal or hexagonal bases out of identical three dimensional units constructed in thin Al sheets. Testing shows high rigidity, strength, thermal and acoustic properties. (T26; Al, 4-53, 4-57, 17-57)

110-T. Titanium Fabrication for the North American Vigilante. Crucible Titanium Review, v. 9, Mar. 1961, 8 p.

Applications of Ti and its alloys in the Mercury rocket capsule. Heat treatment and machining techniques. (T2p; Ti-b, 17-57)

111-T. Materials of Construction for Chemical Plant. J. C. Bailey. Chemical & Process Engineering, v. 42, Mar. 1961, p. 137-143.

Review of composition, properties, production, economics and applications of Al-base materials for chemical engineering plants and equipment. 7 ref. (T29; Al-b, 17-57)

112-T. Pearlitic Moves On and Up. Tooling & Production, v. 27, May 1961, p. 99.

Casting of crankshafts, torsion bars, gears, hardware and shotgun frames from pearlitic malleable Fe. (T7; CI-s, 17-57)

113-T. Steels and Aircraft Engineering. A. J. Kennedy and A. R. Sollars. Aircraft Engineering, v. 33, Apr. 1961, p. 94-99.

Applications of various types of steel in conventional and supersonic aircraft and in rocket motor cases. Composition, corrosion resistance, machinability, mechanical and thermal properties of 420, 422, AM350, AM355, 17-7PH, Tricent and Thermold steels. 11 ref. (T24; ST, 17-57)

114-T. Job Shop Makes Millions. R. O. Bailey. Production, v. 47, May 1961, p. 50-53.

Production of springs by forming, heat treating and grinding of low-carbon steel, stainless steel, Inconel X and brass. Measurements of free length, compression force and electrical resistance. (T7c; CN, Cu-n, Ni-b, SS, 17-57)

115-T. New Applications Spur Malleable Iron Industry. Jack Schaum. Modern Castings, v. 39, Mar. 1961, p. 46-49.

Growing use of pearlitic malleable Fe in automobile and ordnance components because of the materials' high strength per unit cost as a result of technology development in cast iron production and improvement of mechanical properties by alloying and structural control, and design and stress analysis of castings. (T2, T21, Q-general; CI-s, 17-57)

116-T. Sintered Iron Piston Rings. Robert Talmage. Metal Progress, v. 79, May 1961, p. 89-90.

Sintered Fe rings are stronger and more wear resistant than cast iron rings and in addition are self lubricating. They have a cleaner, more uniform microstructure and can be produced at lower cost. (T7, 17-57; Fe, 6-72)

117-T. Reactor Steels. Nuclear Energy, Feb. 1961, p. 76.

Review of papers presented at the British Nuclear Energy Conference covering factors influencing the steel selection, fabrication aspects and corrosion, high temperature, creep and irradiation properties in nuclear reactors and pressure vessels. Steels considered include Affreeze III, Esshete CML, a low-carbon high Mn alloy, a multiple alloy, low-carbon steel and a multiple alloy high-tensile steel. (T11, Q-general, 2-62, 2-67, 10-54; AY, 17-57)

118-T. Some Notes on the Design of Chemical Equipment in Aluminium. E. F. Boon and F. C. A. A. van Berkel. British Welding Journal, v. 8, May 1961, p. 237-244.

Properties of Al as a material of construction for chemical equipment are compared with those of steel, using various parameters; price parameter for strength, price parameter for stability, thermal stress parameters and the strength/density parameter. Design rules for flat Al gaskets and a design study of an Al tank. 15 ref. (T29; Al, 17-57)

119-T. Pressure Vessel Design Requirements in the Future. W. B. Carlson. Engineer, v. 211, Apr. 21, 1961, p. 624-628.

Specifications given for ultimate tensile strength, proof, rupture and creep stresses, safety factor and design stress of pressure vessels. (T26q, 17-51)

120-T. Heat Sinks: Materials. Maureen Pearcy. Lockheed Aircraft Corp. U. S. Office of Technical Services, PB 171372, Aug. 1960, 29 p. $1.

Thermal conductivities of materials to be incorporated in space and re-entry vehicles. (T24e)

121-T. Steel-Like Valves at Near-Iron Prices. Dale Aunspach. ISA Journal, v. 8, May 1961, p. 52-55.

Evaluation of ferritic nodular iron as a substitute for steel in the fabrication of control valve bodies. Analysis of comparative compositions and physical and mechanical properties, including tensile, fatigue, impact, corrosion resistance, machinability and thermal characteristics. (T7b, P-general, Q-general; CI-r, ST, 17-57)

122-T. Pressure-Tight Aluminum Housings. Fred Dunlap. Materials in Design Engineering, v. 53, May 1961, p. 126-127.

Al housings for electronic equipment can now be made, without impregnation, by casting in permeable plaster molds. (T1; Al, 17-57)

123-T. Materials Met Test all the Way--as Expected. Missiles and Rockets, v. 8, May 15, 1961, p. 21.

Applications of structural and protective metals including Be, Ti, steel and Ni-Co alloys in space capsule. Fusion welded Ti components provide weld strengths exceeding base metal strengths. (T24e; Be, Ni-b, Co, ST, Ti, 17-57)

124-T. The New Developments in Bearing and Gear Lubrication. Nicholas P. Chironis. Product Engineering, v. 32, May 15, 1961, p. 98-100.

Survey covering air, sleeve and rolling-contact bearings, improved lubricants and lubrication techniques, wear equations, design charts, performance data and testing methods. Topics include stepped air bearing design, applications of PTFE fabric-lined bearings, properties of silicone lubricants and fire resistant fluids; wear evaluation for ball bearing steels and equations for computing film thickness in gears and bearings. (T7a, T7d, Q9, 18-73; SGA-c, NM-h, 17-51)

125-T. (Italian.) Nickel Alloys in Instrumentation and Electronics. Nickel, Oct. 1960, p. 1-11.

Applications of high permeability, square hysteresis loop, temperature compensation and constant elastic modulus alloys. 4 ref. (T1; Ni-b, SGA-n, 17-57)

126-T. Ball and Roller Bearings. Pt. 3. Power Transmission, v. 30, May 1961, p. 280-285.

Forming, grinding and polishing ball and roller bearings made of heat treated chromium steel. Data given for bore and width deviation, I.S.A. running tolerances and over-all diameter deviation. (T7d; ST, Cr, 17-57)

127-T. Cut Tool Life and Boost Savings? Richard D. Zimmerman. American Machinist/Metalworking Manufacturing, v. 105, May 15, 1961, p. 127-129.

Comparison of tool life, machining speed and cutting efficiency of single-point brazed tooling and disposable cemented-carbide inserts in cutting tests

on stainless and toolsteels and superalloys. (T6n, G17; ST, SGA-h, 6-69, 14-68, 17-57)

128-T. Tableting With Tungsten Steel Tools. American Machinist/Metalworking Manufacturing, v. 105, May 15, 1961, p. 146-147.

Application of Hi Wear 64, a 4% tungsten tool and die steel with nondeforming tendencies, low-hardening temperature and deep hardenability in tableting punch holders for fabrication of tiny magnetic cores. Increase in wear life is compared above Carpenter K-W toolsteels. (T6r, Q9, 2-60; TS, 17-57)

129-T. Metallurgy in Nuclear Power Technology. Pt. 8. Coolant and Containment Problems in Reactors. J. C. Wright Metal Treatment and Drop Forging, v. 28, May 1961, p. 204-210.

Survey of properties and applications of liquid metals and gases in nuclear reactors with attention to metallurgical problems arising from their use. Topics include compatability, mass transfer effects, inhibition of liquid metal attack, coolant gas problems, corrosion of steel in gas-cooled reactors and in high-temperature water systems and brittle fracture of pressure vessels. Liquid metals discussed include Na, Na-K, Bi, Pb, Li and eutectic Pb-Bi. (T11, Q26s, R6m; ST, Bi-b, Li, Na-b, Pb-b, Hg, 14-60, 17-57)

130-T. Aluminum Exchanger and Condenser Tubes in Petroleum Service. R. L. Hilderbrand. Paper from "Proceedings--American Petroleum Institute". Section 3. v. 40. American Petroleum Institute, New York 20, 1960, p. 118-130.

Report on tube failures occurring from both the water and hydrocarbon sides during service in refinery equipment. Maximum temperature limitations and chloride concentrations are suggested. 7 ref. (T29n, R7g; Al, 17-57)

131-T. Stainless Steel in Petroleum Refining and Petrochemical Processes. A. V. Alessandria and Norton Jaggard. Paper from "Proceedings--American Petroleum Institute". Section 3. v. 40. American Petroleum Institute, New York 20, 1960, p. 140-154.

Susceptibility to general and pitting attack, stress corrosion cracking, intergranular attack and embrittlement of stainless steels, especially AISI Type 300 grades. Case histories of failure are described for various kinds of petroleum and chemical process equipment. 15 ref. (T29n; SS, 17-57)

132-T. Low-Temperature Piping Materials for Petroleum Refineries. H. M. Howarth. Paper from "Proceedings--American Petroleum Institute". Section 3. v. 40. American Petroleum Institute, New York 20, 1960, p. 233-244.

Recommendations for piping materials to be used at -50 to -20° F., -150 to -50° F. and below -150° F. Fabricability, cost and availability of stainless and carbon steels, brass, Al and other materials. 14 ref. (T26; Al, CN, Cu-b, SS)

133-T. Which Milling Cutter? Carbide Versus High Speed Steel. James H. Meehan. Machine and Tool Blue Book, v. 56, June 1961, p. 141-142.

Review of factors affecting the choice between high-speed steel and carbide cutters including types of milling machines available, variety of materials used and quantities of similar parts involved. Cutting rates and conditions. (T6n; TS-m, 6-69, 17-57)

134-T. Take a Good Look at Ceramics. W. M. Wheildon. Machinery, v. 67, May 1961, p. 114-123.

Review of development, chemical and physical properties of ceramic cutting tools. Survey of tool geometry, cutting variables and techniques for machining carbon, high-strength alloy and high-hardness steels, cast iron, brass, Al alloys and nonmetallics. (T6n, G17; ST, CI, Cu-b, Al-b, NM-f, 17-57)

135-T. Spring Failures and Their Prevention. L. W. Flewin. Australian Institute of Metals, Journal, v. 6, Feb. 1961, p. 33-40.

Selection of spring materials according to application. Design factors for helical springs cold coiled from pretreated wire and coiled hot from annealed bars and for laminated and volute springs. Shot-peening and corrosion protection and their influence on the finished product. 16 ref. (T7c)

136-T. The Machining of Steel. F. C. Lea and Eric N. Simons. Edgar Allen News, v. 40, May 1961, p. 105-106.

A review of various types of cutting tools with attention to tool geometry, service life and applications of cemented carbide, high-speed steel and hard surfaced toolsteels in machining operations. Design and operation of milling cutters. (T6n, G17, 1-52, 17-57; ST)

137-T. Nuclear Experts Meet on West Coast. Report on the Winter Meeting of the American Nuclear Society, San Francisco, Dec. 1960. Metal Progress, v. 79, June 1960, p. 140, 144, 150, 152.

Brief summaries of paper presented covering metallurgy and fuel manufacture, corrosion of metals in molten U-Bi, reactor and fuel element engineering and radiation effects. (T11, 3-67)

138-T. Spring Strip Preparation and Spring Manufacture. S. C. Poulsen. Machinery (London), v. 98, Apr. 26, 1961, p. 947-951.

Production of coil springs from carbon steel, stainless steel or beryllium copper strip. Heat treatment and torque testing of finished springs. Corrosion resistance, surface finish and mechanical properties. (T7c, J-general, Q-general; CN, SS, Cu-b, 4-53, 17-57)

139-T. Lobed Pressure Vessels. Australasian Manufacturer, v. 46, May 6, 1961, p. 72-77, 79-80, 82-83, 85, 87.

Fabrication of pressure vessel lobes from stainless steel plate or 180° pipe bends in toroidal shapes. Assembly and welding techniques. Thermal and pressure testing of the models to determine bursting pressure, bending and membrane stresses. 6 ref. (T26q, 17-51; SS, 17-57)

140-T. Pitting of Gear Teeth. J.D. Graham. Chapter 7 from "Handbook of Mechanical Wear". University of Michigan, Ann Arbor, Mich., 1961, p. 131-154.

Nature of pitting failure in gears. Stress distribution in the region of contact of mating gear teeth. Influence of subsurface fatigue, surface cracks, surface flow tooth accuracy, surface finish, pressure angle, tooth profile, coatings, lubrication and metallurgical properties on pitting. 11 ref. (T7a, 9-71)

141-T. A Profile of Aluminum Alloy Cylinder Bores. N.W. Smith. SAE Paper no. 369D, 1961, p. 6 p.

Evaluation of die cast Al-Si alloys for durability in automotive and diesel engines. Comparison with cast iron Cr plated Mo sprayed materials in wear tests in four stroke cycle engines. Effect of Si content on wear and abrasion resistance and heat transfer. (T21b, Q9n, 2-60; Al-b, Si, 17-57)

142-T. Forgings in Missiles and Space Vehicles. Jose R. Canal and William C. Kunkler, Jr. Aircraft Production, v. 23, May 1961, p. 188-193.

Review of Be, Ni-base alloy, Ti-base alloy, refractory metal, superalloy, low alloy and stainless steel forgings for use in missile frames, rocket motors and nozzles. Data given for tensile and stress rupture properties at high temperatures and pressures. (T2p, T24e, Q-general, 2-62; ST, Be, Ni-b, Ti-b, SGA-h, 4-51, 17-57)

143-T. Influence of Cutting Edge Sharpness on Tool Behavior. J. Simonet and E. Bodart. Microtechnic, v. 15, Apr. 1961, p. 44-46.

Tool behavior and life as affected by cutting edge sharpness. Definition, measurement and production of cutting edges and tool life tests by normalizing C55 steel (SAE 1055) and subjecting it to machining with various tool angles and at different cutting speeds. (T6n, G17, 1-54, 17-51; ST)

144-T. Survey of Materials for High-Temperature Bearing and Sliding Applications. M. F. Amateau, D. W. Nicholson and W. A. Glaeser. Defense Metals Information Center, Battelle Memorial Institute, DMIC Memo. 106, May 12, 1961, 67 p. (Available as PB 171625 from U. S. Office of Technical Services, Washington 25, D. C.)

Wear and friction data for refractory metals, superalloys, cermets, ceramics and graphite. For rolling contact conditions, cemented carbides and Co-base superalloys appear promising to at least 1300° F. For sliding conditions, the selection of materials is wider including Ni-base and Co-base superalloys, cemented carbides, some cermets and a few pure ceramics. Most of these materials have some merit for use to 1500° F. 118 ref. (T7d; EG-d37, SGA-h, 17-57)

145-T. Anodised Aluminium Foil and Strip in Electrical Windings. P. J. Brandon.

Current Engineering Practice, v. 3, Mar. 1961, p. 33-34.

An oxide layer 10-15 microns thick, serving as an electrical insulator, is produced by anodizing Al strip or foil which is subsequently used for lightweight coil having a volume equal to or less than that of an equivalent coil wound with Cu and the necessary insulation. The reduced insulation thickness of Al coils provides excellent heat transfer characteristics, thus avoiding "hot spots". The coil can be used at temperatures up to the melting point of Al. Anodized strips can be joined by cold pressure welding or by soldering. (T1; Al, 4-53, 4-56, 8-73, 17-53)

146-T. Materials Problems in Stationary and Mobile Power Reactors. U. M. Staebler. Metals Engineering Quarterly, v. 1, May 1961, p. 112-123.

Evaluation of various metals for use as structural, moderator, control, fuel, cladding and coolant materials in nuclear reactors. Includes stainless steels, Cb, Mo, graphite, cermets, Zr alloys and other materials. (T11; Cb, Mo, SS, Zr-b)

147-T. Filament-Wound Pressure Vessels. Richard Gorcey. Machine Design, v. 33, June 22, 1961, p. 178, 180, 183, 184.

Techniques for circumferential, helical and sequential filament winding using high-strength steel wire or glass filaments as reinforcing material and an epoxy resin binder. Density, tensile and yield strengths, modulus of elasticity and elongation properties in comparing the filaments with Ti and steel as pressure vessel materials. (T26q; ST, SGB-a, 4-61, NM-f32)

148-T. Zinc Die Castings Foil Yeggs. Precision Metal Molding, v. 19, June 1961, p. 34-36.

Design and production of die cast Zn components for a universal vault lock using unit dies. Survey of finishing and plating operations. (T6s, 17-51; Zn, 5-61, 17-57)

149-T. Better Motor Cases for Missiles. Pt. 1. Improved Designs. John Cunningham. Metal Progress, v. 80, July 1961, p. 97-100.

Solid-propellant motor cases can be made more reliable by such improvements as matching deflections of cylinder and end closures, using unsymmetrical bosses for reinforcing holes in domes and employing spline joints for attaching nozzles. A method for applying uniaxial tensile data to bi-axial design problems has also been helpful. (T24e, 17-51, Q27, Q25)

150-T. Better Motor Cases for Missiles. Pt. 2. More Accurate Tests. Guy V. Bennett. Metal Progress, v. 80, July 1961, p. 101-105.

Test results from a new partial-crack tensile specimen correlate with behavior of pressure vessels containing similar cracks. Further refinements are expected to produce quantitative data which can be used in designing reliable lightweight motor cases. (T24e, 17-57, Q27, 1-54, Q26)

151-T. Better Motor Cases for Missiles. Pt. 3. Advanced Fabrication Methods. R. E. Heise. Metal Progress, v. 80, July 1961, p. 105-107.

Rigid specifications on incoming material and meticulous quality control throughout production enable Douglas Aircraft to turn out solid-propellant motor cases which consistently meet proof stresses of 235,000 psi. They are made of AISI 4340 sheet by the conventional roll-and-weld process. (T24e, Q26, K-general, J-general; AY)

152-T. The Success Story of Volkswagen. William G. Gude. Foundry, v. 89, July 1961, p. 56-61.

Production methods and equipment used in casting of Al, Mg, gray iron and Zn automobile components. (T21, E-general; Al, CI-n, Mg, Zn, 17-57)

153-T. HH Alloy Castings Out-Perform High-Chromium Iron 7 to 1. Inco Nickel Topics, v. 14, Apr. 1961, p. 4.

Gas line service sulphur dioxide headers of nickel stainless steel and iron-chromium steel alloys are used for transporting high temperature (2280° F.) SO_2 and compared for service life. (R6p, 2-62, T26r; SS, Ni, AY, Cr, 17-57)

154-T. Stainless Filter Tames Corrosion. Welding Design & Fabrication, v. 34, Apr. 1961, p. 59.

Fabrication of heat, corrosion and pressure resistant stainless steel filters used for chemical processing of acids, salts and other contaminants. (T29, P11h, R6; SS, 17-57)

155-T. Pressure Vessel Design Requirements in the Future. W. B. Carlson. Welding Journal, v. 40, June 1961, p. 265s-271s.

Summary of papers sponsored by Pressure Vessels Commission of the IIW emphasizing rational design procedures for welded pressure vessels and proposing that the design stress be raised to values usable in idealized vessels under ideal conditions and be modified down as necessary. It is also proposed that the design stress concept be removed from codes and that vessels be designed against each contingency of failure in terms of mechanical and physical properties of materials. Application of design criteria to vessels of SA-201-A steel. (T26q, Q-general, 3-66; ST, 7-51, 17-51)

156-T. Pressure Vessel Analysis of Submarine Hulls. Edward Wenk, Jr. Welding Journal, v. 40, June 1961, p. 272s-288s.

Review of analysis of welded submarine pressure hulls in terms of pressure vessel design, in particular basic mechanics of yielding and failure under external hydrostatic pressure. Stress-strain relations, buckling phenomena, structural stability of vessels and mechanical properties of steels are considered in design of structure with minimum weight-high strength-high toughness characteristics. 54 ref. (T22, T26q, 3-66, 3-74; ST, 7-51, 17-51, 17-57)

157-T. Putting Magnesium Tooling to Work. Jack M. Hockett. Tool and Manufacturing Engineer, v. 47, July 1961, p. 53-56.

Use of Mg as a tooling material in the fabrication of aircraft components. Advantages include light weight, weldability, wear resistance and part interchangeability. (T6n, G17, T24; Mg, 17-57)

158-T. Refractories Look Best for Structures of Re-Entry Gliders. Edwin G. Czarnecki. Space/Aeronautics, v. 35, June 1961, p. 54-58.

Data on environmental factors of reentry for a winged orbital glider. Analysis of re-entry trajectories, heating rates, aerodynamic loading and structural geometry shows advantages of W, Ta, Cb or Mo for the primary structure of such a glider. Definition of limiting design parameters. 8 ref. (T24e, P11h, 3-73; W, Ta, Cb, Mo, 17-57)

159-T. Powder Metal Tubing Aids Nuclear Reactor Design. Western Metalworking, v. 19, June 1961, p. 54.

Finned Al tube impacts fabricated from Al powder metallurgy alloys containing uranium oxide fuel pellets are arranged in bundles of 25 within a jacket. Organic fluid flowing over the exterior of the tubes controls the atomic fission process in the uranium fuel contained in the impacts. (T11q; Al, 4-60, 6-72, 17-57)

160-T. The Use of Plutonium in Reactors. M. B. Waldron. Nuclear Power, v. 6, July 1961, p. 58-62.

Factors influencing the development of Pu fuels for power reactors. Survey of current reactor programs in the United Kingdom, U. S., Canada, France and Russia. Developments in alloy, ceramic and dispersion fuels. 12 ref. (T11g; Pu, 17-57)

161-T. Fuel and Fertile Materials. Reactor Core Materials, v. 4, May 1961, p. 1-16.

Review of recent work on fabrication, cladding and testing of U, Pu and metals, alloys and compounds. Density, hardness, expansion coefficient, strength, growth, corrosion and X-ray diffraction data. Irradiation effects, elastic moduli, heat capacities and Poisson's ratios. 77 ref. (T11g, L22, P-general, Q-general, 1-54; U, Pu, Th, 17-57)

162-T. (Book.) Nuclear Reactor Containment Buildings and Pressure Vessels. 1960. 572 p. Butterworths & Co. (Publishers) Ltd., 88 Kingsway, W. C. 2, London, England. $18.50.

Twenty-two papers and discussions devoted to the analysis and design of structures used in nuclear power plants representing the Proceedings of an International Symposium organized by the Dept. of Mechanical, Civil and Chemical Engineering of the Royal College of Science and Technology, Glasgow, Scotland, May 17-20, 1960. Papers abstracted separately. (T11, T26q, 10-54)

163-T. Aluminum Die Castings Make New Engines Lighter, Cool Running. F. L.

Church. Modern Metals, v. 17, June 1961, p. 36, 38, 40.

Use of Al die castings in the production of a 2-cylinder, 18-horsepower unit and a single-cylinder, 9-horsepower outboard marine engine. Crankcases of 380 Al-Cu-Si alloy provide good as-cast strength, fatigue strength and corrosion resistance. Construction and assembly details. (T22h, Q7, R-general; Al, 5-61, 17-57)

164-T. Mower Rides on Big, Multi-Purpose Permanent Mold Casting. Modern Metals, v. 17, June 1961, p. 50, 52.

Al-Cu-Si alloy casting serves as main vehicle frame, as well as foot-rest and fenders, cutter-blade housing and axle and steering column support. Casting eliminates corrosion and vibration damage. (T10k, R-general; Al-b, Cu, Si, 5-63, 17-67)

165-T. Refractory Metal Honeycombs for Space Vehicles. Fansteel Metallurgy, June 1961, p. 4.

Fabrication of Mo, Cb and Ta honeycomb for aircraft or missile component parts. Use of ceramic and plastic and metal honeycomb combinations. (T24e; Mo, Cb, Ta, 7-59, 17-57)

166-T. In Specifying Tools, Look After You Leap, Too! W. C. Nemity. Metalworking, v. 17, July 1961, p. 12-14.

Comparison of titanium carbide, tungsten carbide and ceramic insert tools with brazed tools in terms of edge life and temperature and shock resistance in machining mild steel, low-alloy steel, cast steel, cast iron and cast Al. (T6n, G17; CN, AY, CI, Al)

167-T. (Russian.) Cu-Mn-Sn Alloys Used in the Manufacture of Precision Rheostats. V. S. Mes'kin and L. A. Popova. Metallovedenie i Termicheskaya Obrabotka Metallov, Apr. 1961, p. 20-24.

Samples of ternary alloys containing 84.36-93.71% Cu, 4.41-12.87% Mn and 0-7.58% Sn and quaternary alloys composed of 88.46-89.31% Cu, 10.30-11.02% Mn, 0.30-0.34% Sn and 0.06-0.30% Si are tested for electrical resistivity and mechanical properties. Effect of Sn on the electrical resistance temperature coefficient. 7 ref. (T1p, P15g, 2-60, Q-general; Cu-b, Mn, Sn, Si, 17-57)

168-T. Sandwich Construction for Primary Structure of Ballistic Missiles and Space Vehicles. Ralph F. Foral. Aerospace Engineering, v. 20, July 1961, p. 24-25, 93-99.

Design consideration for use of sandwich construction in vehicles using liquid propellants including material and core configuration selection, joining methods, inspection, handling and repair. Examination of the behavior of a sandwich cylinder under axial compression, bending moment, shear, internal and external pressure and thermal gradients. 10 ref. (T2p, T24e, 2-62, 3-66, 3-74; 7-59, 17-57)

169-T. Benefits of High Modulus-High Density Boring-Bar Structures. W. L. Kennicott and J. J. Galimberti. American Society of Mechanical Engineers, Paper no. 61-PROD-13, 1961, 12 p.

Reduction in chatter, vibration and deflection, increase in damping rate and improvement of surface finish quality are achieved with cemented tungsten carbide boring bars. Applications in boring, grinding and grooving. 16 ref. (T6n, G17, G17d, G18)

170-T. New Carbide Put on Market. Steel, v. 149, July 31, 1961, p. 71.

Steel, stainless steel and cast iron parts are machined with titanium carbide tool to close tolerances with minimum tool adjustment and wear. Metal removal rate on 300 and 400 stainless steels is 30 cu. in. per min. (T6n, G17; ST, SS, CI)

171-T. Special Bearings Combat Heat. G. A. Widmeyer. Iron Age, v. 188, Aug. 3, 1961, p. 74-76.

Design and testing of stainless, tool and die steels and Co-base materials to determine operating temperatures and lubricating conditions when used as ball bearing screws in control rod drives for nuclear reactors. (T11g, 2-62; SGA-c, SS, TS, Co-b, 17-57)

172-T. (Book.) Reactor Handbook. 2nd Edition. v. 2. Fuel Reprocessing. S. M. Stoller and R. B. Richards, Editors. 1961. 665 p. Interscience Publishers, Inc., 250 Fifth Ave., New York 1, N. Y.

Survey of nuclear fuel processing, covering aqueous and nonaqueous procedures and including pyrometallurgy;

reconversions of nuclear products (U, Th and Pu); and gaseous, liquid and solid radioactive waste disposal; reprocessing and reconversion economics; and nuclear plant design, management and equipment. 992 ref. (T11g, A-general, C-general, 11-68; U, Th, Pu, 17-57)

173-T. (German-French.) Use of Copper for Organ Pipes. Rudolf Bruhin. Pro-Metal, v. 14, June 1961, p. 491-494.

Application of 0.4-2.2 mm. thick pickled and annealed Cu sheet in organ pipe construction. Data are given for microstructure, chemical composition and mechanical properties. (T9r, F26, Q-general; Cu, 4-53, 17-57)

174-T. (German-French.) Use of Brass and Bronze in Construction of Microswitches. Pro-Metal, v. 14, June 1961, p. 517.

Examples for microswitches of brass or beryllium bronze (380 v. and 10 amp.) having a lifetime of 10-50 million switching operations. (T1d; Cu-b, 17-57)

175-T. Aluminum Sheet Structure. L. S. Makowski. Light Metals, v. 24, July 1961, p. 194-196.

Description of prefabricated pyramids constructed from NS3 Al sheet for application in a space-frame roof of a membrane space structure. (T26; Al-b, 17-57)

176-T. Extrusions Strengthen Aluminum Highway Bridge. Modern Metals, v. 17, July 1961, p. 44.

Use of 6061-T6 Al alloy extrusions and stressed sheet as modules and supports in the construction of a highway bridge 28 ft. wide and 97 ft. long. (T26p; Al-b, 4-53, 4-58)

177-T. Aluminum Tops in Transmission Powers. H. K. Darby. Modern Metals, v. 17, July 1961, p. 68, 72-74.

Use of 6061-T6 Al alloy extrusions in the construction of electric power transmission towers. Assembly and erection details and design considerations. (T26, 17-51; Al-b, 4-58, 17-57)

178-T. (Italian.) Cast Iron or Aluminum? Fonderia, v. 10, June 1961, p. 263, 265, 267, 269.

Advantages and disadvantages of replacing cast iron with Al in casting engine blocks, gearboxes and crankcases. Economic considerations. (T21b, T21c; Al, CI, 17-57)

179-T. High Energy--Weight Ratio, Nickel Cadmium Cells. J. C. Duddy and A. J. Salkind. Electrochemical Society, Journal, v. 108, Aug. 1961, p. 717-719.

The active and conductive materials are dispersed in a microporous plastic structure. Cells with an energy density of 40 watt hour per kg. are constructed. (T1f, 17-57; Ni, Cd)

180-T. Niobium Solid Electrolytic Capacitors. N. Schwartz, M. Gresh and S. Karlik. Electrochemical Society, Journal, v. 108, Aug. 1961, p. 750-758.

Crystallization of the amorphous columbium oxide film is a determining factor in the failure of the capacitors above 20 v. at 85° C. Factors controlling the initiation of crystallization--purity, sintering conditions and anodization conditions--are correlated with initial and life test properties of the capacitors. 19 ref. (T1e, P15g, 2-60; Cb, 6-71)

181-T. Nucleonics in Flight. Metal Progress, v. 80, Aug. 1961, p. 132-144.

Report of a recent symposium sponsored by the North Texas section of the American Nuclear Society, Dallas, Texas, Mar. 1961, covering the manufacture of various fuel elements designed to be a part of reactors for nuclear powered aircraft and space vehicles. (T11g, T24)

182-T. This Is Good Die Casting Design. Precision Metal Molding, v. 19, July 1961, p. 30-31.

Shape, dimensional tolerances, assembly, insert sizing and positioning, finishability and weight considerations in the design of a Zn die cast egg beater. (T10c, 17-51; Zn, 5-61, 17-57)

183-T. Self-Fastening Extrusion Used for Sun Screen Frame. Precision Metal Molding, v. 19, July 1961, p. 34.

Anodized 6063-T6 Al alloy frame members are fastened by a saw-tooth edge on the corner post which forms an interference fit with the rail because the

edges are slightly larger than the extrusion openings. (T10c, K13q; Al-b, 4-58, 8-73, 17-57)

184-T. Better Lighting With Extruded Louvers. Precision Metal Molding, v. 19, July 1961, p. 40.

Extruded 6063-TS Al alloy parabolic louvers focus light downward thereby minimizing horizontal scatter. Louvers are anodized before assembly. (T10c; Al-b, 4-58, 8-73, 17-57)

185-T. Diamond Knife Becomes Precision Cutting Tool. Steel, v. 149, Aug. 7, 1961, p. 70.

Development of a 9/32 in. diamond knife ground to a radius equivalent to 12 carbon atoms. Tests show that the surface can be used for metallographic examination without polishing. Application to cutting of Pb, Sn, Bi, In, Ag, Zn, mild steel and stainless steel. (T6n, G17; Pb, Sn, Bi, In, Ag, Zn, CN, SS)

186-T. Convair 900--Investment Castings. Kenneth H. Pierce. Precision Metal Molding, v. 19, Aug. 1961, p. 28-30.

A 410 stainless steel casting heat treated to 200,000 psi. ultimate strength has application as a critical load-bearing part in the main landing gear unit for a jet aircraft. Fabrication of physical and mechanical properties of castings. (T24; SS, 5-62, 17-57)

187-T. Die Castings Seal Jet Liner Fuel Tanks. Precision Metal Molding, v. 19, Aug. 1961, p. 30-31.

Application of A360 Al alloy die castings having high corrosion resistance and surface finish for wing fuel access doors of a jet aircraft. (T24; Al-b, SGA-g, 5-61, 17-57)

188-T. B-70 Program Develops High Performance Materials. Precision Metal Molding, v. 19, Aug. 1961, p. 32-33.

Extrusion of PH 15-7 Mo stainless steel and other materials for applications in jet aircraft. Tests indicate the effect of cooling rate and annealing temperature on tensile properties. (T24; SS, 4-58, 17-57)

189-T. Extrusions and Casting Under High Stress. B-70 Gets 700 Shapes From 350 Extrusions. Scholer Bangs. Precision Metal Molding, v. 19, Aug. 1961, p. 23-25.

Extrusions of PH15-7Mo Cres steel and Ti are used to replace forgings, weldments, machined barstock and press-former sheet metal in many critical areas of a jet aircraft. (T24; ST, Ti, 4-58, 17-57)

190-T. Titanium Topples Tower Trouble. Union Carbide Metals Review, v. 4, Summer 1961, p. 26-28.

Use of Ti-lined sections and Ti trays in a distillation column used for separating crude organic chemicals. Tray and column fabrication and comparison of corrosion rates with several stainless steels, Hastelloy alloys, Cu, Monel, Nionel, Zr and Alloy 20. (T29m, R7; Ti, 17-57)

191-T. This Fabulous Foil. Aluminum Bulletin, Summer 1961, p. 1-15.

Applications of Al in package design. (T10a)

192-T. Some Properties of Rhenium and Rhenium Alloys Pertinent to Electron-Tube Applications. J. B. Baker and G. B. Gaines. Paper from "Advances in Electron Tube Techniques". Fifth U. S. National Conference, Proceedings (Sept. 1960). Pergamon Press Inc., New York 22, 1961, p. 6-9.

Work functions and emission characteristics of Re alloys containing Mo, W or both used as a base for oxide cathodes or as a constituent in dispenser cathodes. 7 ref. (T1j, P15, 2-60; Rh-b, 17-57)

193-T. Materials Limitation in High Mach Number Air-Breathing Engines. Pol Duwez. Paper from "Combustion and Propulsion". Fourth AGARD Colloquium. Pergamon Press Inc., New York 22, 1961, p. 347-361.

A review of critical materials problems in high mach number air-breathing machines. W, Mo, Ta and Cb in sheet form is used in the construction of a ramjet. Properties of these materials for porous wall cooling and ablating. (T24a, Q24a; EG-d37, W, Mo, Ta, Cb)

194-T. (German.) High-Alloy Steels in Nuclear Power Plants. Pt. 2. J.

Jagersberger. Atomwirtschaft, v. 6, May 1961, p. 283-288.

Composition and mechanical properties (at 20° C.) of quenched alloyed steels X 2 CrNi 189, X 5 CrNi 189, X 2 CrNiMo 1810, X 2 CrNiMo 1814, X 5 CrNiMo 1814, X 5 CrNiMo 1810, X 10 CrNiNb 189, X 10 CNMN 1810 and X 5 NiCrMoCuNb 2218. Behavior under conditions as prevailing in nuclear power plants including resistance to radiation and effect of annealing after raditaion, corrosion resistance (under radiation and to Na, Ca and Na-Ca alloys) and applicability as canning material and in reconditioning of cleavage-waste. (T11, Q-general, R-general, 2-67; AY, 17-57)

195-T. Artillery Shell Stopped by Aluminum. Ted Douglas. Canadian Metalworking, v. 24, Aug. 1961, p. 55-56.

Report of tests and developments in the automobile industry including impact strength of a 1 1/4 in. thick Al plate as measured by firing a 37 mm. shell at a weld; techniques for casting gray iron engine blocks; corrosion resistance of anodized Al parts; and development of a 4 ft. high mesh Al fence which is erected down the median strip of a highway to deflect glare from the lights of oncoming cars. (T21, E-general, Q7, R-general; Al, 4-53, 8-73, CI, 17-57)

196-T. Magnesium in the Volkswagen. Light Metals, v. 24, Aug. 1961, p. 221-224.

Use of Mg castings with special attention to die castings in automobile engine blocks and numerous other parts and fittings from 1945-1960. Comparison of casting methods for crankcases. (T21b, T21c; Mg, 5-61, 17-57)

197-T. (Italian.) Metallurgical Products of Common and Special Steels. Angelo Bellini. Rivista di Meccanica, v. 12, June 24, 1961, p. 35-41.

Types, characteristics, choice criteria and classification of various steels used in making pipes, nuts, bolts and valves for internal combustion engines. Oxidation, corrosion, heat and pressure resistance. (T7f, T21b, P11h, Q27a, R-general; ST, 4-60, 17-57)

198-T. Conveyor System Smooth Flow of In-Process Inventory. Iron Age, v. 188, Aug. 31, 1961, p. 92-94.

A materials handling conveyor system permits simultaneous mass production of 280 different varieties of tubular steel chair and table products. Bending, electrostatic painting, plating, cutting and punching and final assembly are included. (T10b, 1-52, 18-74)

199-T. (Japanese.) Studies on the Inspection Methods of Small-Sized Stainless Steel Tubes for Fuel Cladding. S. Mochizuki, T. Maekawa, M. Mizuta, S. Iwai, S. Maeda and A. Murakami. Atomic Energy Society of Japan, Journal, v. 3, July 1961, p. 30-39.

Methods are given for measuring efficiency, dimensions and integrity of AISI304L stainless steel cladding tubes. Outside and inside diameters are measured by an airmicrometer; material integrity is checked by eddy current instruments for nondestructive testing; pressure resistance is measured for internal and external pressure by hydrostatic testing at high temperature. (T11, S13h, Q10b, 1-53; SS, 4-60)

200-T. (Book.) Steels for Reactor Pressure Circuits. no. 69. 1961. 587 p. Iron and Steel Institute, 4 Grosvenor Gardens, London, SW 1, England.

Report of a symposium held in London on Nov. 30-Dec. 2, 1960, by the Iron and Steel Institute for the British Nuclear Energy Conference. Papers are abstracted separately. (T26q, T11, 11-64; ST)

201-T. Steel and Nuclear Power. Leonard Owen. Paper from "Steels for Reactor Circuits". no. 69. Iron and Steel Institute, London SW 1, England, 1961, p. 1-13.

The demand for steel by the United Kingdom Atomic Energy Authority in terms of requirements of reactor pressure vessels; the brittle fracture problem; and alternatives to mild steel plate. (T26q, T11, Q-general; ST, 4-53, 17-57)

202-T. Titanium Exchangers Defy Chlorine. Chemical Engineering, v. 68, July 24, 1961, p. 170-174.

Corrosion resistance and heat transfer properties of Ti lead to applications in chlorine cooling equipment, replacing glass and conserving both space and maintenance. (T29m; Ti)

203-T. (German.) Metal-Ceramic Ply-Coatings in Missile Engineering. E. Meckelburg. Metall, v. 15, Aug. 1961, p. 776-780.

Review of materials including Be, B, Cr, Co, Ir, Mo, Ni, Ta, Rh, Pt, W, Sn, V, Zr, BeO, Al_2O_3, Cr_3C_2, Cr_2O_3, MgO, $3Al_2O_3 \cdot 2SiO_2$, SiC, W_2C, TiC, Zr_2O_3, $SrSiO_4$; testing methods, properties (heat resistance to 2500° C. and resistance to erosion by hot gas jets) and production by metal and ceramics spraying for ply-coated materials used in missle construction. (T24e, K11b, L23; 6-70, 17-57)

204-T. Water Treatment for Corrosion Control of Aluminum in Low Temperature Nuclear Reactors. E. W. Jackson and H. F. Molineaux. Corrosion Prevention & Control, v. 8, Aug. 1961, p. 36-38, 54.

An ion exchange system is used to purify the reactor cooling water in low temperature nuclear reactors and thereby to prevent the corrosion of Al reactor parts. The design and operation of the ion exchange system is discussed in terms of corrosion resistance. 6 ref. (T11, R-general; Al)

205-T. Pockets Cut Electrolytically in Bluckets. Metalworking Production, v. 105, Aug. 16, 1961, p. 77.

Electrochemical machining is used to sink pockets in superalloy turbo fan blades made integrally with the buckets of the turbine. Use of an electrode contoured to shape of the cavity saves time and capital equipment cost as compared to use of profiling machines. (T24b, G24d; SGA-h)

206-T. Stainless Steel Powder Metallurgy Aids Camera Design. Metalworking Production, v. 105, Aug. 16, 1961, p. 60.

Sintered AISI type 316 stainless steel is coined to specifications with a tolerance of ± 0.001 in. Powder metallurgy allows fabrication of small, intricate shapes of corrosion resistant metal. (T9p, H15, H16n, 1-52, 17-57; SS)

207-T. (Russian.) Application of High-Strength Steel in Welded Metal Construction. N. P. Mel'nikov, L. I. Gladshtein and B. D. Malyshev. Avtomaticheskaya Svarka, v. 14, June 1961, p. 47-55.

Possibility of reducing weight in welded structures using high-strength steel. Use of special alloys, cold deformation, heat treatment or a combination of these methods to increase the strength of the steel. 10 ref. (T26, G23, J1, 2-60; ST, SGB-a, 7-51, 17-57)

208-T. Aluminium Motor Car Cylinder Blocks. Aluminium Courier, no. 54, June 1961, p. 18-22.

Survey of European and American Al alloy engine blocks and crankcases. Casting processes, alloy properties and economic considerations as compared to cast iron components. (T21b, T21c, E-general; Al-b, 17-57)

209-T. Recent Developments in Materials of Construction. T. R. Bott. British Chemical Engineering, v. 6, Sept. 1961, p. 617-620.

Discussion of the corrosion resistance of Ta, Ti, Zr, Be, Cb, Hf and wrought Ni-base alloys for use in chemical plants. Applications of plastics, fiber wound laminating techniques and high-temperature ceramics are outlined. (T29, R6, R7, 17-57; Ni-b, Ta, Ti, Zr, Be, Cb, Hf, SGA-g)

210-T. Recent British Technical Progress in Aeronautics. Pt. 1. Structural Design. A. F. Newell. Aircraft Engineering, v. 33, Sept. 1961, p. 248-250, 251-254.

High-strength ferritic and chromium-nickel steels require high strength fastening methods such as puddle welding in airplane applications. Technological parameters of design, materials selection and construction for honeycomb sandwich and corrugated structures. (T24a, K6, 17-51, 17-57; SS, SGB-a, 7-59)

211-T. The Importance of Wire in Spring Design. Hal McVey. Wire and Wire Products, v. 36, Sept. 1961, p. 1141-1191.

Diameter, cast and torsional stress and specifications are considered as factors in wire spring design. Torsional stress in compression and extension springs are investigated as a function of load application. (T7c, Q1, 3-73, 4-61)

212-T. Pressure Die Cast Aluminum Cylinder Blocks. Machinery (London), v. 99, Aug. 30, 1961, p. 511-518.

Review of the design and production of Al cylinder blocks having integrally cast iron liners. Die design and testing of centrifugally cast cylinder liners are discussed in several commercial applications. (T21b, 1-52; Al, CI, 5-61)

213-T. Welding Polaris Missiles by Hot Edge-Upsetting. R. D. Libert. Metalworking Production, v. 105, Aug. 23, 1961, p. 51-53.

Hot upsetting, rolling, scarfing, welding, stress relieving and inspecting by magnetic particle and X-ray methods of steel sheet expanded to form a 54-in. cylinder for the body of the Polaris missle chamber. (T24e, F21e, F23, J1a, K3s; ST, 4-53)

214-T. Trucks Out, Welded Pipe in for Chicago Plane Fueling. Welding Engineer, v. 46, Sept. 1961, p. 50-51.

Carbon steel pipe, 6-12 in. in diameter, is welded to form fueling network composed of storage tanks, 39 50,000-gal. satellite fuel tanks and "finger" disposal points. (T24d; CN, 4-60, 7-51)

215-T. U. S. Space Capsule--How It Was Welded. Welding Engineer, v. 46, Sept. 1961, p. 59.

Tig welding and resistance seam welding of Rene-41 Ni alloy and AMS-4901 Ti alloy sheet in production of capsule. (T24e, K1d, K3p; Ni-b, Ti-b, 4-53)

216-T. (German.) Experiences of the Uralchimmasch Works in the Use of Ply Metals in Construction of Chemical Apparatus. W. M. Makarow. Chemische Technik, v. 13, Apr. 1961, p. 220-223.

Fabrication methods such as cutting, straightening, rolling, stamping and electric welding of St. 3 steel plated with 1 Cr 18 Ni 9 Ti steel and St. 20 cobalt steel plated with Cr 18 Ni 12 Mo 2 Ti in the production of corrosion resistant chemical apparatus. (T29, 1-52, 17-57; ST, 8-66)

217-T. Annual Report for 1960 Metallurgy Division. Argonne National Laboratory. U.S, Office of Technical Services, ANL-6330, n.d. 273 p. $3.50.

Review of development and fabrication programs and reactor research with experimental boiling and boiling water reactors. Preparation and properties of materials, problems in metal physics and ceramic materials research. (T11)

218-T. Porous Metal Fillers: Application to Feed Materials Production. T. Shapiro and E. L. Halstead. Union Carbide Nuclear Co. U. S. Office of Technical Services, K-1479, 25 p. $.50.

Porous filter elements of 316 stainless steel and Inconel material far exceed the on-stream life of porous carbon tubes in filtering the UO_2 product from gaseous hydrogen-water vapor mixtures recycled through solid gas systems at the Feed Materials Plant, Oak Ridge, Tenn. (T29, 17-57; SS, Ni-b, 6-71)

219-T. New Columbium-Treated Steel Stakes Claim on Pipe Lines. Iron Age, v. 188, Sept. 28, 1961, p. 94-96.

New steel, XC60, gives a minimum yield strength of 60,000 psi. Cb tends to form a high grain structure thereby increasing mechanical properties. Savings derive from less required steel tonnage because of higher strength, lower field welding and material handling costs and reduced freight costs. (T26r, Q-general, 2-60; ST, Cb, 17-57)

220-T. The Development of Aluminum Off Highway Rock Bodies in Canada. R. A. Esmonde. Society of Automotive Engineers, no. 414 A, 1961, 9 p.

Application of Al-Mg alloys,with good as-welded properties and welding properties, joined by inert gas shielded process to unit design. Instrumentation and procedure for laboratory and field testing of maximum stress and abrasion resistance. (T4a, Q-general; Al, Mg, 7-51)

221-T. How Materials Are Used in the Mercury Capsule. Robert J. Fabian. Materials in Design Engineering, v. 54, Sept. 1961, p. 128-132.

Application of Rene-41 for external shingles on the conical portion of the capsule; glass for windows and antenna shields; Ti for the primary structure of the capsule including the pressurized inner skin; Be for the cylindrical section of the exterior structure; and plastics plus an Al honeycomb combined to provide a rigid, composite couch structure that will carry the astronaut in safety and comfort. (T24e; Ni-b, Ti, Be, Al, NM-d, NM-f42, 7-59)

222-T. Hypersonic Fasteners Use "Exotic" Forms and Materials. Irwin Stambler. Space/Aeronautics, v. 36, Sept. 1961, p. 56-62.

Applications of Cb, Mo and W alloys in fasteners for future aerospace vehicles, to function at temperatures up to 4500° F. Helical cam contact surfaces are used instead of threads.

Coating methods and materials are investigated to provide corrosive resistance. (T7f, T24e, L-general, 1-52, 1-74, 17-57; SGA-g, Cb-b, Mo-b, W-b)

223-T. Silver--A Material of Construction for Handling Hydrochloric Acid and Ammonium Chloride. C. Auchmoody. Engelhard Industries, Inc. Technical Bulletin, v. 1, Mar. 1961, p. 135.

Ag replaces ceramics, silica, Monel and Inconel for fabrication of pipes, gas scrubbers and cyclonic separators in order to prevent corrosion due to HCl and NH_4CL Economic considerations. (T29, R6; Ag, SGA-g)

224-T. (German.) Aluminum as a Substitute for Copper. Elektrie, v. 15, June 1961, p. 182-183.

Applications of Al as a conductor require consideration of development of Al alloys and ply metals having increased strength; anodic insulation of Al conductors; development of soldered, welded and mechanical joints. (T1; Al-b, 7, 17-57)

225-T. Press Brake Forming Aluminum Light Reflectors. Modern Metals, v. 17, Sept. 1961, p. 34.

Forming and assembling of contoured Al reflectors for application in new powerful fluorescent luminaires. Sheet Al, even after anodizing, restricts reflected light to a narrower zone than a painted or porcelain enameled surface. (T1a; Al, 4-53)

226-T. Aluminum in Automotive Parts. Harry E. Phipps. Modern Metals, v. 17, Sept. 1961, p. 56, 58, 62, 64.

Selection of proper Al alloy, temper and processing procedures for parts such as bumpers, wheel covers and body components. Tabulation of the nominal composition of wrought Al sheet alloys used for auto applications. (T21, 17-57; Al-b)

227-T. The Use of Galvanized Strip in Automobile Manufacture in the U. S. A. K. P. Scott and M. H. Davies. Sheet Metal Industries, v. 38, Sept. 1961, p. 631-636, 643.

Application of galvanized steel in critical areas of the main body and underbody assemblies for reducing the effect of corrosion on body strength. Selection of steel for galvanizing and welding parameters for the successful spot welding of Zn coated sheet. (T21, K3n, 1-52; ST, 8-65, 17-57)

228-T. Quenched and Tempered Alloy Steels Now in Rolled Structural Shapes. Industrial Gas, v. 40, Aug. 1961, p. 6-7.

Standard I-beams, channels and angles of USS T-I and T-I Type A constructional alloy steels, 9% nickel steel for cryogenic applications at temperatures as low as -320° F. and HY-80 naval armor steel are commercially produced to replace conventional plate. (T26, 1-67, T2g, 17-57; ST, 4-57)

229-T. (Italian.) Metallurgical Products in Common and Special Steels. Angelo Bellini. Rivista di Meccanica, v. 12, July 1961, p. 45-47.

Classification, chemical composition, physical characteristics and criteria for selection of steels with applications in electric machine parts, taps for threading and molds for plastic material. (T-general; ST, 17-57)

230-T. The Case for the Aluminum Engine. James M. Smith. Society of Automotive Engineers, 385A, 1961, 28 p.

Sand casting, die casting and permanent mold casting of Al alloys to produce accurate, light weight cylinder blocks and heads as well as other accessory parts including intake manifolds, water and oil pumps, oil filter bases and starter and generator end plates. 10 ref. (T21b, E-general, 1-52, 17-57; Al-b)

231-T. Aluminum Foil Solves Antenna Reflector Problem. Western Metalworking, v. 19, Sept. 1961, p. 49.

The foil which forms the reflector is only 0.002 in. thick. A flat sheet of the foil is clamped between rings and heated in an oven to 400° F. At this temperature the foil is blown by compressed air to form a bubble. This bubble is then stretch formed over a mold. A skin of plastic is laid over the back of the foil and cured. The preformed Al honeycomb is laid atop the plastic and bonded in place, giving strength to the reflector. (T1; Al, 4-56, 17-57)

232-T. Nonnuclear, Nonmetallic Usés of Rare Earth. Mark M. Woyski and Walter J. Silvernail. Chapter 21 from "The Rare

Earths". John Wiley & Sons, Inc., New York 16, 1961, p. 512-521.

Application of rare-earth oxide mixtures to the preparation of alloys, polishing and coloring of glass and manufacture of carbon-arc electrodes. (T-general, 17-57; EG-g45, 14-68)

233-T. Nuclear Application of Yttrium and the Lanthanons. W. Kermit Anderson. Chapter 22 from "The Rare Earths". John Wiley & Sons, Inc., New York 16, 1961, p. 522-569.

Nuclear properties indicate applications in various areas including neutron absorbers, hydrogenous-moderator carriers, diluents in oxide-cermet fuels, structural metals and coprecipitants of fission-product poisons. 59 ref. (T11; EG-g45)

234-T. What Steel Shall I Use...for Heat Treated Parts in Automobile, Trucks and Tractors? Metal Progress, v. 80, Oct. 1961, p. 66.

In today's automotive components, parts to be heat treated are made from a variety of carbon and low-alloy steels. Wide use is also made of selective heating processes for hardening. (T21, J-general; ST, 17-57)

235-T. What Metal Shall I Use...for Bearings to be Employed at Elevated Temperatures? H. M. Lampert. Metal Progress, v. 80, Oct. 1961, p. 101.

In selecting materials for high-temperature bearings, engineers must consider the type of environment and the lubricant as well as the maximum temperature that the bearing is to withstand. (T7d, 2-62; SGA-c)

236-T. Fabricating Inert Components for Polaris Propulsion System. G. G. Whipple. Western Machinery and Steel World, v. 52, Sept. 1961, p. 64-68.

Use of V-bearing low-alloy steel with good toughness and weldability to fabricate cylinders either by rolled and welded technique or by shear spinning, followed by molten salt bath heat treatment. (T24e, F26p, G13, J2j, 1-52; AY, V)

237-T. Steam Pipework for High Temperatures. J. S. Blair. Engineering, v. 192, Sept. 22, 1961, p. 394-395.

Creep properties and weld strength of high-temperature steels and super-alloys containing Cr, Ni, Mo, Co, V, W, B, Ti, Cb and Al for applications in steam power stations and nuclear power plants. Design considerations and nondestructive testing methods are outlined. (T11, W11g; SGA-h, ST, 4-60, 17-57)

238-T. Bolt Breakthrough With Cold Worked Stainless. J L Explorer, v. 2, no. 3, 1961, p. 5.

Production of type 304 cold worked austenitic stainless steel breakneck fasteners having minimum shear strength of 70,000 psi. and a tensile strength of over 100,000 psi. Heat treatment after forming is eliminated. (T7f, Q2g, Q27a, 1-52; SS-e)

239-T. An Appreciation of Missile Structures. A. F. Newell. Royal Aeronautical Society, Journal, v. 65, July 1961, p. 483-497.

Review from the viewpoint of design including constructional trends, manufacturing techniques, safety factors, types of body joints, honeycomb construction, thin shells, missile structural design and filament-wound pressure vessel design. Special techniques in milling, welding and design to attain high strength/weight ratios with steels, Al, Ti, Mg, plastic and glass. 17 ref. (T24e, 1-52, 17-51, 17-57; ST, Al, Mg, Ti, NM-d, NM-f42)

240-T. Materials for Reactors--Some Basic Questions. G. W. Greenwood and G. K. Williamson. New Scientist, v. 11, Sept. 28, 1961, p. 787-790.

Use of the electron microscope to study the mechanics of radiation damage, ionization damage, vacancies, crystal lattice distortion, growth, lowered creep strength, hardness and brittleness in uranium, graphite, steel and uranium dioxide caused by neutron collisions. (T11, M26, M28n, Q-general, 2-67; ST, NM-k36, U)

241-T. Aluminum Die Castings Save Weight. Precision Metal Molding, v. 19, Oct. 1961, p. 76.

The application of Al die castings instead of sand castings in the manufacture of strong and light parts of crop dusters. (T3; Al, 5-61)

242-T. Fiberglass Motor Case in Polaris Program. J. A. Kies and H. Bernstein. Report of the NRL (Naval Research

Laboratory) Progress, Sept. 1961, p. 31-32. (Available as PB 171322 from U. S. Office of Technical Services, Washington 25, D.C.) $1.25.

Comparison of the practical limits of usable tensile strength-density ratios for steels, Ti-alloys and fiberglass-reinforced plastics for application in rocket motor cases. Application of filament winding techniques to production of cases. Effect of shrinkage stresses on cracking and crazing and failure mechanisms of the plastics. (T24e, G-general; Q-general, 3-66; NM-d, NM-f42, ST, Ti-b, 17-57)

243-T. Use of Tantalum in Chemical Plants. Corrosion Prevention & Control, v. 8, Sept. 1961, p. v-vi.

Acid-resistant qualities of Ta lead to applications where difficulties in welding are overcome by first riveting strips of metal to the steel base and then welding the Ta liner to these backing strips in an Ar atmosphere. (T29, K1d, 1-52; Ta)

244-T. Clad and Coated Steel Sheets Are Increasingly Used to Minimize Corrosion. Corrosion Prevention & Control, v. 8, Sept. 1961, p. 43-44.

Clad or plastic-coated steel plates can replace stainless steel, Ni or Monel in the construction of pressure vessels and other containers only one surface of which is exposed to corrosion. Cladding metals include Cr, Al, Ti, Cb, Ni and Monel in various proportions. (T26q, T29, 1-22, L26p, R-general, 17-57; ST, Al, Cb, Cr, Ni, Ti)

245-T. Aluminum Bright Trim. Aluminum Courier, no. 55, Sept. 1961, p. 4-14.

The use of anodized Al alloy in automobile trim and household applications. Composition and mechanical properties of alloys based on high purity Al including brightness, film thickness and corrosion resistance. (T21a, T10c, Q-general, 1-52; Al-b, 8-73)

246-T. Aluminum in Practice. Pt. 23. Special Fasteners for Aluminum. Aluminum Courier, no. 55, Sept. 1961, p. 18-22.

The design, applications, composition and the method of setting for various types of blind rivets, bolt fasteners and welding studs used to fasten aluminum sheet and components in aircraft, structural and automotive applications. (T7f, 1-52; Al)

247-T. First Success With Cast Uranium. S. D. Chandley, D. G. Fleck and B. W. Crocker. Modern Castings, v. 40, Oct. 1961, p. 41-44.

Production of spotting rounds for atomic workhead firing of weapons from U-8% Mo using a coaxial melting casting process with a refractory mold. (T2j, E15, 1-52; U, Mo)

248-T. (English.) Some Notes on the Design of Chemical Equipment in Aluminum. E. F. Boon and F. C. A. A. van Berkel. Lastechniek, v. 27, Apr. 1961, p. 84-90.

Alloys are compared as construction materials with BS 1501-151 Grade A steel and AISI 316 stainless steel on the basis of cost, strength, thermal stress and strength-weight ratio. 15 ref. (T29, Q-general, 17-51; Al-b, ST)

249-T. (English.) A Recent Specification for Fusion Welded Aluminum and Aluminum Alloy Pressure Vessels for Class I Duties. F. Smith. Lastechniek, v. 27, Apr. 1961, p. 119-125.

Design requirements, including material selection and mechanical testing, with reference to the specification, in relation to those given for carbon steel in British Standard 1500, 1958, Pt. 2. (T26q, 1-54, 11-62, 17-51, 17-57; Al, 7-51)

250-T. How About Aluminum Auto Bumpers. Products Finishing, v. 26, Oct. 1961, p. 60-68.

Forming and anodizing Al automobile bumpers and electroplating with Ni and Cr. Evaluation of bumper strength, rigidity, dent resistance, brightness, abrasion and corrosion resistance and plating adhesion. (T21c, L17, L19, 1-52; Al, Ni, Cr)

251-T. The Use of Galvanized Strip in Automobile Manufacture in the U. S. Metal Finishing Journal, v. 7, Sept. 1961, p. 346-347.

Applications of steel sheet and strip which has been hot dip galvanized, electrogalvanized or sprayed with Zn-rich paints with an evaluation of coating weights and techniques. (T21, 17-57; ST, 4-53, 8, Zn)

252-T. 11 Die Castings Combine to Cut Cost by 90%. Materials in Design Engineering, v. 54, Oct. 1961, p. 15.

Design of die cast Zn counter assembly cases and gears which replace Al and brass parts produced by machining. (T7, 17-57; Zn, 5-61)

253-T. Electrical Insulations for 930° F. Plus. Robert J. Fabian. Materials in Design Engineering, v. 54, Oct. 1961, p. 100-107.

Comparison of air drying cements, chemical setting cements, sintered materials, alumina powder, silicone resins and hydraulic setting compounds as high temperature potting and incapsulation materials. Properties of ceramic coated, anodized, glass-served, fluoride coated and enamel coated magnet wires of stainless or Ni-clad copper. 16 ref. (T1b, T1m, 17-57; Cu, SS, Ni)

254-T. Aluminum Lightens Power Lines. Materials in Design Engineering, v. 54, Oct. 1961, p. 110.

Applications of Al in the development of extra high voltage transmission lines. (T1b, 17-57; Al)

255-T. The Manufacture of Welded Stainless Steel Tubing for Maximum Corrosion Resistance in Kraft Evaporators. S. E. Doughty and W. J. Comerford. Tappi (Technical Assoc. of the Pulp and Paper Industry), v. 44, Sept. 1961, p. 609-613.

Review of factors which cause failure leads to the recommendation of manufacturing and testing processes and of a method for removing carbonaceous deposits which build up during the operation of the evaporator. (T29r, R-general, 1-52; SS, 7-51)

256-T. Materials of Construction for Chemical Plant--New Metals. A. H. Barber. CPE (Chemical and Process Engineering and Atomic World), v. 42, Oct. 1961, p. 451-458.

Physical and mechanical properties, fabrication, application and economic considerations of Be, Zr, Cb and Ta. 22 ref. (T29, 17-57; Be, Cb, Ta, Zr)

257-T. (Czech.) Quality Improvement of Railroad Rails. Slavomir Horejs. Hutnicke Listy, v. 16, Aug. 1961, p. 533-539.

Improvement of yield and tensile strengths, elongation and area reduction by correct choice of ingot size and shape, heating and rolling parameters, steelmaking methods, cooling velocities and heat treatments after rolling. 19 ref. (T23q, D-general, F23, J-general, Q23, Q27a; 5-59)

258-T. Put Eddy Current to Work. Robert J. Cohen. Product Engineering, v. 32, Oct. 16, 1961, p. 97-99.

Materials include Cu, 302 and 303 stainless steels, Al alloy, brass, Au, Ag and mangamin. Application to the transmittal of small forces to or from moving bodies without contact and to the determination of position and clamp vibrations as in d-c. integrators, a-c. relays, tachometers, inertia dampers, position transducers and servomotor-generators. (T1, P16s, 1-52; SS, Ag, Al-b, Au, Cu-b, Mn-b)

259-T. Superconducting Magnets. R. H. Kropschot and V. Arp. Cryogenics, v. 2, Sept. 1961, p. 1-15.

Review of fundamentals, materials, thin film characteristics, applications and economics. Types include air core solenoids and ferromagnetic cores. Design considerations including electromagnetic forces, time constants, field distribution and operational precautions. 78 ref. (T1g, P15g, 1-67, 10-54)

260-T. Equipment for Ultrahigh Pressures. Alexander Zeitlin. Mechanical Engineering, v. 83, Oct. 1961, p. 37-43.

Operating principles and equipment design for metal,nonmetal and plastic anvils, pistons, rams and cylinders with consideration of yield strength at high pressures. 15 ref. (T7, Q23b, 3-74, 17-57)

261-T. Research for Improved Cutting Tools. J. Taylor and J. S. Jackson. Engineering, v. 192, Oct. 13, 1961, p. 490-491.

Production of cemented carbide cutting tools by powder metallurgy. Tools made of the carbides of W, Ta, Ti, Cb, Cr and V are bonded by Co and tested on 0.4% carbon steel, Nimonic 80 A alloy and 12% chromium stainless steel. Determination of cutting performance with respect to toughness, machinability, wear resistance and tool life. (T6n, Q9; W, Ta, Ti, Cb, Cr, V, 6-69, 17-57)

262-T. Fractured-Race Bearings Broaden Design Horizons. Machinery, v. 68, Sept. 1961, p. 114-118.

Ball bearings designed with split outer race have larger complement of balls which give greater load carrying capacity and longer service life when compared to conventional ball bearings of similar dimensions. (T7d)

263-T. How to Evaluate the Effects of Spline Misalignments. Pt. 2. Earle Buckingham. Machinery, v. 68, Sept. 1961, p. 123-130.

Procedures for analyzing and calculating the various effects of misalignments on straight and crowned splines. Tables of comparative wear and deformation data showing the effects of changing the number of teeth, material hardness and misalignment angle for splines of various steels. (T7, Q9; ST, 17-57)

264-T. British View Materials for Supersonic Transport. P. F. Kiddle and P. J. McKenzie. SAE Journal, v. 69, Nov. 1961, p. 64-66.

An evaluation of Al and Ti alloys, various types of stainless steel and ultra high tensile steels for use in supersonic aircraft. Survey of methods of forming, heat treating and welding these materials to produce optimum mechanical properties including formability and high temperature stability. (T24; SS, Ti, Al, SGB-a, 17-57)

265-T. (Italian.) Nickel Alloys and Steels in Catalytic Reforming Plants. Il Nickel, no. 93, Aug. 1961, p. 7-8.

Pipes made of 25-20 and 35-15 stainless steel and Incoloy are used in catalytic reforming plants to provide high pressure and temperature resistance. Data are given for operating conditions and comparative service life. (T29d, 2-62, 3-74; SS, Ni-b, SGA-h, 17-57)

266-T. Cutting Tool Evaluation. Metal Cuttings, v. 9, Oct. 1961, 7 p.

Methods for evaluating cutting tool and drill performance in terms of cutting speed, tool geometry and size. Effects of lubricants and abrasive and temperature sensitive wear. (T7n, G17, 17-52)

267-T. Aluminum Structural Engineering in Britain. R. M. Davies. Light Metals, v. 24, Oct. 1961, p. 279-284.

Fabrication of roof structures, crane jibs, tunnel linings, bridge decking and sewage structures from H30 WP, N6, H9 WP and H15 WP Al-based alloys. Data are given for 0.1% proof stress, U. T. S. and per cent of elongation of the alloys. (T26, Q-general; Al-b, 17-57)

268-T. Test Stand Evaluation of Oil-Film Roll Neck Bearings. Samuel S. Rickley and Norman A. Wilson. Iron and Steel Engineer, v. 38, Sept. 1961, p. 104-115.

Determination of the operating characteristics of roll neck bearings made of Al, babbitt and Fe bars coated with chrome, Cu, Cd, acrylic, Teflon or epoxy. Bearings are subjected to high-speed rubbing tests under loads up to 180,000 lb. using lubricating oil with viscosities of 200-SSU to 2600-SSU. Bearing temperature varied from 40-270° F. (T7d, Q9; Al, Fe, SGA-c, 8, 17-52)

269-T. A Standardized Method for Rating Roller Bearing Load-Carrying Capacity. E. C. Denne, Jr. Iron and Steel Engineer, v. 38, Sept. 1961, p. 204-213.

Determination of the basic load rating, load carrying capacity and life expectancy of hardened steel roller bearings with spherical, cylindrical and tapered designs. (T7d, 17-52; ST, 17-57)

270-T. Thorium as a Nuclear Fuel. Metal Progress, v. 80, Nov. 1961, p. 106.

Fuel materials under development include both metal alloys and ceramics. These include Th-U alloys with up to 20% (by weight) U, Pu-Th alloys; development of Th-containing ceramics includes work on a wide variety of materials such as mixed oxides, carbides and silicides of Th and U or Th and Pu. (T11g, 10-54; Th, Pu, U, 17-57)

271-T. (German.) Noble Metals in Apparatus Construction. Wilhelm Lehrnickel. Dechema Monographien, v. 39, no. 600-615, 1961, p. 239-253.

Physical and mechanical properties of Au, Ag and Pt metals and corrosion resistance to acids and alkaline compounds at elevated temperatures. Properties of Au, Ag and Pt-plated cast iron and steel parts such as valves, vessels, gaskets and expansion fittings. (T-general, L-general, P-general, Q-general, R-general; EG-c31, 17-57)

272-T. Temperature Sensitivity in Germanium Transistors. James D. Mason. Aerospace Engineering, v. 20, Oct. 1961, p. 27, 95.

Screen testing of moisture contamination effect on the temperature cycling efficiency. The "gettered" transistor, incorporating a molecular sieve material added to the transistor interior, is not affected by temperature sensitivity. (T1k, 2-61; Ge, 17-57)

273-T. (German.) Materials for Missile Construction. R. Scherer. Dechema Monographien, v. 39, no. 600-615, 1961, p. 1-23.

Review of physical and mechanical properties and application of materials for missillconstruction including Be, Mg and Al; hardenable, age hardenable, stainless and toolsteels; superalloys having Fe-Ni, Ni and Co-base; refractory metals Mo, Cb, W; and nonmetals such as cermets, ceramics, graphite, plastics and compound materials. (T24e, P-general, Q-general; EG-a39, EG-d37, EG-a38, NM, ST, 17-57)

SECTION W

PLANT EQUIPMENT

1-W. (Polish.) Air and Gas Recuperator Practice. H. Babezynski, J. Kokot and J. Janovcki. Hutnik, v. 27, July-Aug. 1960, p. 278-283.

Fabrication of cast iron and carbon steel gas and air recuperators for metallurgical furnaces. Methods for control of heat exchange; removal of dust accumulated from gas impurities. (W17; CI, CN, 17-57)

2-W. (Italian.) The Metallurgical Blast Cupola: Theory and Practice. Guglielmo Somigli. Fonderia Italiana, v. 9, July-Aug. 1960, p. 312-320. (W18d, E10a)

3-W. The New Basic-Bessemer Steel Plant of the Societe Cockerill-Ougree (Belgium). Emile Foulon. Acier-Stahl-Steel, v. 25, Sept. 1960, p. 349-354.

Design and construction of plant having five 60-ton converters and producing 90,000 metric tons of raw steel monthly. (W10, 18-67)

4-W. Tube-in-Strip--New Approach to Heat Exchange. Welding Fabrication and Design, v. 4, Sept. 1960, p. 17-18.

Development of a multichannel Cu sheet mill product with integral tubes which can be inflated for use as a heat exchanger. (W13b; Cu, 4-53, 17-57)

5-W. Scrap Honeycomb Makes Tools. W. C. Voth. American Machinist/Metalworking Manufacturing, v. 104, Nov. 28, 1960, p. 137-139.

Use of Al honeycomb bonded with glass cloth, epoxy resin and sheet polyvinyl in strong, lightweight aircraft assembly tools. (W1; Al, RM-p, 7-59, 17-57)

6-W. (Spanish.) Structure, Properties and Use of Chromite-Magnesia Refractory Brick in Openhearth Furnaces. Eugenio Perez Blanco. Instituto del Hierro y del Acero, v. 13, July-Sept. 1960, p. 677-700.

Manufacture of chromite and MgO brick. Composition and structure of these materials and their influence on physical, chemical and mechanical properties of brick. Proposed specification for a 75% chromite-25% MgO brick and requirements for raw materials to be used. 32 ref. (W18r; RM-h)

7-W. (German.) Operational Experiences With a Maerz-Boelens Openhearth Furnace of Novel Design. Caspar Heinrich Pottgiesser, Hans-Jurgen Darmann and Egbert Knackstedt. Stahl und Eisen, v. 80, Oct. 27, 1960, p. 1487-1492.

Lining wear, heat consumption, charging rate and efficiency of a coke oven gas and oil heated 150-ton nontiltable furnace. (W18r)

8-W. Annealing Equipment for the Malleable Iron Foundry. B. A. Ruediger. Foundry, v. 88, Dec. 1960, p. 85-89.

Batch and continuous furnaces for the heat treatment and drawing of pearlitic malleable Fe castings are discussed in terms of their operation, cost, operating expenses and product quality. (W27, J-general; CI-s, 5)

9-W. Analysis of Operational Factors Derived From Hot Strip Mill Tests. John S. Ride. Iron and Steel Engineer, v. 37, Nov. 1960, p. 77-90.

Measurement of interstand speeds for the head and tail ends of a coil in the finishing train of a hot strip mill using a cascaded strain gage technique. Data

for actual drafts taken in each stand, roll separating force, amount of forward slip and amount of slip between mating work and back-up rolls. 3 ref. (W23, 1-52)

10-W. (German-French.) Electronically Steered Resistance Welding Equipment. Pt. 1. F. Gallmann. Zeitschrift fur Schweisstechnik, v. 50, Nov. 10, 1960, p. 330-340.

Electronic equipment used in automatic spot welding, resistance butt welding and flash welding. (W29, K3)

11-W. (Translation-Brutcher no. 4849.) Use of Steel Molds for Large Steel Castings. S. I. Smolenskii, N. N. Guglin, G. F. Zasetskii, A. K. Provornyi and V. A. Tyutev. Liteinoe Proizvodstvo, Mar. 1959, p. 23-26.

Classification of steel molds into five groups by wall thickness, rigidity and bottom design. Their use for production of heavy steel castings whose inside surfaces are shaped by sand cores and the outer ones by the molds. Deep cracks and tears as main reason for extensive mold repairs and final scrapping; effect of mold design features on tears; relation between tears and firechecking; effect of high rigidity on tears. (W19g, 17-51)

12-W. (German.) Steels for Pressure Vessels for Atomic Reactors. E. Zastrow. Stahlbau, v. 29, Nov. 1960, p. 329-333.

Selection and properties of steels used in British (gas cooled) and American (water moderated) reactors for pressure vessels with reference to chemical analysis, mechanical properties, corrosion resistance to CO_2 and water at temperatures to 400° C., aging caused by radiation and radioactive contamination depending on steel compositions. (W11p, Q-general, R-general, 2-60, 2-67; ST, 17-57)

13-W. Electrically Heated Elevator Furnaces for Annealing Blackheart-Malleable Castings. J. M. Paton. Foundry Trade Journal, v. 109, Nov. 10, 1960, p. 595-598.

Design and operation of furnace installations consisting of high and low temperature elevator type furnaces and three movable bogie-hearths. Comparison with furnaces fired by powdered fuel. (W27, J23; CI-s)

14-W. Tungsten-Element Furnace With Zirconia Lining Promising for Heating in the Range of 4000° F. Industrial Heating, v. 27, Dec. 1960, p. 2580, 2582, 2584.

Design of an ultra high temperature furnace for sintering of relatively large pressed tungsten ingots. Refractory for the high temperature zone is composed of pure zirconia. (W26e, H15; W, 5-59)

15-W. (Japanese.) Studies on Quenching Media. Pt. 16. The Effect of Flow Rate on the Cooling of Liquids. Masayoshi Tagaya, Imao Tamura and Yoichi Murakami. Japan Institute of Metals, Journal, v. 24, Oct. 1960, p. 676-679.

Cooling rate curve for Ag specimens of various diameters quenched from 800° C. in oil moving at different rates in turbulent streams. Kinematic equations are derived for determining cooling ability of the oil in terms of flow rate for application to quench tank and agitation equipment design. 3 ref. (W28p, J26; Ag)

16-W. (German.) Construction and Production Experiences With Electric Annealing Furnaces for Semifinished Light Metals. Rudolf Meyer. Neue Hutte, v. 5, Nov. 1960, p. 655-660.

Design of radiation furnaces and one and two-chamber furnaces with longitudinal and transverse air revolution for annealing at temperatures up to 500° C. Construction of furnace from nonheat resistant steel ST 00 and heating elements from Fe-Cr-Al alloys. Power consumption and furnace efficiency. (W27)

17-W. (German.) Modern Heavy Plate Rolling Mill. W. Lehnert. Neue Hutte, v. 5, Nov. 1960, p. 678-683.

Machinery and operations in modern plate rolling from slab, ingot or bloom including transport and storing of blooms and methods of cleaning, heating and descaling. (W23, 1-52)

18-W. (German.) Effect and Elimination of Humidity Absorption of Unalloyed Lime-Basic Electrodes. E. Kauhausen and S. Sadowski. Schweisstechnik, v. 14, Nov. 1960, p. 121-126.

Water absorption in electrodes with and without water-repellant treatment during storing in air with 43-98% relative humidity. Method and apparatus for measuring water content of electrode coatings. Welding faults with emphasis on porosity, caused by

water containing electrode coatings. (W29h, K9)

19-W. Is End in Sight for Stick Electrodes? Harry H. Thomasson. Canadian Metalworking, v. 24, Jan. 1961, p. 51-53.

Analysis of the advantages offered by the coiled electrode. These include in addition to the elimination of the losses and nuisance of the stub ends, freedom from irregularities due to electrode changeover, high rate of metal deposition, high arc density and deep penetration. (W29h)

20-W. Giant Press Lifts Size Limits of Closed Die Forgings. Iron Age, v. 187, Jan. 12, 1961, p. 66-67.

Design and operation of a new forging press having a 20,000 ton capacity unit which makes possible the forging of jet engine parts, turbine cases, shafts and atomic power-plant parts composed of supperalloys, stainless steel, Mo, Ta, W or Cb and also allows vertical extrusion through the press. (W22p, F22; SGA-h, SS, Mo, Ta, W, Cb)

21-W. Unit Couples Heat Treating Steps. Iron Age, v. 187, Jan. 12, 1961, p. 70.

Design and operation of a machine for heat treating forged steel sledge-hammer heads which combines steps of heating, quenching and tempering in a continuous operation. (W27, J-general; ST)

22-W. (German.) 30 Ton Travelling Crane With All-Welded Aluminum Box Type Girder. Heinrich Degenhardt and Egon Bernhoft. VDI-Zeitschrift, v. 102, Dec. 11, 1960, p. 1742-1749.

Design and construction of an all-welded AlMg5F24 alloy single-beam box bridge for a dockyard travelling crane with 30 tons capacity and 25.9 meters span. Data are given for fatigue strength, bending moment and moment of inertia. (W12q, Q7a, Q5; Al-b, Mg)

23-W. Cold Rolling Mill Expansion in New Jersey. Engineer, v. 210, Nov. 28, 1960, p. 651-652.

Integration and expansion of the Athenia Steel Div. of the National Standard Co. to improve quality of high-carbon strip steel. New equipment includes a three-stand tandem wire flattening mill, a strip steel cluster rolling mill, slitting lines, large-capacity annealing furnaces. A wide dimensional variety of flat steels and flattened round wire are produced. (W23f, F23, 1-67; CN)

24-W. Production Eyes New Furnace for Vacuum Heat Treating. Iron Age, v. 187, Jan. 19, 1961, p. 84-85.

Design of an insulated vacuum furnace for heat treating and brazing of stainless and high-temperature alloy parts. (W27, W29m, J-general, K8, 1-73; SS, SGA-h)

25-W. Program Control for Forging Press and Manipulator. Tom Bishop. Metal Progress, v. 79, Jan. 1961, p. 94-96.

Motions of a forging press and a manipulator are controlled by electronic devices so as to avoid necessity for reheating, to speed up forging process and avoid wastage of heat. Hydraulic manipulator diagrammed. (W22p, W12s, 18-74)

26-W. Feeding Billet Furnaces. Metal Industry, v. 97, Dec. 16, 1960, p. 498.

Automatic loading and unloading equipment operated by compressed air is used to feed billets to a rotary hearth furnace for heating. (W18b)

27-W. The Advantages of Aluminum Foil for Transformer Windings. L. W. Swann. Metallurgia, v. 62, Dec. 1960, p. 265-268.

Advantages include minimum weight and winding area of finished coils and simplicity of machines for winding. Methods are given for insulating turns by anodizing and for making electrical connections with the foil winding. (W11r; Al, 4-56, 17-57)

28-W. Press Selection for Cold Forging. H. D. Feldman. Metalworking Production, v. 105, Jan. 11, 1961, p. 51-55.

Comparison of load displacement and work diagrams of hydraulic, knuckle joint and crank presses for extrusion, upsetting, necking and other similar operations. (W22p)

29-W. What Vacuum Furnaces Can Do for You. Steel, v. 148, Feb. 6, 1961, p. 70-73.

Comparison of arc, electron beam, resistance and induction vacuum furnaces for heating, melting and refining operations on steel, Al, Cu, Ni and other alloys. (W18, D8m, C25, 1-52; Al, Cu, Ni)

30-W. Developments at Alcan's Rogerstone Plant. Metallurgia, v. 62, Nov. 1960, p. 201-206.

Description of an expansion program, the main feature of which is the installation of a 144 in. hot mill for a plant producing commercially pure Al, Al-Mn and Al-Mg alloys in building and container sheet, foil stock, general sheet and plate. Review of melting, casting, preheating and rolling operations. (W23, F23; Al-b, Mg, Mn, 4-53, 4-56)

31-W. Vacuum Annealing Copper Wire. Metallurgia, v. 62, Nov. 1960, p. 206.

Design of a bell furnace installation which can operate at 550° C. and is heated by coils of Ni-Cr wire supported around the circumference of the chamber and arranged in three zones. (W27, J23, 1-73; Cu, 4-60)

32-W. (German.) Manual Device for Bulging and Stretching Operations. E. Draeger. Industrie-Anzeiger, v. 82, Dec. 20, 1960, p. 1747-1751.

Construction and operation of a manual device for shaping of plain and sectioned steel and Cu alloy sheets by individual stretching and bulging operations. (W24, G14, G17c; Cu-b, ST, 4-53)

33-W. Die Design for Cold Extrusion. Charles H. Wick. Chapter 14 from "Chipless Machining". Industrial Press, New York, 1960, p. 367-406.

Tolerances, specification, material selection, tooling, properties, treatments for dies, die components and extrusion tools. Design of forward and backward extrusion dies and punches taking into account wear allowances, tolerances and properties of die materials and materials to be extruded. (W24n, 17-51, G5)

34-W. Press Selection for Cold Extrusion. Charles H. Wick. Chapter 15 from "Chipless Machining". Industrial Press, New York, 1960, p. 407-434.

Design and comparison of mechanical and hydraulic presses for cold extrusion of steel parts. Effect of material, die design, surface coating and ram speed on extrusion pressure. 15 ref. (W24g, G5; ST)

35-W. New Plant for Rolling Aluminum. C. G. Keil. Aircraft Engineering, v. 32, Nov. 1960, p. 332.

Continuous strip mill employs powerful rolling equipment to produce Al plate. Al alloy is protected from harmful products of combustion by an indirect method of heating in which the air circulating through the furnace passes around banks of radiant tubes which are heated by marine oil fuel. (W23c, F21b, F23; Al)

36-W. Application of Aerodynamic Design to the "U-Fired" Soaking Pit. J. H. Richards, D. K. Griffiths and C. W. Sidwell. Iron & Steel, v. 33, Dec. 19, 1960, p. 634-636.

Design of regenerative soaking pits for combustion of blast furnace gas in which the gases enter and leave the pit chamber at the same side and travel through the chamber in a U-shaped path. Examination of flow pattern of gases as affected by port size, burner design and burner location. (W20g, F21b, 17-51)

37-W. Aerodynamics of OH Furnace Regenerators. C. Holse. Iron & Steel, v. 33, Dec. 19, 1960, p. 636-640.

Examination of flow patterns and velocity distributions to determine preheat temperature distribution in the regenerated air. Cold trial of openhearth furnace regenerators is shown to be as effective as the use of normal working regenerators in measuring the maldistribution of air and gas flows. (W28q, D2h)

38-W. New, Vacuum Arc Furnace Produces Larger Ingots. Steel, v. 148, Feb. 13, 1961, p. 129.

Production of ingots up to 50 in. in diameter and weighing 60,000 lb. in a new, consumable electrode, vacuum arc furnace. (W18s)

39-W. Fluidized Bed Furnaces Offer Speedy Heat Transfer. Steel, v. 148, Feb. 13, 1961, p. 108-110.

Development of furnaces which feature rapid heat transfer and easy adjustability for heating or quenching of ferrous and nonferrous metals. (W27j)

40-W. TsKBMM Mills for New Rolling Processes. A. I. Tselikov. Paper from "Contemporary Problems of Metallurgy". Consultants Bureau, Inc., New York, 1960, p. 392-415.

Design, operation and performance characteristics of multiple roll and planetary rolling mills. Applications

in tube, thread, cylinder spherical bearing and gear rollings; production of beams and structural shapes with varying cross sections and rolling of profiles and different thickness of sheet. Process mechanism and deformation characteristics of carbon steel, stainless steel, Al and Cu workpieces. 26 ref. (W23, F23, F26r, G12)

41-W. (Book.) The Durgapur Steelworks. F. H. Harley, Editor. 188 p. 1960. A Technical Survey published by Iron & Coal Trades Review, John Adam St. Adelphi, London, W. C. Z., England.

Survey of openhearth furnace steelworks at Durgapur, India, including layout and design of coke ovens, iron and steelmaking plants, rolling mills, foundry and power plant. Construction methods. (W10a, 18-67)

42-W. (French.) Refractory Products in Metallurgy. A. Libon. Revue de Metallurgie, v. 57, Nov. 1960, p. 1033-1038.

Applications of silica-alumina, silica, silica plus silica-alumina and Mg refractories in blast furnaces, basic Bessemer, openhearth and electric steel works. Consumption of refractories from France in 1952-1958. (W17, W18; RM-h, 10-54, 17-57)

43-W. Furnaces for High Temperature Carburizing. Pt. 3. W. H. Holcroft. Industrial Heating, v. 28, Jan. 1961, p. 40-44, 46, 48, 50, 52.

Design of batch and continuous furnaces for high temperature carburizing, including rotary, roller hearth, conveyor chain and pusher types. (W27, J28g, 1-66)

44-W. Low Cost Reversing Narrow Strip Rolling Mill. Australasian Manufacturer, v. 45, Jan. 7, 1961, p. 36.

Stainless steel, Ni, Zr, Pt, Be, Cu, rolled Au plate and the bimetals, indium-aluminum and silver-antimony are reduced to thin gages by a two-high, four-high mill. Mill uses work rolls of alloy toolsteel or solid tungsten carbide. (W23c, F23; Au, Be, Cu, Ni, SS, Zr)

45-W. (Czech.) Service Life of Dies Used in the Forging of Grinding Balls. Josef Benes and Antonin Vach. Sbornik, v. 6, Jan. 1960, p. 85-92.

From a steel bar containing 0.65-0.95% C, 0.6-1.8% Mn and 0.2-0.8% Si, grinding mill balls of 30-120 mm. in diameter are forged at 1050° C. initial temperature and finish-forged at 750-780° C. using in both processes dies of low alloyed Cr-Ni steel. Increase of service life by adequate design and choice of a finishing temperature between 1000 and 900° C. 8 ref. (W22a; AY, 17-57)

46-W. U. S. Pipe's Number 5 Blast Furnace. Pig Iron Rough Notes, no. 119, Autumn 1960, p. 2-22.

Design of a new blast furnace plant producing 1000 tons of high grade pig iron per day and having boiler plant steam generators fired by blast furnace gas, coke oven gas or pulverized coal. Air is preheated by three hot blast stoves. (W17g)

47-W. (Japanese.) Construction of the Tobata No. 1 Blast Furnace and Its Blowing-In. Kumao Ueshima, Makoto Inoue and Naoto Nakamura. Tetsu-to-Hagane (Iron and Steel Institute of Japan, Journal), v. 47, Jan. 1961, p. 8-15.

Description of layout, ore-treating system and charging facilities of a large blast furnace installation in operation for one year. Sintering machine has also been installed to improve productivity. (W17g, 17-51)

48-W. Research on Oxide-Coated Cathodes. H. E. Kern. Bell Laboratories Record, v. 38, Dec. 1960, p. 451-456.

Use of Al, C, Mg, Mn, Si, Ti, W and Zr reducing agents with Ni-alloy base to increase life and efficiency of electron tubes. Diagram of planar diode with thermocouple control. (W3h; Ni-b, AD-q, 17-57)

49-W. Asarcon Benefits Cost Performance of Critical Steam Turbine. Asarco Nonferrous Metals Digest, v. 2, Feb. 1961, p. 5-6.

Application of continuous-cast nickel silver bar stock, leaded bronze and other Cu base alloys in steam turbine and other precision machinery parts. (W11k; Cu-b, 17-57)

50-W. Layout and Design of a Modern Hot Strip Mill. M. F. Dowding, C. Sturdy and A. A. Thomas. Paper from "Production of Wide Steel Strip". Iron and Steel Institute, London, England, May 1960, p. 65-75.

Design requirements for a hot strip mill rolling steel slabs weighing 1000 lb. per in. of width. Layouts for slabyards, roughing and finishing trains and runout tables and coilers are suggested for several types of mills. (W23a, 17-51)

51-W. Study of Mold-Iron Compositions. J. R. Kattus. Blast Furnace and Steel Plant, v. 49, Feb. 1961, p. 159-163.

Service life of ingot molds is correlated with a parameter consisting of various thermal and mechanical properties of the ingot mold material. Thermal fatigue parameters are compared for a ferritic ductile iron and various ingot mold irons. 29 ref. (W19c; Fe, 17-57)

52-W. (German.) Influence of Welding Position and Electrode Diameter on Economics of High-Efficiency Electrodes. W. Carl. Oerlikon Schweissmitteilungen, v. 18, no. 39, 1960, p. 9-23.

Test welding of single fillet welds using h and w position and high efficiency Ti and FeTi-type electrodes of varying diameters. Shape and efficiency of weld; economics. (W29h, K1; Fe, Ti, 17-57)

53-W. Steel Fabricator Modernizes Large Scale Job-Shop. Automation, v. 8, Mar. 1961, p. 75-77.

Use of automatic tandem submerged arc welder and tape controlled three spindle drilling machine in the production of bridge structural members from steel beams and columns. (W29, K1e; ST, 4-57)

54-W. Spheroidizing Coiled Wire. John Malis. Production, v. 47, Mar. 1961, p. 70-73.

Description of an automatic, continuous pusher-type atmosphere controlled furnace with six heating zones for the heat treatment of 1018, 1075 and 1060 steel wire. Gas generators and an Autocarb unit are used to maintain the natural gas furnace atmosphere at 55-60 dew point. (W27, 1-52, J-general; ST, 4-61)

55-W. The Contribution of Metallurgy to Electric Power Generation. L. Rotherham. Iron and Steel Institute, Journal, v. 197, Feb. 1961, p. 109-116.

Operation at temperatures up to 950° F. of alternators with cores of carbon steel, Mo carbon steel, Cr-Mo carbon steel and Cr-Mo-V carbon steel and end rings of austenitic steel, austenitic Mn-Cr steel and magnetic Cr-Mo steel. Generation of steam at temperatures up to 1200° F. in boilers of Cr-Mo steel, Mo-V steel, Cr-Mo-V steel and 18-12-1Nb steel. (W11q; ST, 17-57)

56-W. Welding Equipment Employed for Operations on Missile and Satellite Components. Machinery (London), v. 97, Nov. 1960, p. 1061-1064.

Components produced from Al and Mg sheets are welded by stake, spot and boom welders. (W29, K-general, T24e; Al, Mg, 4-53)

57-W. Spray Cooling Inside Standard Bell Furnace. Metalworking Production, v. 105, Feb. 22, 1961, p. 54-56.

Capacity, operation and design of a bell furnace having an internal water spray cooling system for controlled atmosphere annealing. (W27n)

58-W. Corrosion Problems in Industrial Cooling Waters. W. G. Ashbaugh. Paper from "Short Course on Process Industry Corrosion, Proceedings". National Assoc. of Corrosion Engineers, Houston 2, Tex., 1960, p. 235-237.

Corrosion resistance of Al, Cu and Cu alloys, Ni and Ni alloys, stainless steel and other materials which may be used in heat exchangers in fresh or brackish water. (R4a, R4f, W13b; Al, Cu-b, Ni-b, SS, 17-57)

59-W. Electron Unit Slims Refractory Metal Gap. Steel, v. 148, Mar. 20, 1961, p. 1-15.

Design of an electron beam furnace capable of refining and casting ingots of refractory metals up to 8 in. in diameter and 42 in. long. (W18, C-general; EG-d37)

60-W. Unique Furnace Hardens Mill Rolls. J. M. Dugan. Blast Furnace and Steel Plant, v. 49, Mar. 1961, p. 257-258.

Design of a furnace for uniform heating of rolls to controlled depths with a minimum of scale formation. Description of molding, pouring, annealing, machining, hardening and tempering

operations in roll production. (W27, J-general, W23k)

61-W. Two-Chamber Induction Furnaces for the Melting and Holding of Nonferrous Metals. Karl Tiljander. ASEA Journal, v. 34, no. 3, 1961, p. 47-49.

Design and operation of two-chamber mains-frequency furnaces. Application to the simultaneous melting and holding of nonferrous metals such as Al and Al alloys, Zr and brass. Maintenance requirements, melting capacity and power consumption. (W18a, W19a, C5n; Al-b, Cu-n, Zr)

62-W. (German.) Drawing Force and Drive Power in Multiple Wire Drawing. A. F. Mohrnheim and F. Liehmeier. Draht, v. 12, Feb. 1961, p. 45-50.

Computation of drawing force, die diameter and drawing speed for steels containing 0.1-1% carbon in drawing at constant cross section reduction ratio and at constant drive power. (W28; ST)

63-W. Acme Steel Puts New Hot Strip Mill Into Operation. Iron and Steel Engineer, v. 38, Mar. 1961, p. 161.

Design and operation of a semi-continuous hot strip mill which converts steel slabs into coils with improved surface as a result of greater descaling water pressure available on the mill. (W23c, F23; ST)

64-W. (German.) Modern Hardening Salt-Bath Furnaces With Four Electrodes and Increased Useful Resistance. E. Zmihorski. Harterei-Technische Mitteilungen, v. 15, Apr. 1961, p. 223-227.

Operation and design of a salt-bath furnace for hardening of unusually long steel parts (bath temperatures 600-1350° C.) Heating with two regular and two auxiliary electrodes. Thermal efficiency. (W27m)

65-W. Refractories Hold Key to Nuclear Turbogenerators. M. A. Zipkin and R. B. Brooks. Space Aeronautics, v. 34, Dec. 1960, p. 44-48.

Application of alloys with high-strength low-weight ration, stress resistance and high-temperature stability as construction materials of turbogenerators used for communication and propulsion in space craft with alkaline liquid metals as the working fluid. Comparison of properties of 1ZrCb, 0.5 ZrMo, Hastelloy X, Inconel, A110AT, F48, 316 stainless and 347 stainless alloys. (W11p; Q-general, SGA-h, EG-d37, Mo-b, Cb-b, Ni-b, SS, 17-57)

66-W. Developments in the Melting of Metals for Foundries. British Foundryman, v. 54, Mar. 1961, p. 103-130.

A conference paper covering the character and performance of melting furnaces such as cupolas, air furnaces, pulverized-fuel and oil-fired furnaces, etc., used in production of iron castings, melting furnaces such as arc furnaces, mains frequency furnaces, etc., used for steel castings and melting furnaces for nonferrous melting such as fuel-fired and electric furnaces. 53 ref. (W18)

67-W. (French.) Electric Furnace With Rocking Melting in Rotating Vat for Refining Special Ferrous Alloys. Journal du Four Electrique, Jan. 1961, p. 11-12.

Design, operation and advantages of this furnace type. (W18s)

68-W. Giant Electron Beam Furnace Casts 20-In. Ingots. Western Metalworking, v. 19, Apr. 1961, p. 38-39.

A new Megawatt capacity furnace for commercial scale electron beam melting and vacuum casting of refractory metals, superalloys and special steels with close composition control. (W18, C5, 1-53; SGA-h, EG-d37)

69-W. (Italian.) Filler Rods for Gas Welding of Spheroid Castings. Fonderia, v. 10, Feb. 1961, p. 71-74.

Composition and mechanical properties of Fe filler rods. Impact resistance, flame treatment and microstructure of repaired spheroid castings. (W29h, K2, 18-72; CI)

70-W. Present Trends in Direct Arc Electric Furnace Applications. Pt. 2. Industrial Heating, v. 28, Apr. 1961, p. 728-732.

Report on improvement of power input and control of electric arc furnaces in conjunction with electrode regulation and as related to energy levels and arc resistance. (W17j)

71-W. New Steel Treating Facility of North American Aviation. Christy Lambesis. Industrial Heating, v. 28, Mar. 1961, p. 447-450, 452, 454.

Specialized processing of heat resistant stainless steels is achieved in a flexible installation consisting of a gantry-type hardening furnace, pit-type draw furnace, pit-type subzero coal chamber, two subsurface tanks for water and atmospheric quenching, 14 tanks for chemical cleaning and rinsing, vapor degreaser, drying oven for cleaning metal parts, sand blast machine, metal spray booth and elaborate fluorescent die penetrant inspection installation. (W27, 1-53, J-general; SS)

72-W. Hot Presses Used for Shaping and Forming Exotic Alloys. Industrial Heating, v. 28, Mar. 1961, p. 474, 476, 478, 480.

Blanks of Be, Mo, Ti and other aircraft materials are formed by two or more presses as one large tool by mechanically, hydraulically and electrically interlocking their shuttle tables and mean rams for simultaneous control from a single station. Other aircraft parts are hot formed with a roto forge spinning machine. (W24g, G-general; Be, Mo, Ti)

73-W. Largest Vacuum Electron Beam Melting Furnace Will Produce 20" Ingots of High Temperature Metals and Alloys. Industrial Heating, v. 28, Mar. 1961, p. 484, 486, 488.

Scrap, bulk powder or chips of steel, Ti, Zr, Cb, Mo, Ta and Ni alloys may be melted and cast in 6 ft. ingots 20 in. across in a furnace three stories high and weighing about 25 tons. (W18, C25; Cb, Mo, Ni-b, ST, Ta, Ti, Zr)

74-W. New Furnace Heat Treats Stainless Steel for the B-70's. Christy Lambesis. Metal Treating, v. 12, Apr-May 1961, p. 15, 32.

Heat resistant stainless steels are treated in a gantry furnace capable of heating a maximum load of 10,000 lb. to 2050° F. within ± 10° F. (W27j, J-general; SS, SGA-h)

75-W. New Electrode Is Efficient in Every Position. Welding Fabrication and Design, v. 4, Mar. 1961, p. 19-20.

Electrode for touch or short arc welding permits control of slag and weld metal in all positions. Control of the arc is sustained for the length of the electrode. (W29h)

76-W. Oil Fired Furnaces. J. A. Taylor. Metal Industry, v. 98, Mar. 17, 1961, p. 203-206.

Application of oil fuel in furnaces and soaking pits for high and low-temperature processes in the nonferrous metal industry such as Al and bronze melting, heating of Cu billets and heat treatment of Al alloys. (W20g, W27h)

77-W. Mild Steel Electrodes for Contact Welding. J. W. Addie. British Welding Journal, v. 8, Apr. 1961, p. 135-140.

Report on design, properties and applications of mild steel electrodes for contact welding including comparison with noncontact processes with respect to electrode and welding cost. (W29h; CN, 17-57)

78-W. Automatic Arc Welding Equipment. C. W. J. Vernon. Welding and Metal Fabrication, v. 29, Apr. 1961, p. 141-148.

A review of arc welding equipment and techniques for continuous covered electrode, submerged-arc and semi-automatic submerged-arc welding process. (W29, K1)

79-W. (German.) Metallurgy of Arc Welding Electrodes. P. E. Wimmer. Schweissen und Schneiden, v. 13, Apr. 1961, p. 140-146.

Metallurgical reactions in welding with basic, heat resistant and high-alloyed electrodes are discussed in terms of reduction, oxidation, gas absorption (hydrogen, oxygen, nitrogen) and mutual reactions between basic and acid slag and metal, solid state precipitations, precipitation hardening and strain hardening. Sulphur sensitivity of electrodes; mechanical properties. Trends in electrode development. (W29h)

80-W. (Russian.) Investigation of the Working Space of a Ferrosilicon Furnace. I. T. Zherdev, V. N. Davatts and I. I. Polyakov. Izvestiya Vuz--Chernaya Metallurgiya, Sept. 1960, p. 173-181.

Graphite and steel probes are used to determine contours of ferrosilicon electric furnace cavity with Ammeter and voltmeter measurements of bath to electrode distance. (W17j, D5, 1-54, 17-52)

81-W. (Slovak.) New Filler Materials Used in CSR. Stefan Horvath. Zvaracsky Sbornik, v. 10, Jan. 1961, p. 65-88.

Yield strength, tensile strength, elongation and notch impact strength of

filler metals obtained from electrodes used in the welding of alloy steels and heat resistant steels. Effect of heat treatment for 2 hr. at 400-1000° C. on the hardness. Microstructure of filler metal. Composition and application of various fluxes for submerged arc welding. Survey on soldering and brazing solders. Composition of a wire used in gas welding. 13 ref. (W29h, K-general; AY, SS, SGA-h)

82-W. (Slovak.) Development of an Electrode for Hard Surfacing Operations in Metallurgical Plants. Ladislav Lakatos. Zvaracsky Sbornik, v. 10, Jan. 1961, p. 109-148.

Composition and characteristics of welding wires and composite electrodes used in hard surfacing by the submerged arc process. Coefficients for the transition of C, Mo, W, Cr, V and Mn varying with the concentration of these elements in the filler metal. Shape of beads produced with the composite electrode VUS-PW1 as a function of current density and welding parameters. 11 ref. (W29h, L24)

83-W. High Temperature Alloys for Small Gas-Turbine Application. M. Kaufman. American Society of Mechanical Engineers, Paper no. 61-AV-44, 1961, 9 p.

Review of alloys now available for use in components operating at 1500° F. and over; basic metallurgical structure; their limitations and possible future course of development. 16 ref. (W11m; SGA-h, 17-57)

84-W. Power-Driven Brushes. E. P. Fisher. American Machinist/Metalworking Manufacturing, v. 105, May 15, 1961, p. 149-156.

Guide to power-driven brushes utilization and design. Review of operation variables, metallic and nonmetallic fill materials and construction application in finishing operations on Al, steel, Cu and brass. (W2b, L10; Al, ST, Cu-b)

85-W. Heat Exchanger Design Variables. Arthur J. Makris. Alcoa Review, v. 10, Spring 1961, p. 6-9.

Survey of mechanical and process variables which influence production costs of steel heat exchangers such as construction type, tube length and pitch, pressure drop, fluid selection, temperature approach, MTD and mass, fouling factors and design pressure. (W13b, 17-51; ST, 17-57)

86-W. The Brinsworth Cold-Strip Mill. Sheet Metal Industries, v. 38, May 1961, p. 359-366.

Production of mild steel strip coil in a tandem cold rolling mill with ancillary equipment consisting of a hot strip mill, pickling bath, shearing and trimming lines and skin-pass mill. (W23c, F23; CN)

87-W. Using H-13 Steel in Diecasting Dies. Arthur E. Scholz. Foundry, v. 89, June 1961, p. 76-79.

Properties and application of AISI H-13 hot work toolsteel utilized for Al, Mg and long-run Zn die casting dies, including internal defects, machinability, polishing characteristics, strength, toughness, weldability and erosion and heat checking resistance and heat treatability. (W19n, Q-general; TS-m, 17-57)

88-W. European Experience With the Electrically Heated Soaking Pit. H. C. Bjerke. Iron and Steel Engineer, v. 38, Apr. 1961, p. 92-98.

Various types of soaking pit are described in terms of ingot size and ingot capacity, heating and temperature uniformity and atmosphere and oxidation control. Applications in preheating high-carbon alloy and stainless steel ingots for forging and rolling operations. (W20g, F21b; ST, 4-52)

89-W. Aluminium in Heat Exchange Equipment. Light Metals, v. 24, May 1961, p. 124-126.

Corrosion resistance and high thermal conductivity and specific heat of Al favor its application in the fabrication of heat exchange equipment including fan blades and refrigerator parts. (W13b; Al, 17-57)

90-W. Steel Rolls Used for Hot Strip Mill Table. Iron and Steel Engineer, v. 38, May 1961, p. 164.

Production and operation of carbonitrided steel rolls which give service comparable to cast iron rolls in mill runout tables. Wear, warpage and oxide pickup are discussed as causes of failure. (W23p; ST, 17-57)

91-W. New Control System Developed for Consumable Electrode Vacuum Arc

Melting Furnace. Industrial Heating, v. 28, May 1961, p. 949.

Hydraulic system for electrode motion and arc voltage control used in Ti, Cb, W and Mo melting operations. Voltage sensitivity can be maintained at ± 1/4 volt and total time delay for activation of the electrode shaft is not more than 3 milliseconds. (W18s, C5h, 1-73; Ti, Cb, W, Mo)

92-W. Welding by Plasma Torch. Metalworking Production, v. 105, May 24, 1961, p. 73.

Plasma arc torch and its application in welding and surfacing. (W29d, K6)

93-W. Automatic Vacuum Furnace Lops Off 75% in Braze Time. Western Metalworking, v. 19, May 1961, p. 44.

Automatic vacuum furnace designed for high volume precision work at temperatures to 2250° F. reduces production time during brazing and heat treating of refractory and nuclear equipment metals. (W29m, 17-51)

94-W. Forgings Cost 10-20% Less as a Result of a New Automatic Forging Press. Materials in Design Engineering, v. 53, June 1961, p. 15, 165.

Automatic forging press which handles the entire forging process from billet heating to trimming and hot coining without any manual handling operation. (W22p)

95-W. New Torch Solves Welding Problems. Light Metal Age, v. 19, Feb. 1961, p. 24.

Controlled angle torch permits continuous flexibility of the head, complete controlled angle positioning and longitudinal movement. It can be quickly set and extended to reach recessed areas. Application to the welding of an Al housing. (W29d, K-general; Al)

96-W. Sendzimir Mills Tuned Up to Roll Thin Tin Plate. Steel, v. 148, June 19, 1961, p. 96, 99.

Thin Sn plate with high surface quality and close gage tolerances is produced on a Sendzimir mill, using tungsten carbide work rolls and bearings. (W23b)

97-W. (Spanish.) Testing of Electrodes for Welding of High-Strength Mild and Low-Alloy Steel. Ciencia y Tecnica de la Soldadura, v. 10, Nov-Dec. 1960, p. 3-323, 1-10.

Testing of the quality of the base metal and of the position of electrodes, sheets and tubes to be welded. Heat treatment of welded seam. Necking and notch tests on weldments. (W29h, J-general, Q27g, Q27d; CN, AY, 7-51)

98-W. Electric Furnaces in Iron Foundries. R. Genwo. Demag News, no. 159, 1961, p. 28-34.

Description, operation and application of electric arc and crucible type induction furnaces. (W18a, W18s, 1-53)

99-W. "Walking Beam" Furnace Continuously Heat Treats Wide Range of Missile and Aircraft Steel Forgings. John P. Molony. Industrial Heating, v. 28, June 1961, p. 1084-1088, 1102.

A 50 ft. long furnace is equipped with two parallel walking beams to carry the work through four distinct direct gas-fired zones of control. The furnace is capable of heat treating approximately 10,000-lb. of work per hr., depending on the weight and geometry of the particular steel being treated. (W27, J-general, T24; ST, 4-51)

100-W. Electric Furnace With Shroud Assembly Used to Solution Heat Treat Aluminum Torpedo Shells. B. Wirth and R. W. Coolbaugh. Industrial Heating, v. 28, June 1961, p. 1092-1094, 1096, 1102.

Transfer of shells from the furnace to a quench tank without the use of a drop-bottom furnace is accomplished by a shroud which limits heat loss and an air hoist. (W27j, J-general; Al)

101-W. Variety of Nickel-Alloyed Materials Used in B & W Coal Pulverizers. Inco Nickel Topics, v. 14, Apr. 1961, p. 2-3.

Use of heat treated cast or wrought Ni alloys in shafts, gears, springs, grinding rings and balls in coal pulverizers. (W15n; Ni-b, 4, 5, 17-57)

102-W. Specify Stainless for Steel Mill Sintering Screens. Inco Nickel Topics, v. 14, Apr. 1961, p. 10.

Vibrating feeder screens made of stainless steel alloy containing Cr, Ni and Mo are abrasion, creep, fatigue and corrosion resistant at very high temperatures (1400-1500° F.) (W15p, Q-general, R-general; SS, 17-57, SGA-h)

103-W. (Russian.) Strength of Rolling Mill Universal Shafts During Changing Loads. V. M. Grebenik and F. K. Ivanchenko. Izvestiya VUZ--Chernaya Metallurgiya, Feb. 1961, p. 164-171.

Method of calculating stresses, strains and maximum permissible loading of rolling mill shafts to avoid breakage before expected lifetime (6 yr.) Recommendation of 40X steel with a safety factor of 1.7 in place of ordinary carbon steel with a safety factor of 1.0. 9 ref. (W23p, Q25; AY, 17-57)

104-W. Switch in Tool Steel Solves Breakage Problem. Western Metalworking, v. 19, June 1961, p. 48.

Use of AISI Type L6 matched tool and die steel in place of Type D-2 high-carbon/high-chromium toolsteel as a punch material. Breakage is eliminated in fabricating powdered metal for gear sections, internal splines and other precision parts. (W24p, G2j; TS, 17-57, 6)

105-W. Investigation of Filler Materials for Welding Al-Zn-Mg Alloys. P. T. Houldcraft. British Welding Journal, v. 8, July 1961, p. 360-365.

Report of work carried out to develop a filler material for welding high-strength DTD 683 alloy containing 6% Zn and 2.75% Mg. Tests are conducted on filler alloys containing Zn and Mg in various proportions to determine resistance to cracking. Effect of Si additions. 11 ref. (W29h, K-general; Al-b, Zn, Mg)

106-W. Plating Anodes. Pt. 2. D. J. Fishlock. Electroplating (India), v. 3, Jan-Mar. 1961, p. 14-23.

Applications and advantages of inert, contoured, auxiliary and bipolar anodes. Recommendations of anode shape and type for Cr, Ni, Sn, Ag and Rh plating processes. 9 ref. (W3h; Cr, Ni, Sn, Ag, Rh, 17-57)

107-W. Platinum-Lined Furnaces for Plutonium Production. Platinum Metals Review, v. 5, July 1961, p. 92.

Parts of high temperature electric muffle furnaces are lined with Pt to prevent contamination by HF gas in the extraction of Pu from irradiated U. (W27p, R6g; Pt, 17-57)

108-W. (German.) Influence of Manganese Content on Lifetime of Steel Mill Molds. Karl-Ludwig Kiesel. Neue Hutte, v. 6, May 1961, p. 284-291.

Statistical analysis of lifetime as influenced by Mn content of 2.5-ton ingot and 2.4-ton slab molds of cast iron. Critical Mn content as influenced by C and Si. (W19c, 2-60, 17-52; CI, Mn, 17-57)

109-W. Jig Design for Precision Furnace Brazing. Alexander M. Hanfmann. American Machinist/Metalworking Manufacturing, v. 105, July 10, 1961, p. 97-104.

Use of self-jigging parts or precision brazing jigs to hold parts in precise alignment through the furnace during brazing. Principles of the process are outlined. Dimensions and tolerances for brazing jigs, distribution of tolerance, expansion calculations, prevention of sticking, reduction of friction, jig warpage and criteria for choice of jig materials. (W25b, K8j)

110-W. Abrasive Belts Speed Finishing. John H. Miller. Industrial Finishing (London), v. 13, June 1961, p. 27, 29-30.

Structure and composition of abrasive belts relative to various finishing processes. Abrasive belt grinding and polishing techniques and equipment. (W25c, G18k, L10b, 1-52)

111-W. Low-Hydrogen Electrodes Make Sound Welds in Pressure Piping. Welding Design & Fabrication, v. 34, July 1961, p. 29.

Designing of welded joints, selection of proper welding electrodes and fixing preheat and stress relieving temperatures for thick-walled pipeline used to transport steam from boiler to turbine in an electric power plant. Radiographic and magnetic particle inspection of joints. (W29h, K9p, S13, T26r; 7-51, 17-51)

112-W. (French.) Performance of Quenching Oils. L. Mazet, M. Vauzelle and M. Pothier. Revue de Metallurgie, v. 58, May 1961, p. 417-428.

Study of resistance to thermal deterioration; methods of measuring oxidation; carbon analysis of the oils; influence of oxidation inhibitors; determination of quenching power. The quenching power of paraffinic oils decreases rapidly in use, whereas for naphthenic oils it remains constant or tends to increase. 24 ref. (W28p)

113-W. Annealing Brass Strip. Metal Treatment and Drop Forging, v. 28, July 1961, p. 288.

Electric batch furnaces used for annealing brass strip at 500-600° C. Design and construction details of the furnaces. (W27j, J23; Cu-n, 4-53)

114-W. Induction Unit Cuts Heating Time. Steel, v. 149, July 31, 1961, p. 74-75.

Carbon and alloy steel crankshafts for locomotive or marine diesel engines are heated in 60 cycle equipment to 2200° F. in 22 min. Scale formation is reduced by rapid heating. (W27k, J2g, T7; CN, AY, 9-52)

115-W. Pressing Aluminium. J. W. Lengbridge. Metal Industry, v. 99, July 14, 1961, p. 26-30.

Importance of tool and die design and construction with emphasis on the draw radii of the tool. Examples of pressing tools for circular shells. (W24, 17-51, G1; Al)

116-W. Reactive Metals Start to Roll. Iron Age, v. 188, Aug. 10, 1961, p. 71.

Installation of a 300 kw. electron beam melting furnace and development of a new Cb alloy, Cb-752, permits increased production of rod, bar, wire and plate forms of Cb-base alloys. (W18, C5k; Cb-b, 4-53, 4-55, 4-61)

117-W. Electron Beam Furnace Ups Refractory Metal Capacity. Steel, v. 149, Aug. 7, 1961, p. 71.

Installation of an electron beam furnace and development of an 89% Cb, 10% W, 1% Zr alloy (CB-752) for the production of Cb and V alloys in rod, bar, wire, sheet or plate form. (W18, C5k; Cb-b, V-b, 4-53, 4-55, 4-61)

118-W. Developments in Welding Techniques. Australian Mechanical Engineering, v. 48, July 5, 1961, p. 38-40.

Automatic electric welding of cast iron and stainless steel including advances in the design of gas shielded electrodes and innovations in stud welding. (K1f, W29h; CI, SS)

119-W. Automatic Harden, Quench and Draw Line Automates Heat Treating at Colorado Fuel and Iron Corporation. Fred F. Bach and John Jones. Sunbeam Metal Minutes, v. 20, no. 2, 3 p.

Description and operation of a 100 ft. conveyorized line for heat treating forged steel grinding balls. The continuous gas-fired equipment includes a 43 ft. conveyor type hardening furnace, a 16 ft. conveyor water quench tank, a 48 ft. conveyor draw furnace, safety equipment and an enclosed control panel. (W27g, W28, J-general; ST, 4-51)

120-W. (Translation-Brutcher no. 4999.) Modernizing the OKB-704 Vacuum Furnace for the Annealing of Special Steels in a Magnetic Field. M. N. Solov'ev and I. Z. Naumov. Metallovedenie i Termicheskaya Obrabotka Metallov, Nov. 1959, p. 51-53.

Previously abstracted. See item 36-W, 1960. (W27, J2, 2-64; AY)

121-W. Low Melting Alloys for Pattern Shop Use. O. J. Seeds. Modern Castings, v. 40, Aug. 1961, p. 65-72.

Use of Bi alloys containing Pb, Sn and Cd in fabrication of duplicate patterns for matchplate construction to coat wood patterns to increase wear resistance and prevent warpage, to construct metal shell patterns for core boxes and dryers and to make metal-faced plastic-reinforced molds for plastic patterns. (W19j, W19g; Bi-b, 17-57)

122-W. Report on First 750-Ton Presses by Australian Producer. H. Grafton. Australian Machinery and Production Engineering, v. 14, July 1961, p. 33-35.

Design, control and operation of a mechanical press used to produce wheel centers for truck and bus wheels from mild steel blanks. Blanking, dishing and piercing operations. (W24g, G-general, T21; CN)

123-W. Pinch Trimming and Swaging Dies for Covers. J. M. Goldstein. Machinery (London), v. 99, Aug. 1961, p. 305-306.

Tool design for forming, cutting and finishing kitchenware covers from mild steel and brass sheet. (W24n, G-general, T6n, T10a; CN, Cu-n, 4-53)

124-W. Manufacture of Industrial Heating Equipment at Sunbeam Plant. Industrial Heating, v. 28, Aug. 1961, p. 1489-1492, 1496, 1498, 1502, 1584.

Plant equipment and processes for the production of heat treating furnaces, protective atmosphere generators, power and control panels and quenching equipment. (W27, W28, 1-52)

125-W. Stamping Plant Keeps Up-To-Date With Modern Shearing Line. Metal Products Manufacturing, v. 18, Sept. 1961, p. 27-29.

Processing of cold rolled or stainless steel coils weighing up to 15,000 lb., in 40 and 48 in. widths, by a coil shearing line which can be run at speeds up to 190 ppm. under automatic control. (W24m, 1-52, 4-53, 18-74; ST)

126-W. Electric Furnace Bottoms and Their Maintenance. Erwin Franzen. American Institute of Mining, Metallurgical and Petroleum Engineers, Preprint, Nov. 30-Dec. 2, 1960, 7 p.

Parameters of design and maintenance for electric furnace bottoms. Optimum characteristics include a wide, shallow flat, steep lower bank sections and thick upper bank sections. (W17j, D5, 1-52, 17-51, 18-71)

127-W. Flux and Filler-Wire Developments for Submerged-Arc Welding Hy-80 Steel. W. J. Lewis, G. E. Faulkner and P. J. Rieppel. Welding Journal, v. 40, Aug. 1961, p. 337s-345s.

Development of a flux which improves weld metal impact properties while lowering oxygen and inclusion contents and a filler wire which produces weld metal with notch toughness of over 40 ft-lb. at -80° F. in both as-welded and stress-relieved states. 4 ref. (W29h, K1e; AY, RM-q)

128-W. (Japanese.) Measurement of Erosion of Blast Furnace Linings Using Radioactive Isotopes. Satoshi Hayashi, Gyoichi Suzuki, Tadashi Kobayshi, Hiroshi Iizima and Tetuo Yamaguchi. Tetsu-To-Hagane (Iron and Steel Institute of Japan, Journal), v. 47, Aug. 1961, p. 1143-1147.

Radiation originating from Co^{60} embedded in the bosh, hearth and shaft bricks is used to determine quantity of residual pig iron and refractory erosion during a six-month smelting period. Erosion is dependent largely on length of operation and furnace gas distribution. (Q29g, Q9, 1-59; RM-h, 17-57)

129-W. (Japanese.) Trial Manufacture of a Vacuum Arc-Melting Furnace for Laboratories. Pt. 1. Study of Vacuum and Inert-Arc Melting. Shuzo Takeda, Naoki Nagai, Natsuo Yukawa and Fumio Hori. Tetsu-To-Hagane (Iron and Steel Institute of Japan, Journal, v. 47, Aug. 1961, p. 1148-1155.

Design and operation of an arc furnace using nonconsumable and consumable electrodes for melting in vacuum and inert gas atmospheres. Applications to refractory and high temperature metals including Ti, Mo, Cr and 18-8 stainless steels. Effect of process variable on ingot soundness, composition and gas content. 30 ref. (W18s, C5h, D6, 1-73; SS, SGA-h, Ti, Mo, Cr, EG-d37)

130-W. (German.) Electrometallurgy of Sinter Materials. P. Koenig. Elektrothermie, 1960, p. 132-139.

Use of electric energy in production of metal and nonmetal powder and in sintering and soaking is discussed with emphasis on design and use of continuous and batch type electric furnaces, their temperature ranges and power consumption (W26e, H10b, H15, 1-52, 16-61, 17-51)

131-W. Mammoth Box Girder Supports Crane Runways. Welding Engineer, v. 46, Sept. 1961, p. 74.

Automatic-submerged-arc welding and positioning are used in fabricating a 96-ton, 102-ft. long steel girder. (W12q, K1e, 1-52, 17-57)

132-W. Is Your Heat Processing Out of Date? Steel, v. 149, Sept. 25, 1961, p. 142-148.

Survey of industrial furnaces and heating equipment in terms of the requirements for newly developed metalworking processes. Induction or dielectric, electric fuel-fired furnaces are evaluated for use with various metals in various processes. (W18, W19, 1-52, 17-52)

133-W. (German-French.) Tungsten Electrodes for Tig Welding. Gustav Purt. Schweisstechnik Soudure, v. 51, Aug. 1961, p. 274-279.

Production of electrodes by pressing and sintering of thoriated and zirconated WO_3 powder under hydrogen at 1100° C. and subsequent drawing or hammering at 1600-1200° C. Physical properties such as density and resistivity are evaluated in terms of welding applications. (W29h, H-general, P10a, P15g, 1-52, 17-57; W)

134-W. (French.) Automatic Heat Treatment Equipment. Trempe, no. 37, May 1960, p. 5-12.

Furnaces and conveying equipment used in the quench hardening, case hardening and isothermal heat treatment, in fused baths, of small, medium and heavy parts. (W27, J-general)

135-W. The Mill of the Future--The 80-Inch Hot Strip Mill. Stephen T. Kraft. Paper from "Regional Technical Meetings, 1960". American Iron and Steel Institute, New York 17, 1961, p. 333-342.

Hot rolling of coiled steel strip on a continuous mill at 84 sec. intervals. Design of mill and auxiliary five-zone heat treatment furnaces. (W23c, F23, 1-66, 17-51; ST, 4-53)

136-W. Study of Mold-Iron Compositions. J. R. Kattus. Paper from "Regional Technical Meetings, 1960". American Iron and Steel Institute, New York 17, 1961, p. 463-498.

Performance of gray and Mg-treated irons in ingot mold service and laboratory thermal fatigue tests. A parameter is derived from various material properties for predicting performance in any thermal-fatigue application. 29 ref. (W19c, 17-57, Q7j, 2-60; CI-n, 17-52)

137-W. New Vacuum Arc Remelting Furnace Installation at Standard Steel Works. Industrial Heating, v. 28, Sept. 1961, p. 1724, 1729.

Furnace can produce ingots in diameters of 16-30 in. ranging in weight from 6000-20,000 lb. Materials can be produced exhibiting all of the advantages of vacuum melting--principally superior cleanliness with decreased shrinkage and segregation. (W18s, D5, D8, 1-52, 1-73; ST)

138-W. Vacuum-Casting Installations at River Don Works, Sheffield. Metal Treatment and Drop Forging, v. 28, Aug. 1961, p. 326.

Design and application of an electric arc-melting furnace having a shell diameter of 21 ft. and an electrical rating of 20 mva. for producing alloy steels for casting in vacuum. (W18s, C5h, 1-52; ST)

139-W. (German.) New Heat Exchanger of Aluminum. L. Forgo. Allgemeine Warmetechnik, v. 10, Aug. 1961, p. 149-156.

Design and construction details for heat exchanger of pure (99.5%) Al for condensation power plant. Thermal conductivity and corrosion resistance are evaluated and parameters given for computation of necessary materials requirements. (W11g, P11h, R-general, 17-51, 17-57; Al, ST, Cu)

140-W. Electroplate-Bonded Diamond Wheel. Metalworking Production, v. 105, Sept. 20, 1961, p. 57-59.

Carbide, ceramic, ferrite and hardened steel are ground with wheels made by coating a mild steel base with a layer of diamond particles in an electrolytically deposited matrix. (W25c, G18, K11, L17; CN, NM-k37)

141-W. (German.) Influence of Material and Internal Stresses on Lifetime of Steel Plant Molds. Waldemar Gerkan. Stahl und Eisen, v. 81, Aug. 31, 1961, p. 1192-1203.

Mechanical testing, measurement of thermal conductivity and internal stresses and microstructure investigation of square cast iron molds (3.4-3.75% C, 1.3-1.9% Si, 0.48-0.84% Mn, 0.10-0.12% P, 0.072-0.24% S) for 1-1.7-ton basic Bessemer steel ingots. Molding and casting technology for production of molds. Lifetime as influenced by composition, microstructure and internal stresses of molds. (W19c, D9k, P11, Q-general, 2-60, 3-66, 3-71; CI)

142-W. Recent Blast Furnace Rebuilds at Kaiser Steel Corporation. J. H. Owen. Blast Furnace and Steel Plant, v. 49, Oct. 1961, p. 985-991.

Retailed schedule of operations from blowing out furnace to filling and blowing in, covering a 40-day period. Work includes major repair work and modification of basic furnace lines and associated equipment with installation of a moisture injection system. (W17g, 18-72)

143-W. (Rumanian.) Improvement of Cupola Operation. Al. C. Vissarion. Buletinul Institutului Politehnic Bucuresti, v. 22, July-Sept. 1960, p. 111-128.

Research carried out with three cupola furnaces of 380 and 500 mm. ID showing different arrangements of the tuyeres. Effect of blast air preheating and tuyere arrangement on air and coke consumptions, melt temperature and waste gas composition. 13 ref. (W18d, 10-52)

144-W. Co-Operation Improves Steel Casting Design. British Steelmaker, v. 27, Oct. 1961, p. 325.

Branched ends of an intercept steam chest casting of Mo-V high-temperature steel are tapered to assist directional solidification. The intercept castings are for application in a turbine generator installation. (W11k, E13, 17-51, 17-57; SGA-h, ST, Mo, V)

145-W. The Aerodynamics of Gases in Continuous Furnaces. M. M. Korotaev. Iron and Steel Institute, Journal, v. 199, Sept. 1961, p. 15-18.

Euler's theorem is applied to calculating the dynamics of gas flow in a furnace fired with a preheated gas-air mixture. Calculations are made to determine the effect of roof configuration on pressure distribution along the furnace length. (W20h, F21b)

146-W. Bar and Strip Mill Loopers. W. E. Kollek. Iron and Steel Engineer, v. 38, Oct. 1961, p. 125-132.

Looper operation to control interstand tension on the rolling operation limiting undesirable cross-section reductions. Diagrams and descriptions of subassemblies such as pressure and hydraulic systems and electrical controls. (W23d, 1-52)

147-W. Evaluation of Checker Design. F. D. Nelson. Iron and Steel Engineer, v. 38, Oct. 1961, p. 133-142.

Use of double-pass checker chambers of sufficient volume permits higher combustion air preheat with a subsequent flame temperature increase and a fuel consumption decrease. Comparison with single-pass chambers in terms of efficiency and costs. (W17g, 17-51)

148-W. Limitations of Blast Furnace Stoves. T. R. Schuerger. Iron and Steel Engineer, v. 38, Oct. 1961, p. 143-151.

Stoves are analyzed in terms of operating temperatures. Heat-transfer coefficients, heat-storage data and thermal efficiency are evaluated in terms of heating rates and stack temperatures. Research to determine a compatible analog for the blast furnace stove to be programmed for digital computation. 21 ref. (W17g, 10-52)

149-W. (Italian.) A New Nickel-Chromium Alloy for Solving the Problem of Fuel Oil Ash Corrosion. Il Nickel, no. 93, Aug. 1961, p. 1-6.

Crude processing of fuel oil to raise the fusion point of ashes and to remove V, S and Na corrosive agents. Coating processes, with subsequent corrosion testing, for Cr-Ni and Ni-Cr alloys and steels, Inconel X and Corronel 230 used as industrial heating equipment. (W10e, R7d; SGA-h, SGA-g, Ni-b, Cr-b, SS, 17-57)

SECTION X

INSTRUMENTATION

Laboratory and Control Equipment

1-X. (Italian.) Pyrometry in Italian Steel Mills. Metallurgia Italiana, v. 52, Aug. 1960, p. 205-207.

Description of a satisfactory immersion thermocouple and its use and care. Interpretation of readings. (X9q, S16, D-general)

2-X. (Translation-ConBur.) New Alloys for High Temperature Thermocouples. A. A. Rudnitskii and I. I. Tyurin. Russian Journal of Inorganic Chemistry, v. 5, Feb. 1960, p. 192-196.

Calibration curves and electrical resistivity of thermocouples composed of pure Ir and Rh, binary Pt-Rh and Ir-Rh alloys and ternary alloys of Pt and Rh with Ru, Ir or Pd. 12 ref. (X9q, P15g; Ir-b, Rh-b, Pt-b, 17-57)

3-X. Resistance Apparatus for the Continuous Measurement of Fine Wire Uniformity. A. I. Michaels, T. L. Weaver and R. C. Nelson. Metallurgical Society of AIME, Transactions, v. 218, Dec. 1960, p. 1070-1076.

Design and operation of an apparatus for making continuous nondestructive resistance measurements throughout a spool of fine wire. Highly reproducible results on clean and graphite coated tungsten and molybdenum wires indicating a correlation between tensile strength, hardness and resistivity. (X25, P15g; Mo, W, 4-61)

4-X. (French.) Contribution to the Micrographic Study of Structural Transformations in Solids. Andre Kerleroux. Comptes Rendus, v. 251, Nov. 14, 1960, p. 2169-2170.

Microscopic hot stage which permits heating to 1500° C. and direct observation of specimens under vacuum of specimens. Application to study of martensitic reaction in an Al bronze and corrosion in an Al brass. (X3p, M-general, N6q; Cu-b, Al)

5-X. Further Experiences With Aluminum Wire Seals for Bakeable Vacuum Systems. L. Elsworth, L. Holland and L. Lawrenson. Journal of Scientific Instruments, v. 37, Dec. 1960, p. 449-451.

Al wire is clamped between machined stainless steel flanges and baked at 300° C. to form air tight seals. Joint strength is directly proportional to baking temperature. (X13e; Al, 17-57)

6-X (German.) Temperature Measurement With Platinum-Metal Thermocouples. J. Sagoschen. Metall, v. 15, Jan. 1961, p. 34-40.

Pt-PtRh thermocouples of varying composition for temperature measurements up to 1500° C. Calibration of thermocouples. Properties such as thermoforce and stability. Use of platinum-metal (Ir, Rh, Pt, Ru) based alloys containing Re, Ru, W or Mo in thermocouples for temperature measurement above 1500° C. (X9q; EG-c30, 17-57)

7-X. (German.) Iron-Cobalt Permanent Magnetic Alloys With Additions of Vanadium and Chromium. Pt. B. Practical Applications. H. Fahlenbrach. Technische Mitteilungen Krupp, v. 18, Nov. 1960, p. 91-96.

Application of magnets of small cross section and great length composed of Fe-Co alloys with V and/or Cr in the production of rotary-magnet measuring devices, television correction rings, hysteresis motors and magnetogram carriers. Limitations and advantages in terms of fabricability, remanence and coercive force. 10 ref. (X11g; Fe-b, Co, Cr, V, 17-57, SGA-n)

8-X. (Ukrainian.) Simple Cryostat for Metallographic Research. R. E. Bubley and N. N. Lulicheva. Ukrainskii Fizichnyi Zhurnal, v. 5, Apr. 1960, p. 576-577.

Microscopic examination of phase transformations in alloys at low temperatures with the aid of a new cryostat consisting of a cylinder with a flat and transparent bottom filled with liquid oxygen or nitrogen. Influence of the thickness of transparent bottom on the magnified image of the etched sample. (X24b, M27)

9-X. A New Electron Gun for the Vacuum Evaporation of Metals and Dielectrics. R. Thun and J. B. Ramsey. Paper from "Vacuum Technology Transactions". Pergamon Press, New York, 1959, p. 192-196.

Description of a new electron gun which focuses the electron beam by a spherical field between cathode and anode. Pt, Si, W and Mo may be deposited with the apparatus. (X27a, L25g; Mo, Pt, Si, W)

10-X. Critical Comparison of Moving Bar Impact With Gas Expansion Machines for Dynamic Loading of Metals. J. M. Krafft. Journal of Applied Polymer Science, v. 4, Nov-Dec. 1960, p. 314-331.

Analysis of the motional characteristics of two high-speed testing machines, a gas-pressure and a bar-impact loader, utilized to determine dynamic loading of metals. Variables considered include high-velocity input and stiffness. Data are given for loading patterns and stress-strain curves for steel specimens. 9 ref. (X29, Q25; ST)

11-X. (German.) Problems Involved in Production of Ultra-High Vacuum. E. B. Bas. Schweizer Archiv, v. 27, Feb. 1961, p. 55-61.

Review of materials used in vacuum technology and systems for production of ultra-high (10^{-8} Torr and better) vacuum including Hg-diffusion pump and condensation steam trap, oil diffusion pump and absorption steam trap or condensation steam trap, systems with getter ion pumps, systems with cryo-pumps (He-cooling) and systems with molecular pumps. (X12p, X13e)

12-X. (German.) Vacuum Measuring Techniques. K. G. Muller. Schweizer Archiv, v. 27, Feb. 1961, p. 70-78.

Review of techniques and apparatus for low pressure measurement involving use of liquid (10^{-2} Torr), elastic spring (10^{-5} Torr), thermal conductivity (10^{-5} Torr) and ionization manometers (10^{-11} Torr and better) and the radiometer-manometer. Leak detection with particular reference to halide leak detector (sensitivity 10^{-11} Torr x liter per sec. and better). Application in vacuum engineering. (X19p, 1-52)

13-X. (German.) Experiences With a Novel Temperature Measuring Device on Roll Stands. Rudolf Schneider. Siemens Zeitschrift, v. 35, Feb. 1961, p. 123-125.

Optical temperature measurement of bloom surface after the ninth pass by the "Ardofot" pyrometer with registration by a strip chart compensator at 1100-1200° C. and a measuring error of less than ± 1%. (X9r, F23, 1-66)

14-X. Low Temperature Thermocouples. Pt. 1. Gold-Cobalt or Constantan Versus Copper or Normal Silver. R. L. Powell, M. D. Bunch and R. J. Corruccini. Cryogenics, v. 1, Mar. 1961, p. 139-150.

Application of a new cryostat for calibrating thermocouples at 4-300° K. Measurement of the thermoelectric power and potential difference for constantan, Au-2.1% Co alloy and normal Ag (0.37 at.% Au) versus Cu wires. 21 ref. (X9q, X24b, 2-63; Ag-b, Au-b, Cu-b, 17-57)

15-X. Bimetal Thermometers. E. R. Kebbon. Instruments and Control Systems, v. 34, May 1961, p. 841-845.

Construction and testing of bimetal element industrial thermometers of flat spiral, single helix and multiple helix design. Metals used in construction include Pt, Ag, brass, Au, Ni, Fe and Cr. Invar, a Ni-Fe alloy containing 36-50% Ni, is used as a length-measuring standard for low expansion. 8 ref. (X9n; SGB-a, 17-57)

16-X. Temperature Measurement by Filled System. Robert C. Nelson. Instruments and Control Systems, v. 34, May 1961, p. 849-853.

Review and classification of filled-system (pressure) thermometers using temperature-induced liquid or gas expansion effects with filling media of

Hg, Tl-Hg eutectic amalgam, gas, liquid or vapor and operation ranges varying from -450 to 1400° F. Evaluation of wells and bulbs made of brass, bronze, 304, 316 and 347 stainless steels, Ta, Pb, Ag, Ti, Sb, Cu, Monel, Hastelloy and glass. (X9n, 10-54; SGB-a, 17-57)

17-X. Ceramic-Insulated Thermocouples. L. Scadron. Instruments and Control Systems, v. 34, May 1961, p. 856-857.

Construction of ceramic-insulated thermocouples from multi-alloy assemblies of triaxial and bitriaxial thermocouples are produced by multiple-pass drawing and annealing to temperatures exceeding 1800° F. (X9q; SGB-a, Ni-b, Al-b, NM-f40, 7-59, 17-57)

18-X. Thermocouples for Ultrahigh Temperatures. J. C. Lochman. Metal Progress, v. 80, July 1961, p. 73-76.

Three new thermocouples have been devised for measuring temperatures in the 3000-5000° F. range. Of these, Pt-30% Rh/Pt-6% Rh and Ir/Ir-Rh are useful to about 3700° F. and W/W-26% Re is useful to 4200° F. Better heat insulators are expected to increase the range of the latter combination to 5000° F. (X9q)

19-X. Plasma Research Furthered by Stainless Steel Device. Steel, v. 149, Aug. 28, 1961, p. 74.

Application of 305 stainless steel in the supporting structure, vacuum vessel and coil cases of a unit designed for study of plasmas at very high temperatures. Tensile properties, fabricability and hardness of the steel are given with rolling, welding and other fabrication parameters. (X24f, F-general, K-general, Q-general; SS, 17-57)

20-X. The Metallurgists' Role in Selecting Materials for Business Machines. D. C. Williams. Metal Progress, v. 80, Oct. 1961, p. 79.

When choosing the correct alloy for stress-bearing parts in business machine, the final decision is generally made through the combined effort of the design engineer and the metallurgist. Application of design criteria to selection of tool-steel parts. (X14, J-general; ST, 17-57)

21-X. Investigation Into the Stability and Accuracy of Gauge Blocks. Metal Treatment and Drop Forging, v. 28, Oct. 1961, p. 407-409, 418.

Development of gage blocks that will retain calibrated lengths with high accuracy and less shrinkage. Requirements of thermal expansion, surface finish and flatness, parallelism and resistance. Production of hard, wear resistant surfaces by Cr plating, tungsten carbide or Al_2O_3 coating, Ni-Cr-B alloy spraying and case hardening by carbonitriding, carburizing and cyanide hardening. Materials include 410 stainless and 52100 modified steel. (X20a, J-general, L-general; ST, 17-57)

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ABM Boletim da Associacao Brasileira de Metals, Viaduto Dona Paulina, 8° Andar, Palacio Maria, Sao Paulo, Brazil

Abrasive Workshop, Abrasive Div., Carborundum Co., Niagara Falls, N. Y.

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Acier-Stahl-Steel, 47 rue Montoyer, Brussels 4, Belgium

Aciers Fins et Speciaux Francais, 12 rue de Madrid, Paris, 8e, France

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British Steelmaker, 7 Chesterfield Gardens, Curzon St., London, W. 1, England
British Welding Journal, 54 Princess Gate, London, S. W. 7, England
British Welding Research Assoc., 19 Fitzroy Sq., London, W. 1, England
Brown Boveri Review, 19 Rector St., New York 6, N. Y., and Brown Boveri and Co., Ltd., Baden, Switzerland
Bulletin de l'Academie Polonaise des Sciences, Polska Akademia Nauk, Palac Kultury i Nauki, Warsaw, Poland
Bulletin de l'Institut International du Froid, 177, Blvd. Malesherbes, Paris, 17^{e}, France

C

Cahiers de Physique, 3-5 Blvd. Pasteur, Paris 15^{e}, France
California Mineral Information Service, Div. of Mines and Geology, Ferry Bldg., San Francisco 11, Calif.
Calore, via Tadino 62, Milan, Italy
Cambridge Philosophical Society, Proceedings, 200 Euston Rd., London, N. W., England
Canadian Ceramic Society, Journal, 49 Turner Rd., Toronto, Ont., Canada
Canadian Chemical Processing, 1450 Don Mills Rd., Don Mills, Ont., Canada
Canadian Dept. of Mines and Technical Surveys, Information Circular and Research Reports, Ottawa 2, Ont., Canada
Canadian Journal of Chemistry, Ottawa 2, Ont., Canada
Canadian Journal of Physics, Ottawa 2, Ont., Canada
Canadian Machinery, 481 University Ave., Toronto 2, Ont., Canada
Canadian Metals, Box 4000, Terminal A, Toronto 1, Ont., Canada
Canadian Metalworking, 1450 Don Mills Rd., Don Mills, Ont., Canada

Canadian Mining Journal, Gardenvale, P. Q., Canada
Canadian Mining and Metallurgical Bulletin, 906 Drummond Bldg., Montreal 2, Que., Canada
Canadian Welder, 365 Bannatyne Ave., Winnipeg 2, Man., Canada
Castings, Wingello House, Angel Place, Sydney, Australia
Castings Institute of Japan, Journal, Nippon Imono Kyokai, Totsukamachi, Tokyo, Japan
Castings Research Laboratory, Waseda University, 500, Totsuka 1-chome, Shinjuku-ku, Japan
Cast Iron Pipe News, Suite 3440, Prudential Plaza, Chicago 1, Ill.
Centre Belge d'Etude de la Corrosion, (Rapport) Technique, 24 rue des Chevaliers, Brussels, Belgium
Centre de Documentation Siderurgique (See I.R.S.I.D.)
Ceramic Age, 9th-Chester Bldg., Cleveland 14, Ohio
Ceramics, 1 Stamford St., London, N. W. 6, England
Chaleur et Industrie, 2 rue des Tanneries, Paris 13^{e}, France
Chartered Mechanical Engineer, 1 Birdcage Walk, Westminster, S. W. 1, England
Chase Centaur, Chase Brase and Copper Co., Inc., Waterbury 20, Conn.
Chemical Age, Bouverie House, 154 Fleet St., London, E. C. 4, England
Chemical and Engineering News, 1155 16th St., N. W., Washington 6, D. C.
Chemical and Process Engineering, Leonard Hill House, Eden St., London, N. W. 1, England
Chemical Engineering, 330 W. 42nd St., New York 36, N. Y.
Chemical Engineering Progress, 345 W. 47th St., New York 17, N. Y.
Chemical Processing, 11 E. Delaware Place, Chicago 11, Ill.
Chemical Processing (Australia) 49 Clarence St., Sydney, Australia
Chemical Products and Chemical News, Temple Chambers, Temple Ave., London, E. C. 4, England
Chemical Reviews, 1155 16th St., N. W., Washington 6, D. C.
Chemical Society Journal, Burlington House, Piccadilly, London, W. 1, England
Chemical Society of Japan, Bulletin, No. 5, 1-chome, Surugadai-Kanda, Chiyoda-ku, Tokyo, Japan
Chemical Week, 330 W. 42nd St., New York 36, N. Y.
Chemicke Listy, Hradcany, Hradcanske Nam. 12, Prague 1, Czechoslovakia
Chemicky Prumysl, Spalena 51, Prague 2, Czechoslovakia
Chemie fur Labor und Betrieb, Stuttgarten Str. 20-24, Frankfurt-am-Main, Germany
Chemie-Ingenieur-Technik, Pappelallee 3, Weinheim/Bergstr., Germany
Chemiker Zeitung, Wilckensstr. 3, Heidelberg, Germany
Chemische Rundschau, Buckdruckerei Vogt-Schild AG, Solothurn, Switzerland
Chemist-Analyst, J. T. Baker Chemical Co., Phillipsburg, N. J.
Chemistry and Industry, 14-16 Belgrave Sq., London, S. W. 1, England
Chicago Purchasor, 134 N. LaSalle St., Chicago 2, Ill.
Chimica e l'Industria, via del Politecnico 10, Milan, Italy
Chimie Analytique, 28 rue St. Dominique, Paris 7^{e}, France
Chimika Chronika, 10 Kaningos St., Athens, Greece
Chrome Dur, 28 rue St. Dominique, Paris 7^{e}, France
Ciencia y Tecnica de la Soldadura, Serrano, 144-A, Madrid 6, Spain
Cobalt (English Edition) Battelle Memorial Institute, 505 King Ave., Columbus 1, Ohio
Collection of Czechoslovak Chemical Communication, Artia, Sneeky 30, Prague 2, Czechoslovakia
Colorado Engineer, University of Colorado, Boulder, Colo.
Colorado School of Mines, Mineral Industries Bulletin, Dept. of Publications, Golden, Colo.
Comptes Rendus (France) Quai Des Grands-Augustins 55, Paris, France
Comptes Rendus (Bulgaria) 1 rue 7 Noemvri, Sofia, Bulgaria
Contemporary Physics, 18 Red Lion Court, Fleet St., London, E. C. 4, England
Control, 3 Percy St., London, W. 1, England
Control Engineering, 330 W. 42nd St., New York 36, N. Y.
Copper, 55 S. Audley St., London, W. 1, England

Copper and Brass Bulletin, 420 Lexington Ave., New York 17, N. Y.
Cornell Engineer, 1 Carpenter Hall, Ithaca, N. Y.
Corrosion, 1061 M & M Bldg., Houston 2, Tex.
Corrosion and Protection of Materials, U mestanskeho pivovaru 4, Prague 7, Czechoslovakia
Corrosion et Anticorrosion, 28 rue St. Dominique, Paris, 7e, France
Corrosionomics, Fansteel Metallurgical Corp., Chemical Equipment Div., North Chicago, Ill.
Corrosion Prevention and Control, 97 Old Brompton Rd., S. Kensington, London, S. W. 7, England
Corrosion Technology, Leonard Hill House, 9 Eden St., London, N. W. 1, England
Cost Engineering, Masonic Bldg., Dover, N. H.
Cryogenics, Carlton House, Gt. Queen St., London, W. C. 2, England
Cuivre-Laitons-Alliages, 45 ave. du Roule, Neuilly, Seine, France
Current Engineering Practice, India House, Opp. G. P. O., P. B. no. 1374, Bombay 1, India
Current Science, Bangalore 6, India
Cutting Tool Engineering, 222 E. Willow Ave., Wheaton, Ill.
Czechoslovak Heavy Industry, 13 ul. 28 rijna, Prague, Czechoslovakia
Czechoslovak Journal of Physics, Cukrovarnicka 10, Prague, Czechoslovakia

D

Datamation, 141 E. 44th St., New York 17, N. Y.
Demag News, Demag A. G., Duisburg, Germany
Design Engineering, Box 4000, Terminal A., Toronto 1, Ont., Canada
Design News, 20 N. Wacker Dr., Chicago 6, Ill.
Deutsche Eisenbahn Technik, Berlin, W. 8, Germany
Deutsch Farben-Zeitschrift, Wissenschaftliche Verlagsgesellschaft, Stuttgart, Germany
Deutschen Akademie der Wissenschaften zu Berlin, Abhandlungen, Akademie-Verlag, Berlin 1, Germany
Diamond Data, Industrial Diamond Div., Engelhard Industries, Inc., 113 Astor St., Newark 2, N. J.
Die Casting Engineer, 19382 James Couzens Hwy., Detroit 35, Mich.
Doklady Akademii Nauk SSSR, Akademii Nauk SSSR, Shubinskii per 10, Moscow, Russia
Doklady Balgarskoi Adakemii Nauk, Bulgarska Adademiia ria naukite, Sofia, Bulgaria
Draht, 13a Coburg/Ofr., Germany
Draht (English Edition), Coburg/Ofr., Germany

E

Eaton Engineering Forum, 739 E. 140th St., Cleveland 10, Ohio
Edgar Allen News, 3 St. James Sq., London, S. W. 1, England
Egyptian Academy of Sciences, Proceedings, "Dar el Hikma," 42 Qasr el Aini St., Cairo, Egypt
Egyptian Journal of Chemistry, National Research Center, Technical Bureau, Dokki, Cairo, Egypt
Electrical Engineering, 345 E. 47th St., New York 18, N. Y.
Electrical Manufacturing, 205 E. 42nd St., New York 17, N. Y.
Electrochimica Acta, 122 E. 55th St., New York 22, N. Y.
Electrochemical Society, Journal, 1860 Broadway, New York 23, N. Y.
Electrochemical Society (India), Bulletin, Indian Institute of Science, Bangalore 3, India
Electronic Engineering, 28 Essex St., Strand, London, W. C. 2, England
Electronics, 330 W. 42nd St., New York 36, N. Y.
Electronics Industry, Chestnut & 56th St., Philadelphia, 39, Pa.
Electronics Technician, 480 Lexington Ave., New York 17, N. Y.
Electroplating and Metal Finishing, 85 Udney Park Rd., Teddington, Middlesex, England
Elektro-Anzeiger, Verlag W. Girardet, Essen, Germany
Elektro-Warme, Haus der Technik, Essen, Germany
Elin-Zeitschrift, Volksgartenstrabe 3, Vienna 1, Austria
Endeavour, North Block, Thames House, Millbank, London, S. W. 1, England

Energia Industrial, Avda. de Mayo 963, Buenos Aires, Argentina
Engelhard Industries, Inc., Technical Bulletin, 497 Delancy St., Newark 5, N. J.
Engenharia, Mineracao Metallurgia, rua 7 de Setembro, 135-2, Rio de Janeiro, Brazil
Engineer, 28 Essex St., Strand, London, W. C. 2, England
Engineer, Western Electric Co., Inc., 195 Broadway, New York 7, N. Y.
Engineer and Foundryman, 206-8 Jubilee House, 15 Simmonds St., Johannesburg, South Africa
Engineering, 330 W. 42nd St., New York 36, N. Y.
Engineering (British), 36 Bedford St., London, W. C. 2, England
Engineering Institute of Canada, Transactions, 2050 Mansfield St., Montreal 2, P. Q., Canada
Engineering and Mining Journal, 330 W. 42nd St., New York 36, N. Y.
Engineering Journal, 2050 Mansfield St., Montreal 2, P. Q., Canada
Engineering Materials & Design, Drury House, Russell St., London, W. C. 2, England
Engineering News, 9 Gt. Queen St., London, W. C. 2, England
Engineer's Digest, 120 Wigmore St., London, W. 1, England
English Electrical Review, Queens House, Kingsway, London, W. C. 2, England
l'Equipement Mecanique, 40 rue du Colisee, Paris, 8^{e}, France
Erdol und Kohle, Industrie Verlag von Hernhaussen, Hamburg 11, Germany
Ertzmetall, Postfach 447, Stuttgart, Germany
ETZ-Electrotechnische Zeitschrift, Bismarckstr. 33, Berlin-Charlottenburg 2, Germany
Experimental Mechanics, 21 Bridge Sq., Westport, Conn.
Explorer, Stainless and Strip Div., Jones & Laughlin Steel Corp., Detroit 34, Mich.
Explosivstoffe, Schwetzinger Str. 154, Mannheim 1, Germany

F

Fansteel Metallurgy, Fansteel Metallurgical Corp., North Chicago, Ill.
Faraday Society, Transactions and Discussions, 6 Gray's Inn Sq., London, England
Farbe und Lack, Curt R. Vincentz Verlag, Hannover, Germany
Feingerate Technik, Unter den Linden 12, Berlin, N. W. 7, Germany
Fertigungstechnik, Unter den Linden 12, Berlin, N. W. 7, Germany
Fizika Metallov i Metallovedenie, Akademiia Nauk SSSR, Sverdlovsk, Moscow, Russia
Fonderia, via Mameli 19, Milan, Italy
Fonderia Italiana, via Moscova 16, Milan, Italy
Fonderie, 12 ave. Raphael, Paris 16^{e}, France
Fonderie Belge, 21 rue des Drapiers, Brussels 5, Belgium
Foote Prints, 18 W. Chelten Ave., Philadelphia 44, Pa.
Foundry, Penton Bldg., Cleveland 13, Ohio
Foundry Developments, Long Acre, Nechells, Birmingham 7, England
Foundry Trade Journal, John Adam House, 17-19 John Adam St., London, W. C. 2, England
Franklin Institute, Journal, Ben Franklin Parkway at 20th St., Philadelphia 3, Pa.
Freiberger Forschungshefte, Akademie Verlag, Berlin, Germany
Frontier, Armour Research Foundation, Technology Center, Chicago 16, Ill.
Fusion de Metales, Apartado 667, Monterrey, N. L., Mexico

G

Galvano, 79 ave. des Champs-Elysees, Paris 18^{e}, France
Galvanotechnica, via Campigli 10, Varesa, Italy
Galvanotechnik, Silcherstra. 3, Saulgau 1, Wurtemberg, Germany
Gas-Wasser-Warme, Mariahilfer Str. 63, Vienna 6, Austria
Gazetta Chimica Italiana, viale Liegi, 48, Rome, Italy
General Motors Engineering Journal, 3044 W. Grand Blvd., Detroit 2, Mich.
Giesserei, Breite St. 27, Dusseldorf, Germany
Giesserei-Praxis, Markgrafenstr. 11, Berlin, S. W. 61, Germany
Giessereitechnik, Oranienburger Str. 13-14, Berlin, C. 2, Germany

Gjuteriet, Kungsgatan 80, Stockholm K, Sweden
Gieterij-Centrum, Metaalinstituut T.N.O., Delft, Netherlands
Goldsmiths Journal, 226 Latymer Ct., Hammersmith, London, W. 6, England
Government Industrial Research Institute, Nagoya, Report, Hirate-Machi, Kita-ku, Nagoya, Japan
Grinding and Finishing, 222 E. Willow Ave., Wheaton, Ill.
Grits and Grinds, Norton Co., Worcester, Mass.

H

HAL Technical Society, Digest, Hindustan Aircraft Ltd., Bangalore, India
Harterei-Technischen Mitteilungen, Postfach 13, Bremen 16, Germany
Hawker-Siddeley Technical Journal, 18 St. James Sq., London, S. W. 1, England
Heating, Piping and Air Conditioning, 6 N. Michigan Ave., Chicago 2, Ill.
Helvetica Chimica Acta, Basil 7, Switzerland
Helvetica Physica Acta, Basil 7, Switzerland
Hitachi Review, Hitachi, Ltd., Tokyo, Japan
Hokkaido University, Research Institute for Catalysis, Journal, Hokkaido University, Sapporo, Japan
Hutnicke Listy, Spalena 51, Prague, Czechoslovakia
Hutnik, ul. k. Miarki 12, Aliwice, Poland
Hydraulic Power Transmission, 1 Tuder Dr., Morden, Surrey, England

I

IBM Journal of Research & Development, 590 Madison Ave., New York 22, N. Y.
I/EC (Industrial and Engineering Chemistry), 1155 16th St., N. W., Washington 6, D. C.
Inco Corrosion Reporter, International Nickel Co., Inc., 67 Wall St., New York 5, N. Y.
Indian Ceramics, 17 Sourin Roy Rd., Behala, Calcutta 34, India
Indian Chemical Society, Journal, 92, Upper Circular Rd., Calcutta 9, India
Indian Institute of Metals, Transactions, 31 Chowringhee Rd., Calcutta 16, India
Indian Machine Tools Journal, 75 New Stock Exchange Bldg., Fort Bombay 1, India
Indian Minerals, 29, Chowringhee Rd., Calcutta 16, India
Industria Mineraria, via Sardegna, 14, Rome, Italy
Industrial Chemist, 33 Tothill St., Westminster, London, S. W. 1, England
Industrial Diamond Review, 226 Latymer Ct., Hammersmith, London, W. 6, England
Industrial Finishing, 1142 N. Meridian St., Indianapolis 4, Ind.
Industrial Finishing (British), Arrow Press Ltd., 1 Stamford St., London, S. E. 1, England
Industrial Gas, 48 W. 38th St., New York 18, N. Y.
Industrial Heating, Union Trust Bldg., Pittsburgh 19, Pa.
Industrial Quality Control, 161 W. Wisconsin Ave., Milwaukee 3, Wis.
Industrial Research, 200 S. Michigan, Chicago 4, Ill.
Industrial Science and Engineering, 201 N. Wells St., Chicago 6, Ill.
Industrie-Anzeiger, Verlag W. Girardet, Essen, Germany
Industrieblatt, Neckarstr. 121, Stuttgart O, Germany
l'Industrie Ceramique, 9 rue Lafayette, Paris 9^{e}, France
l'Industrie Chemique le Phosphate, 8, rue de Miromesnil, Paris 8^{e}, France
Industrie Chimique Belge, 32 rue Joseph II, Brussels, Belgium
Industrie des Plastiques Modernes, 40 rue du Colisee, Paris 8^{e}, France
l'Industrie Francaise, 6 rue de Liege, Paris 9, France
Industrielle Organisation, Zurichbergstr. 18, Zurich 7/32, Switzerland
Industry and Welding, 812 Huron Rd., Cleveland 15, Ohio
Ingregnere Mecannica, via Tadino 62, Milan, Italy
Ingenierie e Industria, Santiago del Estero 643, Buenos Aires, Argentina
Institut de Recherches de la Siderurgie (IRSID), 185, rue President Roosevelt, St. Germaine-en-Laye, France
Institute of Marine Engineers, Transactions, 76 Mark Lane, London, E. C. 3, England
Institute of Metal Finishing, Transactions, 32 Great Ormond St., London, W. C. 1, England

Institute of Metals, Journal, 17 Belgrave Sq., London, S. W. 1, England
Institute of Vitreous Enamellers, Bulletin, Ripley, Near Derby, England
Institution of Chemical Engineers, Transactions, 16 Belgrave Sq., London, S. W. 1, England
Institution of Electrical Engineers, Proceedings, Savoy Place, London, W. E. 2, England
Institution of Engineers, Journal, 8 Gokhole Rd., Calcutta, India
Institution of Mechanical Engineers, Proceedings, 1 Birdcage Walk, Westminster, S. W. 1, England
Institution of Mining and Metallurgy, Bulletin, 44 Portland Place, London, W. 1, England
Institution of Production Engineers, Journal, 10 Chesterfield St., London, W. 1, England
Instituto del Hierro y del Acero, Artes Graficas, Madrid, Spain
Instrument Engineer, Biscot Rd., Luton, Beds., England
Instrument Practice, 9 Gough Sq., Fleet St., London, E. C. 4, England
ISA Journal, Instrument Society of America, 313 6th Ave., Pittsburgh 22, Pa.
Instrumentation, Minneapolis-Honeywell Regulator Co., Wayne and Windrim Ave., Philadelphia 44, Pa.
Instruments and Control Systems, 845 Ridge Ave., Pittsburgh 12, Pa.
Instruments & Laboratories, 92 rue Bonaparte, Paris 6^{e}, France
Insulation, 8 Buckingham St., London, W. C. 2, England
Interceram, Herderstr. 2, Lubeck, Germany
International Chemical Engineering, 345 E. 47th St., New York 17, N. Y.
International Journal of Applied Radiation and Isotopes, 4-5 Fitzroy Sq., London, W. 1, England
International Journal of Mechanical Sciences, Headington Hill Hall, Oxford, England
International Science & Technology, 205 E. 42nd St., New York 17, N. Y.
Ion, Paseo del Prado, 18-20 Madrid, Spain
Iowa Engineer, Iowa State College, Ames, Iowa
IRE Transactions of Nuclear Science, 1 E. 79th St., New York 21, N. Y.
Iron Age, Chestnut & 56th St., Philadelphia 39, Pa.
Iron Age Metalworking International, Chestnut & 57th St., Philadelphia 39, Pa.
Iron and Coal Trades Review, John Adam House, 17-19 John Adam St., Adelphi, London, W. C. 2, England
Iron & Steel, Dorset House, Stamford St., London, S. E. 1, England
Iron and Steel Engineer, 1010 Empire Bldg., Pittsburgh 22, Pa.
Iron and Steel Institute, Journal, 4 Grosvenor Gardens, London, S. W. 1, England
Iron and Steel Institute of Japan, Journal, Nippon Tekko Kyokai, Naka-14-go-kan, 10 Marunouchi 2-chome, Chiyoda-ku, Tokyo, Japan
IRSID, 185 rue President Roosevelt, St. Germaine-en-Laye, France
Istanbul Teknik Universitesi Bulletin, Istanbul Teknik Universitesi, Giimiissuyu, Turkey

J

Japan Electrotechnical Laboratory, Bulletin, Nagata-cho, Chiyoda-ku, Tokyo, Japan
Japan Foundrymen's Society, Journal (IMONO), 30, Toyokawa Bldg., no. 4, Higashi 8-chome, Ginza, Chuo-ku, Tokyo, Japan
Japan Journal of Applied Physics, Faculty of Engineering, University of Tokyo, 1, Motofujicho, Bunky-ku, Tokyo, Japan
Japan Journal of the Metal Finishing Society, Kinzoku-Hyomen-Kijutsu-Kyokai, Kobikikan Bldg., 7 Higashi 6 chome, Ginza, Ghuo-ku, Tokyo, Japan
Japan Society of Mechanical Engineers, Journal, Marunouchi Bldg., 561, Chiyoda-ku, 2 Marunouchi, 2-chome, Tokyo, Japan
Japanese Government Mechanical Laboratory, Bulletin, Journal, Reports, Sumiyoshi-cho, Suginami-ku, Tokyo, Japan
Japanese Welding Society, Journal, 29, Higashi Matsushitacho, Kanda, Chiyoda-ku, Tokyo, Japan
Jerindustri, Kristian Augustsgate 23, Oslo, Norway
Jernkontorets Annaler, Kungstradgardsgatan 6, Stockholm-C, Sweden
Journal de Chimie Physique, 11 rue Pierre-Curie, Paris, France

Journal du Four Electrique, 86 rue Cardinet, Paris 17e, France
Journal of the Aeronautical Sciences, 2 E. 64th St., New York 21, N. Y.
Journal of Applied Chemistry, 14 Belgrave Sq., London, S. W. 1, England
Journal of Applied Mechanics, 345 E. 47th St., New York 17, N. Y.
Journal of Applied Physics, American Institute of Physics, 335 E. 45th St., New York 17, N. Y.
Journal of Basic Engineering, 345 E. 47th St., New York 17, N. Y.
Journal of Chemical Physics, 57 E. 55th St., New York, N. Y.
Journal of Electronics and Control, 18 Red Lion Ct., Fleet St., London, E. C. 4, England
Journal of Electronmicroscopy, Japan, Nagata-cho 2-1, Chiyoda, Tokyo, Japan
Journal of Engineering Education, University of Illinois, Urbana, Ill.
Journal of Engineering for Industry, 345 E. 47th St., New York 17, N. Y.
Journal d'informations techniques des Industries de la Founderie, 12 ave. Raphael, Paris 16e, France
Journal of Inorganic and Nuclear Chemistry, 4-5 Fitzroy Sq., London, W. 1, England
Journal of the Less-Common Metals, 110-112 Spuistra., Amsterdam-C, Holland
Journal of the Mechanics and Physics of Solids, 4-5 Fitzroy Sq., London, W. 1, England
Journal of the Metallurgical Club, Royal College of Science and Technology, Glasgow, C. 1, Scotland
Journal of Metals, 345 E. 47th St., New York 17, N. Y.
Journal of Nuclear Energy, 4-5 Fitzroy Sq., London, W. 1, England
Journal of Nuclear Materials, 68-70 N. Z. Voorburgwal, P. O. Box 103, Amsterdam-C, Holland
Journal of Nuclear Physics, 68-70 N. Z. Voorburgwal, P. O. Box 103, Amsterdam-C, Holland
Journal of Petroleum Technology, 800 Fidelity Union Bldg., Dallas 1, Tex.
Journal of Physical Chemistry, Ohio State University, Columbus 10, Ohio
Journal de Physique et la Radium, 12 place Henri Bergson, Paris 8e, France
Journal of Research, National Bureau of Standards, Office of Technical Information, Washington 25, D. C.
Journal of Scientific Instruments, 47 Belgrave Sq., London, S. W. 1, England
Journal of Steel Castings Research, 606 Terminal Tower, Cleveland 13, Ohio
Journal of Technology, Calcutta, Bengal Engineering College, P. O. Botanic Garden, Howrah, India
Journal de la Soudure (see Zeitschrift fur Schweisstechnic)

K

Kaltetchnik, Karlsruhe, Germany
Kohaszati Lapok, Szabadsag Ter 17, Budapest 5, Hungary
Korose a Ochrana Materialu, u Mistanskiho Pinovaru 4, Prague 7, Czechoslovakia
Korrosion, Weinheim/Bergstr., Germany
Kumamato University, Faculty of Engineering, Memoirs, Kumamoto, Japan
Kyoto University, Faculty of Engineering, Memoirs, Kyoto, Japan

L

Lastechniek, Zeestr. 62, 's-Gravenhage, Netherlands
Lead, 292 Madison Ave., New York 17, N. Y.
Light Metal Age, 549 W. Randolph St., Chicago 6, Ill.
Light Metals, Bowling Green Lane, London, E. C. 1, England
Light Metals (Japanese), Hibuija Asai Seinei Bldg., no. 2, 1 Yuraku-cho, Chi yo Da-ku, Tokyo, Japan
Light Metals Bulletin, Norfolk House, St. James Sq., London, S. W. 1, England
Linde Tips, Linde Air Products, 30 E. 42nd St., New York, N. Y.
Liteinoe Proizvodstvo, Gosudarstvennoe Nauchno-Tekhnicheskoe, Izdatel 'stvo Mashinostroitel '-noi Literatury, Moscow, Russia
Lubrication, 135 E. 42nd St., New York 17, N. Y.
Lubrication Engineering, 84 E. Randolph St., Chicago 1, Ill.

M

Macchine, via Mameli, 19, Milan, Italy
Machine and Tool Blue Book, 222 E. Willow Ave., Wheaton, Ill.

Machine Design, Penton Bldg., Cleveland 13, Ohio
Machine Moderne, 15, rue Bleue, Paris 9e, France
Machine Production and Canadian Supply, 341 Church St., Toronto 2, Ont., Canada
Machinery, 93 Worth St., New York 13, N. Y.
Machinery Lloyd, 33 Tothill St., Westminster, London, S. W. 1, England
Machinery (London), Clifton House, 83-117 Euston Rd., London, N. W. 1, England
Machinery Market, 146a Queen Victoria St., London, E. C. 4, England
Magazine of Standards, 70 E. 55th St., New York 17, N. Y.
Magnafacts, 7300 W. Lawrence Ave., Chicago 31, Ill.
Magnesium Products, 1950 W. Fort St., Detroit 16, Mich.
Maschinenbautechnik, Oranienburger Str. 13-14 Berlin, C. 2, Germany
Mass Production, 4 Ludgate Circus, London, E. C. 4, England
Materialprufung, Unter den Eichen 87, Berlin-Dahlem, Germany
Materials in Design Engineering, 430 Park Ave., New York 22, N. Y.
Mechanical Engineering, 345 E. 47th St. New York 17, N. Y.
Mechanical World & Engineering Record, 31 King St. W., Manchester 3, England
Mededelingen, 41 Stadhouderslaan, The Hague, Netherlands
Memoires Scientifiques de la Revue de Metallurgie, 25 rue de Clichy, Paris 9e, France
Messe-Kurier, Postfach 6147, Hannover 6, Germany
Metaalbewerking, Bellamypark 58, Vlissingen, Netherlands
Metaalinstituut T.N.O. Gietergcentrum, Delft, Netherlands
Metal Age, Birkett House, 27 Albemarle St., London, W. 1, England
Metal Bulletin, Birkett House, 27 Albemarle St., London, W. 1, England
Metal Cuttings, National Twist Drill & Tool Co., Rochester, Mich.
Metal Fabricator, 104 Shaw Ave., Edgewood, R. I.
Metal Finishing, 381 Broadway, Westwood, N. J.
Metal Finishing Journal, John Adam House, 17-19 John Adam St., Adelphi, London, W. C. 2, England
Metal Forming and Fabricating, 201 N. Wells St., Chicago 6, Ill.
Metal Industry, Dorset House, Stamford St., London, S. E. 1, England
Metal Powder Assoc., Proceedings, 420 Lexington Ave., New York 17, N. Y.
Metal Powder Report, 59-62 High Halborn, London, W. C. 1, England
Metal Products Manufacturing, Elmhurst, National Bank Bldg., York at Park Ave., Elmhurst, Ill.
Metal Progress, American Society for Metals, Metals Park, Ohio
Metal Removing, 179 Winton Rd., N., Rochester 10, Pa.
Metal Treating, 271 North Ave., New Rochelle, N. Y.
Metal Treatment, 2 Caxton St., Westminster, London, S. W. 1, England
Metal Treatment and Drop Forging, John Adam House, 17-19 John Adam St., Adelphi, London, W. C. 2, England
Metalen, Scheepmakerastr. 1-3-'s Gravenhage, The Hague, Netherlands
Metall, Hubertusallee 18, Berlin-Grunewald, Germany
Metall-Reinigungund Vorbehandlung, Schloss Str. 2-6, Hamburg-Wandsbek, Germany
Metallen, AB Svenska Metallverken, Vasteras, Sweden
Metalloberflache, Munich 27, Germany
Metallurgia, 31 King St., W. Manchester 3, England
Metallurgia Italiana, via Moscova 16, Milan, Italy
Metallurgical Reviews, 17 Belgrave Sq., London, S. W. 1, England
Metallurgie, 26 Place Tolozan, Lyon, France
Metallurgie et la Construction Mechanique, 79 ave. des Champs-Elysees, Paris 8e, France
Metallurgist, 4 Grosvenor Gardens, London, S. W. 1, England
Metals, 10 Ichibancho, Chiyoda-ku, Tokyo, Japan
Metals Engineering Quarterly, Metals Park, Ohio
Metalurgia Moderna, Santa Fe 1145, Buenos Aires, Argentina
Metalurgia si Constructii de Masini, Str. Ion Ghica 3, Bucarest, Rumania
Metalurgia y Electricidads, 7 Cuesta de Santo Domingo, Madrid, Spain
Metalworking, 221 Columbus Ave., Boston 16, Mass.

Metalworking News, 7 E. 12th St., New York 3, N. Y.
Metalworking Production, 95 Farringdon St., London, E. C. 4, England
Metaux-Corrosion-Industries, 32 rue du Marechal-Joffre, St. Germain-en-Laye, France
Microchemical Journal, 250 Fifth Ave., New York 1, N. Y.
Microtechnic, 23 ave. de la Gare, Lousanne, Switzerland
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Pratique des Industries Mecaniques, 92 rue Bonaparte, Paris 6e, France
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SUBJECT INDEX

Since the annotations in this book are grouped into broad classes on the basis of process or property, the major emphasis in the index has been placed on materials, products and applications. Entries under the names of processes and properties usually refer only to general treatments of the subject. Wherever possible, items have been indexed under the name of the material or the type of material (metals, alloys, and metal forms) or product. For example, material on the rolling of aluminum appears as a subhead under the main entry "Aluminum alloys," and not under the main entry "Rolling." It is suggested that the reader look under both the metal and alloy in seeking particular information. For instance, Aluminum, rolling and Aluminum alloys, rolling or even perhaps Aluminum-copper alloys, rolling.

The ASM-SLA Metallurgical Literature Classification, International (Second) Edition, has been used as an authority list, since this contains generally accepted and standardized metallurgical terminology and concepts. Index headings, therefore, fall mainly into the categories of materials (or products), forms of materials, properties, processes, and influencing factors, arrayed in approximately that order.

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